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R00001 THIS LGC PROGRAM IS INTENDED FOR USE IN THE LM DURING THE MANNED LUNAR LANDING MISSION OR ANY SUBSET THEREOF.
R00002 THE DETAILS OF IMPLEMENTATION ARE SPECIFIED IN REPORT R-567, AS AMENDED.

R000025 GUIDANCE SYSTEM OPERATIONS PLAN
R00003 FOR MANNED LM EARTH ORBITAL AND LUNAR MISSIONS
R000035 USING PROGRAM LUMINARY

R00004 THIS PROGRAM AND R-567 HAVE BEEN PREPARED BY THE INSTRUMENTATION LABORATORY, MASSACHUSETTS INSTITUTE OF
R00005 TECHNOLOGY 75 CAMBRIDGE PARKWAY, CAMBRIDGE, MASSACHUSETTS UNDER PROJECT 55-238-70, SPONSORED BY THE MANNED
R00006 SPACECRAFT CENTER OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, CONTRACT NAS 9-4065

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R0103 SYMBOL TABLE LISTING
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P0113 VERB LIST FOR LUMINARY

R0114 REGULAR VERBS

R0115 00 NOT IN USE
R0116 01 DISPLAY OCTAL COMP 1 IN R1
R0117 02 DISPLAY OCTAL COMP 2 IN R1
R0118 03 DISPLAY OCTAL COMP 3 IN R1
R0119 04 DISPLAY OCTAL COMP 1,2 IN R1,R2
R0120 05 DISPLAY OCTAL COMP 1,2,3 IN R1,R2,R3
R0121 06 DISPLAY DECIMAL IN R1 OR R1,R2 OR R1,R2,R3
R0122 07 DISPLAY DP DECIMAL IN R1,R2 (TEST ONLY)
R0123 08
R0124 09
R0125 10
R0126 11 MONITOR OCTAL COMP 1 IN R1
R0127 12 MONITOR OCTAL COMP 2 IN R1
R0128 13 MONITOR OCTAL COMP 3 IN R1
R0129 14 MONITOR OCTAL COMP 1,2 IN R1,R2
R0130 15 MONITOR OCTAL COMP 1,2,3 IN R1,R2,R3
R0131 16 MONITOR DECIMAL IN R1 OR R1,R2 OR R1,R2,R3
R0132 17 MONITOR DP DECIMAL IN R1,R2 (TEST ONLY)
R0133 18
R0134 19
R0135 20
R0136 21 LOAD COMPONENT 1 INTO R1
R0137 22 LOAD COMPONENT 2 INTO R2
R0138 23 LOAD COMPONENT 3 INTO R3
R0139 24 LOAD COMPONENT 1,2 INTO R1,R2
R0140 25 LOAD COMPONENT 1,2,3 INTO R1,R2,R3
R0141 26
R0142 27 DISPLAY FIXED MEMORY
R0143 28
R0144 29
R0145 30 REQUEST EXECUTIVE
R0146 31 REQUEST WAITLIST
R0147 32 RECYCLE PROGRAM
R0148 33 PROCEED WITHOUT DSKY INPUTS
R0149 34 TERMINATE FUNCTION
R0150 35 TEST LIGHTS
R0151 36 REQUEST FRESH START
R0152 37 CHANGE PROGRAM (MAJOR MODE)
R0153 38
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PO155 EXTENDED VERBS

RO156 40 ZERO CDU-S
RO157 41 COARSE ALIGN CDU-S
RO158 42 FINE ALIGN IMU
RO159 43 LOAD IMU ATT ERROR METERS
RO160 44 TERMINATE RR CONTINUOUS DESIGNATE (V41N72 OPTION 2)
RO161 45
RO162 46
RO163 47 INITIALIZE AGS (R47)
RO164 48 REQUEST DAP DATA LOAD ROUTINE (R03)
RO165 49 REQUEST CREW DEFINED MANEUVER ROUTINE (R62)
RO166 50 PLEASE PERFORM
RO167 51
RO168 52 MARK X-RETICLE
RO169 53 MARK Y-RETICLE
RO170 54 MARK X OR Y-RETICLE
RO171 55 INCREMENT AGC TIME (DECIMAL)
RO172 56 TERMINATE TRACKING (P20 + P25)
RO173 57 PERMIT LANDING RADAR UPDATES
RO174 58 INHIBIT LANDING RADAR UPDATES
RO175 59
RO176 60 COMMAND LR TO POSITION 2.
RO177 61 DISPLAY DAP FOLLOWING ATTITUDE ERRORS.
RO178 62 DISPLAY TOTAL ATTITUDE ERRORS WITH RESPECT TO NOUN 22.
RO179 63 SAMPLE RADAR ONCE PER SECOND (R04).
RO180 64 REQUEST S-BAND ANTENNA ROUTINE (R05)
RO181 65 DISABLE U AND V JET FIRINGS DURING DPS BURNS.
RO182 66 VEHICLES ARE ATTACHED. MOVE THIS VEHICLE STATE TO OTHER VEHICLE.
RO183 67 DISPLAY W MATRIX
RO184 68 CAUSES IMMEDIATE SWITCHING FROM P63 TO P64.
RO185 69 CAUSE RESTART
RO186 70 UPDATE LIFTOFF TIME
RO187 71 UNIVERSAL UPDATE-BLOCK ADR
RO188 72 UNIVERSAL UPDATE-SINGLE ADR
RO189 73 UPDATE AGC TIME (OCTAL)
RO190 74 INITIALIZE ERASABLE DUMP VIA DOWNLINK
RO191 75 ENABLE U AND V JET FIRINGS DURING DPS BURNS.
RO192 76 MINIMUM IMPULSE COMMAND MODE
RO193 77 RATE COMMAND AND ATTITUDE HOLD MODE
RO194 78 LR SPURIOUS RETURN TEST START (R77)
RO195 79 LR SPURIOUS RETURN TEST STOP
RO196 80 UPDATE LEM STATE VECTOR
RO197 81 UPDATE CSM STATE VECTOR
RO198 82 REQUEST ORBIT PARAM DISPLAY (R30)
RO199 83 REQUEST REND PARAM DISPLAY (R31)
RO200 84
RO201 85 DISPLAY RR LOS AZ AND ELEV
RO202 86
RO203 87

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R0204 88
R0205 89 REQUEST RENDEZVOUS FINAL ATTITUDE ROUTINE (R63)
R0206 90 REQUEST RENDEZVOUS OUT OF PLANE DISPLAY ROUTINE (R36)
R0207 91 DISPLAY BANK SUM
R0208 92 OPERATE IMU PERFORMANCE TEST (P07)
R0209 93 ENABLE W MATRIX INITIALIZATION
R0210 94
R0211 95 NO UPDATE OF EITHER STATE VECTOR (P20 OR P22)
R0212 96 INTERRUPT INTEGRATION AND GO TO P00
R0213 97 PERFORM ENGINE FAIL PROCEDURE
R0214 98
R0215 99 PLEASE ENABLE ENGINE

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R0216 IN THE FOLLOWING NOUN LIST THE :NO LOAD: RESTRICTION MEANS THE NOUN
 R0217 CONTAINS AT LEAST ONE COMPONENT WHICH CANNOT BE LOADED, I.E. OF
 R0218 SCALE TYPE L (MIN/SEC), PP (2 INTEGERS) OR TT (LANDING RADAR POSITION).
 R0219 IN THIS CASE VERBS 24 AND 25 ARE NOT ALLOWED, BUT VERBS 21, 22 OR 23
 R0220 MAY BE USED TO LOAD ANY OF THE NOUN:S COMPONENTS WHICH ARE NOT OF THE
 R0221 ABOVE SCALE TYPES.
 R0222 THE :DEC ONLY: RESTRICTION MEANS ONLY DECIMAL OPERATION IS ALLOWED ON
 R0223 EVERY COMPONENT IN THE NOUN. (NOTE THAT :NO LOAD: IMPLIES :DEC ONLY:.)

R0224	NCRMAL NOUNS	COMPONENTS	SCALE AND DECIMAL POINT	RESTRICTIONS
R0226	00 NOT IN USE			
R0227	01 SPECIFY MACHINE ADDRESS (FRACTIONAL)	3COMP	.XXXXX FOR EACH	
R0228	02 SPECIFY MACHINE ADDRESS (WHOLE)	3COMP	XXXXX. FOR EACH	
R0229	03 SPECIFY MACHINE ADDRESS (DEGREES)	3COMP	XXX.XX DEG FOR EACH	
R0230	04 ANGULAR ERROR/DIFFERENCE	1COMP	XXX.XX DEG	
R0231	05 ANGULAR ERROR/DIFFERENCE	1COMP	XXX.XX DEG	
R0232	06 OPTION CODE	3COMP	OCTAL ONLY FOR EACH	
R0233	LOADING NOUN 07 WILL SET OR RESET SELECTED BITS IN ANY FRASABLE REGISTER			
R0234	07 ECADR CF WORD TO BE MODIFIED	3COMP	OCTAL ONLY FOR EACH	
R0235	ONES FOR BITS TO BE MODIFIED			
R0236	1 TO SET OR 0 TO RESET SELECTED BITS			
R0237	08 ALARM DATA	3COMP	OCTAL ONLY FOR EACH	
R0238	09 ALARM CODES	3COMP	OCTAL ONLY FOR EACH	
R0239	10 CHANNEL TO BE SPECIFIED	1COMP	OCTAL ONLY	
R0240	11 TIG OF CSI	3COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC	DEC ONLY MUST LOAD 3 COMPS
R0242				
R0244				
R0245	12 OPTION CODE	2COMP	OCTAL ONLY FOR EACH	
R0246	(USED BY EXTENDED VERBS ONLY)			
R0247	13 TIG OF CDH	3COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC	DEC ONLY MUST LOAD 3 COMPS
R0249				
R0251				
R0252	14 CHECKLIST	3COMP	XXXXX. FOR EACH	
R0253	(USED BY EXTENDED VERBS ONLY)			
R0254	(NOUN 25 IS PASTED AFTER DISPLAY)			
R0255	15 INCREMENT MACHINE ADDRESS	1COMP	OCTAL ONLY	
R0256	16 TIME OF EVENT	3COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC	DEC ONLY MUST LOAD 3 COMPS
R0258	(USED BY EXTENDED VERBS ONLY)			
R0260				
R0261	17 SPARE			
R0262	18 ALTO MANEUVER BALL ANGLES	3COMP	XXX.XX DEG FOR EACH	
R0263	19 SPARE			
R0264	20 ICCU ANGLES	3COMP	XXX.XX DEG FOR EACH	
R0265	21 PIPAS	3COMP	XXXXX. PULSES FOR EACH	
R0267	22 NEW ICCU ANGLES	3COMP	XXX.XX DEG FOR EACH	
R0268	23 SPARE			
R0269	24 DELTA TIME FOR AGC CLOCK	3COMP	00XXX. HRS 000XX. MIN 0XX.XX SEC	DEC ONLY MUST LOAD 3 COMPS
R0271				
R0273				

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R0274	25	CHECKLIST	3COMP	XXXXX. FOR EACH	
R0275		(USED WITH PLEASE PERFORM ONLY)			
R0276	26	PRIORITY/DELAY, ADRES, BBCON	3COMP	OCTAL ONLY FOR EACH	
R0277	27	SELF TEST ON/OFF SWITCH	1COMP	XXXXX.	
R0278	28	SPARE			
R0279	29	SPARE			
R0280	30	SPARE			
R0281	31	SPARE			
R0282	32	TIME FROM PERIGEE	3COMP	00XXX. HRS	DEC ONLY
R0284				000XX. MIN	MUST LOAD 3 COMPS
R0286				0XX.XX SEC	
R0287	33	TIME OF IGNITION	3COMP	00XXX. HRS	DEC ONLY
R0289				000XX. MIN	MUST LOAD 3 COMPS
R0291				0XX.XX SEC	
R0292	34	TIME OF EVENT	3COMP	00XXX. HRS	DEC ONLY
R0294				000XX. MIN	MUST LOAD 3 COMPS
R0296				0XX.XX SEC	
R0297	35	TIME FROM EVENT	3COMP	00XXX. HRS	DEC ONLY
R0299				000XX. MIN	MUST LOAD 3 COMPS
R0301				0XX.XX SEC	
R0302	36	TIME OF AGC CLOCK	3COMP	00XXX. HRS	DEC ONLY
R0304				000XX. MIN	MUST LOAD 3 COMPS
R0306				0XX.XX SEC	
R0307	37	TIC OF TPI	3COMP	00XXX. HRS	DEC ONLY
R0309				000XX. MIN	MUST LOAD 3 COMPS
R0311				0XX.XX SEC	
R0312	38	TIME OF STATE BEING INTEGRATED	3COMP	00XXX. HRS	DEC ONLY
R0314				000XX. MIN	MUST LOAD 3 COMPS
R0316				0XX.XX SEC	
R0317	39	SPARE			

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			COMPONENTS	SCALE AND DECIMAL POINT	RESTRICTIONS
P0318	MIXED NOUNS				
R0320	40	TIME FROM IGNITION/CUTOFF	3COMP	XXBXX MIN/SEC	NO LOAD, DEC ONLY
R0322		VG,		XXXX.X FT/SEC	
R0323		DELTA V (ACCUMULATED)		XXXX.X FT/SEC	
R0324	41	TARGET AZIMUTH,	2COMP	XXX.XX DEG	(FOR SYSTEM TEST)
R0326		ELEVATION		XX.XXX DEG	
R0327	42	APOGEE,	3COMP	XXXX.X NAUT MI	DEC ONLY
R0329		PERIGEE,		XXXX.X NAUT MI	
R0330		DELTA V (REQUIRED)		XXXX.X FT/SEC	
R0331	43	LATITUDE,	3COMP	XXX.XX DEG	DEC ONLY
R0333		LONGITUDE,		XXX.XX DEG	
R0334		ALTITUDE		XXXX.X NAUT MI	
R0335	44	APOGEE,	3COMP	XXXX.X NAUT MI	NO LOAD, DEC ONLY
R0337		PERIGEE,		XXXX.X NAUT MI	
R0338		TFF		XXBXX MIN/SEC	
R0339	45	MARKS,	3COMP	XXXXX.	NO LOAD, DEC ONLY
R0341		TFI OF NEXT BURN		XXBXX MIN/SEC	
R0342		MGA		XXX.XX DEG	
R0343	46	AUTOPILOT CONFIGURATION	1COMP	OCTAL ONLY	
R0344	47	LEM WEIGHT,	2COMP	XXXXX. LBS	DEC ONLY
R0346		CSM WEIGHT		XXXXX. LBS	
R0347	48	GIMBAL PITCH TRIM,	2COMP	XXX.XX DEG	DEC ONLY
R0349		GIMBAL ROLL TRIM		XXX.XX DEG	
R0350	49	DELTA R,	2COMP	XXXX.X NAUT MI	DEC ONLY
R0352		DELTA V,		XXXX.X FT/SEC	
R0353	50	SPARE			
R0354	51	S-BAND ANTENNA ANGLES PITCH	2COMP	XXX.XX DEG	DEC ONLY
R0356		YAW		XXX.XX DEG	
R0357	52	CENTRAL ANGLE OF ACTIVE VEHICLE	1COMP	XXX.XX DEG	
R0358	53	SPARE			
R0359	54	RANGE,	3COMP	XXX.XX NAUT MI	DEC ONLY
R0361		RANGE RATE,		XXXX.X FT/SEC	
R0362		THETA		XXX.XX DEG	
R0363	55	NO. OF APSIDAL CROSSINGS	3COMP	XXXXX.	DEC ONLY
R0365		ELEVATION ANGLE		XXX.XX DEG	
R0366		CENTRAL ANGLE OF PASSIVE VEHICLE		XXX.XX DEG	
R0367	56	RR LOS AZIMUTH	2COMP	XXX.XX DEG	
R0368		ELEVATION		XXX.XX DEG	
R0369	57	DELTA R	1COMP	XXXX.X NAUT MI	DEC ONLY
R0371	58	PERIGEE ALT (POST TPI)	3COMP	XXXX.X NAUT MI	DEC ONLY
R0373		DELTA V TPI		XXXX.X FT/SEC	
R0374		DELTA V TPF		XXXX.X FT/SEC	
R0375	59	DELTA VELOCITY LOS	3COMP	XXXX.X FT/SEC FOR EA.	DEC ONLY
R0377	60	HORIZONTAL VELOCITY	3COMP	XXXX.X FT/SEC	DEC ONLY
R0379		ALTITUDE RATE		XXXX.X FT/SEC	
R0380		COMPUTED ALTITUDE		XXXXX. FEET	
R0381	61	TIME TO GO IN BRAKING PHASE	3COMP	XXBXX MIN/SEC	NO LOAD, DEC ONLY
R0383		TIME FROM IGNITION		XXBXX MIN/SEC	
R0384		CROSS RANGE DISTANCE		XXXX.X NAUT MI	

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R0385	62	ABSOLUTE VALUE OF VELOCITY	3COMP	XXXX.X FT/SEC	NO LOAD, DEC ONLY
R0387		TIME FROM IGNITION		XXBXX MIN/SEC	
R0388		DELTA V (ACCUMULATED)		XXXX.X FT/SEC	
R0389	63	ABSOLUTE VALUE OF VELOCITY	3COMP	XXXX.X FT/SEC	DEC ONLY
R0391		ALTITUDE RATE		XXXX.X FT/SEC	
R0392		COMPUTED ALTITUDE		XXXXX. FEET	
R0393	64	TIME LEFT FOR REDESIGNATION- LPD ANGLE	3COMP	XXBXX	NO LOAD, DEC ONLY
R0395		ALTITUDE RATE		XXXX.X FT/SEC	
R0396		COMPUTED ALTITUDE		XXXXX. FEET	
R0397	65	SAMPLED AGC TIME	3COMP	00XXX. HRS	DEC ONLY
R0399		(FETCHED IN INTERRUPT)		000XX. MIN	MUST LOAD 3 COMPS
R0401				0XX.XX SEC	
R0402	66	LR RANGE	2COMP	XXXXX. FEET	NO LOAD, DEC ONLY
R0404		POSITION		+0000X	
R0405	67	LRVX	3COMP	XXXXX. FT/SEC	
R0406		LRVY		XXXXX. FT/SEC	
R0407		LRVZ		XXXXX. FT/SEC	
R0408	68	SLANT RANGE TO LANDING SITE	3COMP	XXXX.X NAUT MI	NO LOAD, DEC ONLY
R0410		TIME TO GO IN BRAKING PHASE		XXBXX MIN/SEC	
R0411		LR ALTITUDE - COMPUTED ALTITUDE		XXXXX. FEET	
R0412	69	SPARE			
R0413	70	AOT DETENT CODE/STAR CODE	3COMP	OCTAL ONLY FOR EACH	
R0414	71	AOT DETENT CODE/STAR CODE	3COMP	OCTAL ONLY FOR EACH	
R0415	72	RR 360 - TRUNNION ANGLE	2COMP	XXX.XX DEG	
R0416		SHAFT ANGLE		XXX.XX DEG	
R0417	73	NEW RR 360 - TRUNNION ANGLE	2COMP	XXX.XX DEG	
R0418		SHAFT ANGLE		XXX.XX DEG	
R0419	74	TIME FROM IGNITION	3COMP	XXBXX MIN/SEC	NO LOAD, DEC ONLY
R0421		YAW AFTER VEHICLE RISE		XXX.XX DEG	
R0422		PITCH AFTER VEHICLE RISE		XXX.XX DEG	
R0423	75	DELTA ALTITUDE CDH	3COMP	XXXX.X NAUT MI	NO LOAD, DEC ONLY
R0425		DELTA TIME (CDH-CSI OR TPI-CDH)		XXBXX MIN/SEC	
R0426		DELTA TIME (TPI-CDH OR TPI-NOMTPI)		XXBXX MIN/SEC	
R0427	76	CROSS-RANGE DISTANCE	2COMP	XXXX.X NAUT MI	DEC ONLY
R0429		APOCYNTHION ALTITUDE		XXXX.X NAUT MI	
R0430	77	TIME TO ENGINE CUTOFF	2COMP	XXBXX MIN/SEC	NO LOAD, DEC ONLY
R0432		VELOCITY NORMAL TO CSM PLANE		XXXX.X FT/SEC	
R0433	78	RR RANGE	2COMP	XXX.XX NAUT MI	
R0434		RANGE RATE		XXXXX. FT/SEC	
R0435	79	CURSOR ANGLE	3COMP	XXX.XX DEG	DEC ONLY
R0437		SPIRAL ANGLE		XXX.XX DEG	
R0438		POSITION CODE		XXXXX.	
R0439	80	DATA INDICATOR,	2COMP	XXXXX.	
R0440		OMEGA		XXX.XX DEG	
R0441	81	DELTA V (LV)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY

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P0443	82	DELTA V (LV)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY
R0445	83	DELTA V (BODY)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY
R0447	84	DELTA V (OTHER VEHICLE)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY
R0449	85	VG (BODY)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY
R0451	86	VG (LV)	3COMP	XXXX.X FT/SEC FOR EACH	DEC ONLY
R0453	87	BACKUP OPTICS LOS AZIMUTH	2COMP	XXX.XX DEG	
R0454		ELEVATION		XXX.XX DEG	
R0455	88	HALF UNIT SUN OR PLANET VECTOR	3COMP	.XXXXX FOR EACH	DEC ONLY
R0457	89	LANDMARK LATITUDE	3COMP	XX.XXX DEG	DEC ONLY
R0459		LONGITUDE/2		XX.XXX DEG	
R0460		ALTITUDE		XXX.XX NAUT MI	
R0461	90	Y	3COMP	XXX.XX NM	DEC ONLY
R0463		Y DOT		XXXX.X FPS	
R0464		PSI		XXX.XX DEG	
R0465	91	SPARE			
R0466	92	SPARE			
R0467	93	DELTA GYRO ANGLES	3COMP	XX.XXX DEG FOR EACH	
R0468	94	SPARE			
R0469	95	SPARE			
R0470	96	SPARE			
R0471	97	SYSTEM TEST INPUTS	3COMP	XXXXX. FOR EACH	
R0472	98	SYSTEM TEST RESULTS AND INPUTS	3COMP	XXXXX.	
R0473				.XXXXX	
R0474				XXXXX.	
R0475	99	RMS IN POSITION	2COMP	XXX.XX NAUT MI	DEC ONLY
R0477		RMS IN VELOCITY		XXXX.X FT/SEC	

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P0478 REGISTERS AND SCALING FOR NORMAL NOUNS

R0479	NCUN	REGISTER	SCALE TYPE
R0480	00	NOT IN USE	
R0481	01	SPECIFY ADDRESS	B
R0482	02	SPECIFY ADDRESS	C
R0483	03	SPECIFY ADDRESS	D
R0484	04	DSPTM1	H
R0485	05	DSPTM1	H
R0486	06	OPTION1	A
R0487	07	XREG	A
R0488	08	ALMCADR	A
R0489	09	FAILREG	A
R0490	10	SPECIFY CHANNEL	A
R0491	11	TCSI	K
R0492	12	OPTIONX	A
R0493	13	TCDH	K
R0494	14	DSPTMX	C
R0495	15	INCREMENT ADDRESS	A
R0496	16	DSPTMX	C
R0497	17	SPARE	
R0498	18	FDAIX	D
R0499	19	SPARE	
R0500	20	CDUX	D
R0501	21	PIPAX	C
R0502	22	THETAD	D
R0503	23	SPARE	
R0504	24	DSPTM2 +1	K
R0505	25	DSPTM1	C
R0506	26	DSPTM1	A
R0507	27	S MODE	C
R0508	28	SPARE	
R0509	29	SPARE	
R0510	30	SPARE	
R0511	31	SPARE	
R0512	32	-TPER	K
R0513	33	TIG	K
R0514	34	DSPTM1	K
R0515	35	TTOGO	K
R0516	36	TIME2	K
R0517	37	TTPI	K
R0518	38	TET	K
R0519	39	SPARE	

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P0520 REGISTERS AND SCALING FOR MIXED NOUNS

R0521	NCUN	COMP	REGISTER	SCALE TYPE
R0522	40	1	TTOGO	L
R0523		2	VGDISP	S
R0524		3	DVTOTAL	S
R0525	41	1	DSPTM1	D
R0526		2	DSPTM1 +1	E
R0527	42	1	HAPO	Q
R0528		2	HPER	Q
R0529		3	VGDISP	S
R0530	43	1	LAT	H
R0531		2	LCNG	H
R0532		3	ALT	Q
R0533	44	1	HAPOX	Q
R0534		2	HPERX	Q
R0535		3	TFF	L
R0536	45	1	TRKMKCNT	C
R0537		2	TTOGO	L
R0538		3	+MGA	H
R0539	46	1	DAPDATR1	A
R0540	47	1	LEMASS	KK
R0541		2	CSMASS	KK
R0542	48	1	PITTIME	NN
R0543		2	ROLLTIME	NN
R0544	49	1	R22DISP	Q
R0545		2	R22DISP +2	S
R0546	50	SPARE		
R0547	51	1	ALPHASB	H
R0548		2	BETASB	H
R0549	52	1	ACTCENT	H
R0550	53	SPARE		
R0551	54	1	RANGE	JJ
R0552		2	RRATE	S
R0553		3	RTHETA	H
R0554	55	1	NN	C
R0555		2	ELEV	H
R0556		3	CENTANG	H
R0557	56	1	RR-AZ	H
R0558		2	RR-ELEV	H
R0559	57	1	DELTAR	Q
R0560	58	1	POSTTPI	Q
R0561		2	DELVTPI	S
R0562		3	DELVTPI	S
R0563	59	1	DVLOS	S
R0564		2	DVLOS +2	S
R0565		3	DVLOS +4	S
R0566	60	1	VHORIZ	S
R0567		2	HDDTDISP	S

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R0568		3	HCALC	RR
R0569	61	1	TTFDISP	L
R0570		2	TTOGO	L
R0571		3	OUTOPLN	QQ
R0572	62	1	ABVEL	S
R0573		2	TTOGO	L
R0574		3	DVTOTAL	S
R0575	63	1	ABVEL	S
R0576		2	HDOTDISP	S
R0577		3	HCALC	RR
R0578	64	1	FUNNYDSP	PP
R0579		2	HDOTDISP	S
R0580		3	HCALC	RR
R0581	65	1	SAMPTIME	K
R0582		2	SAMPTIME	K
R0583		3	SAMPTIME	K
R0584	66	1	RSTACK +6	W
R0585		2	CHANNEL 33	TT
R0586	67	1	RSTACK	X
R0587		2	RSTACK +2	Y
R0588		3	RSTACK +4	Z
R0589	68	1	RANGEDSP	QQ
R0590		2	TTFDISP	L
R0591		3	DELTAH	RR
R0592	69	SPARE		
R0593	70	1	AOTCODE	A
R0594		2	AOTCODE +1	A
R0595		3	AOTCODE +2	A
R0596	71	1	AOTCODE	A
R0597		2	AOTCODE +1	A
R0598		3	AOTCODE +2	A
R0599	72	1	CDUT	WW
R0600		2	CDUS	D
R0601	73	1	TANG	WW
R0602		2	TANG +1	D
R0603	74	1	TTOGO	L
R0604		2	YAW	H
R0605		3	PITCH	H
R0606	75	1	DIFFALT	Q
R0607		2	T1TOT2	L
R0608		3	T2TOT3	L
R0609	76	1	XRANGE	Q
R0610		2	APQ	Q
R0611	77	1	TTOGO	L
R0612		2	YDOT	S
R0613	78	1	RSTACK	U
R0614		2	RSTACK +2	V
R0615	79	1	CURSOR	D
R0616		2	SPIRAL	D
R0617		3	POSCODE	C

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R0618	80	1	DATAGOOD	C
R0619		2	OMEGAD	H
R0620	81	1	DELVLVC	S
R0621		2	DELVLVC +2	S
R0622		3	DELVLVC +4	S
R0623	82	1	DELVLVC	S
R0624		2	DELVLVC +2	S
R0625		3	DELVLVC +4	S
R0626	83	1	DELVIMU	S
R0627		2	DELVIMU +2	S
R0628		3	DELVIMU +4	S
R0629	84	1	DELVOV	S
R0630		2	DELVOV +2	S
R0631		3	DELVOV +4	S
R0632	85	1	VGBODY	S
R0633		2	VGBODY +2	S
R0634		3	VGBODY +4	S
R0635	86	1	DELVLVC	S
R0636		2	DELVLVC +2	S
R0637		3	DELVLVC +4	S
R0638	87	1	AZ	D
R0639		2	EL	D
R0640	88	1	STARAD	B
R0641		2	STARAD +2	B
R0642		3	STARAD +4	B
R0643	89	1	LANDLAT	G
R0644		2	LANDLONG	G
R0645		3	LANDALT	JJ
R0646	90	1	RANGE	JJ
R0647		2	RRATE	S
R0648		3	RTHETA	H
R0649	91		SPARE	
R0650	92		SPARE	
R0651	93	1	OGC	G
R0652		2	OGC +2	G
R0653		3	OGC +4	G
R0654	94		SPARE	
R0655	95		SPARE	
R0656	96		SPARE	
R0657	97	1	DSPTM1	C
R0658		2	DSPTM1 +1	C
R0659		3	DSPTM1 +2	C
R0660	98	1	DSPTM2	C
R0661		2	DSPTM2 +1	B
R0662		3	DSPTM2 +2	C
R0663	99	1	WWPOS	XX
R0664		2	WWVEL	YY

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P0665 NCUN SCALES AND FORMATS

R0666	-SCALE TYPE-		PRECISION
R0667	UNITS	DECIMAL FORMAT	-- AGC FORMAT
R0668	-----	-----	-----
R0669	-A-		
R0670	OCTAL	XXXXXX	SP OCTAL
R0671	-B-		
R0672	FRACTIONAL	.XXXXXX	SP BIT 1 = 2 ⁻¹⁴ UNITS
R0673		(MAX .99996)	
R0674	-C-		
R0675	WHOLE	XXXXX.	SP BIT 1 = 1 UNIT
R0676		(MAX 16383.)	
R0677	-D-		
R0678	CDU DEGREES	XXX.XX DEGREES	SP BIT 1 = 360/2 ¹⁵ DEGREES
R0679		(MAX 359.99)	(USES 15 BITS FOR MAGNITUDE AND 2-S COMP.)
R0680			
R0681	-E-		
R0682	ELEVATION DEGREES	XX.XXX DEGREES	SP BIT 1 = 90/2 ¹⁴ DEGREES
R0683		(MAX 89.999)	
R0684	-F-		
R0685	DEGREES (180)	XXX.XX DEGREES	SP BIT 1 = 180/2 ¹⁴ DEGREES
R0686		(MAX 179.99)	
R0687	-G-		
R0688	DP DEGREES (90)	XX.XXX DEGREES	DP BIT 1 OF LOW REGISTER =
R0689			28
R0690			360/2 DEGREES
R0691	-H-		
R0692	DP DEGREES (360)	XXX.XX DEGREES	DP BIT 1 OF LOW REGISTER =
R0693			28
R0694		(MAX 359.99)	360/2 DEGREES

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R0695 -K-
 R0696 TIME (HR, MIN, SEC) 00XXX. HR DP BIT 1 OF LOW REGISTER =
 R0697 000XX. MIN -2
 R0698 0XX.XX SEC 10 SEC
 R0699 (DECIMAL ONLY.
 R0700 MAX MIN COMP=59
 R0701 MAX SEC COMP=59.99
 R0702 MAX CAPACITY=745 HRS
 R0703 39 MINS
 R0704 14.55 SECS.
 R0705 WHEN LOADING, ALL 3
 R0706 COMPONENTS MUST BE
 R0707 SUPPLIED.)

R0708 -L-
 R0709 TIME (MIN/SEC) XXBXX MIN/SEC DP BIT 1 OF LOW REGISTER =
 R0710 (B IS A BLANK -2
 R0711 POSITION, DECIMAL 10 SEC
 R0712 ONLY, DISPLAY OR
 R0713 MONITOR ONLY. CANNOT
 R0714 BE LOADED.
 R0715 MAX MIN COMP=59
 R0716 MAX SEC COMP=59
 R0717 VALUES GREATER THAN
 R0718 59 MIN 59 SEC
 R0719 ARE DISPLAYED AS
 R0720 59 MIN 59 SEC.)

R0721 -M-
 R0722 TIME (SEC) XXX.XX SEC SP BIT 1 = 10⁻² SEC
 R0723 (MAX 163.83)

R0724 -N-
 R0725 TIME(SEC) DP XXX.XX SEC DP BIT 1 OF LOW REGISTER =
 R0726 -2
 R0727 10 SEC

R0728 -P-
 R0729 VELOCITY 2 XXXXX. FEET/SEC DP BIT 1 OF HIGH REGISTER =
 R0730 (MAX 41994.) -7
 R0731 2 METERS/CENTI-SEC

R0732 -Q-
 R0733 POSITION 4 XXXX.X NAUTICAL MILES DP BIT 1 OF LOW REGISTER =
 R0734 2 METERS

R0735 -S-
 R0736 VELOCITY 3 XXXX.X FT/SEC DP BIT 1 OF HIGH REGISTER =
 R0737 -7
 R0738 2 METERS/CENTI-SEC

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R0739	-T-		
R0740	G	XXX.XX G	SP BIT 1 = 10^{-2} G
R0741		(MAX 163.83)	
R0742	-U-		
R0743	RENDEZVOUS	XXX.XX NAUT MI	DP LOW ORDER BIT OF LOW ORDER
R0744	RADAR RANGE		WORD = 9.38 FEET
R0745	-V-		
R0746	RENDEZVOUS	XXXXX. FEET/SEC	DP LOW ORDER BIT OF LOW ORDER
R0747	RADAR RANGE RATE		WORD = -.6278 FEET/SEC
R0748	-W-		
R0749	LANDING RADAR	XXXXX. FEET	DP LOW ORDER BIT OF LOW ORDER
R0750	ALTITUDE		WORD = 1.079 FEET
R0751	-X-		
R0752	LANDING RADAR	XXXXX. FEET/SEC	DP LOW ORDER BIT OF LOW ORDER
R0753	VELX		WORD = -.6440 FEET/SEC
R0754	-Y-		
R0755	LANDING RADAR	XXXXX. FEET/SEC	DP LOW ORDER BIT OF LOW ORDER
R0756	VELY		WORD = 1.212 FEET/SEC
R0757	-Z-		
R0758	LANDING RADAR	XXXXX. FEET/SEC	DP LOW ORDER BIT OF LOW ORDER
R0759	VELZ		WORD = .8668 FEET/SEC
R0760	-AA-		
R0761	INITIAL/FINAL	XXXXX. FEET	DP LOW ORDER BIT OF LOW ORDER
R0762	ALTITUDE		WORD = 2.345 FEET
R0763	-BB-		
R0764	ALTITUDE RATE	XXXXX. FEET/SEC	SP LOW ORDER BIT = .5
R0765		(MAX 08191.)	FEET/SEC
R0766	-CC-		
R0767	FORWARD/LATERAL	XXXXX. FEET/SEC	SP LOW ORDER BIT = .5571
R0768	VFLOCITY	(MAX 09126.)	FEET/SEC
R0769	-DD-		
R0770	ROTATIONAL HAND	XXXXX. DEG/SEC	SP FRACTIONAL PART OF PI RAD
R0771	CCNTRCLER ANGULAR	(MAX 00044.)	4 SEC
R0772	RATES		
R0773	-EE-		
R0774	OPTICAL TRACKER	XXX.XX DEG.	DP LOW ORDER BIT OF LOW ORDER
R0775	AZIMUTH ANGLE		15
R0776			WORD = 360/2 DEGREES

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R0777	-JJ-			
R0778	POSITION5	XXX.XX NAUT MI	DP BIT 1 OF LOW REGISTER =	
R0779			2 METERS	
R0780	-KK-			16
R0781	WEIGHT2	XXXXX. LBS	SP FRACTIONAL PART OF 2	KG
R0782	-NN-			
R0783	TRIM DEGREES 2	XXX.XX DEG	SP BIT 1=.01SEC(TIME)	
R0784		{MAX 032.76}		
R0785	-PP-			
R0786	2 INTEGERS	+XXBYY	DP BIT 1 OF HIGH REGISTER =	
R0787		{B IS A BLANK	1 UNIT OF XX	
R0788		POSITION. DECIMAL	BIT 1 OF LOW REGISTER =	
R0789		ONLY, DISPLAY OR	1 UNIT OF YY	
R0790		MONITOR ONLY. CANNOT	{EACH REGISTER MUST	
R0791		BE LOADED.}	CONTAIN A POSITIVE INTEGER	
R0792		{MAX 99B99}	LESS THAN 100}	
R0793	-CC-			
R0794	POSITION7	XXXX.X NAUT MI	DP BIT 1 OF LOW REGISTER =	
R0795		{MAX 9058.9}	-4	
R0796			2 METERS	
R0797	-RR-			
R0798	COMPUTED ALTITUDE	XXXXX. FEET	DP BIT 1 OF LOW REGISTER =	
R0799			-4	
R0800			2 METERS	
R0801	-SS-			
R0802	DP DEGREES	XXXX.X DEGREES	DP BIT 1 OF HIGH REGISTER =	
R0803			1 DEGREE	
R0804	-TT-			
R0805	LANDING RADAR	+0000X	CHANNEL 33,BIT 6=NOT POSIT. 1	
R0806	POSITION	{DECIMAL ONLY.	CHANNEL 33,BIT 7=NOT POSIT. 2	
R0807		DISPLAY OR MONITOR	X = 1 FOR LR POSITION 1	
R0808		ONLY. CANNOT BE	X = 2 FOR LR POSITION 2	
R0809		LOADED.}		
R0810	-hw-			15
R0811	360-CDU DEGREES	XXX.XX DEGREES	SP BIT 1 = 360 - (360/2)	
R0812		{MAX 359.99}	DEGREES	
R0813			{USES 15 BITS FOR MAGNI-	
R0814			TUDE AND 2-S COMP.}	
R0815	-XX-			
R0816	POSITION 9	XXX.XX NAUT MI	DP BIT 1 OF LOW REGISTER =	
R0817		{MAX 283.09}	-9	
R0818			2 METERS	

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R0819 -YY-
R0820 VELOCITY 4 XXXX.X FEET/SEC DP FRACTIONAL PART OF
R0821 (MAX 328.0) METERS/CENTI-SEC
R0822 THAT-S ALL ON THE NOUNS.

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P0823 ALARM CODES FOR LUMINARY

R0824 *9 ----*18 *60 COLUMN

R0825 CODE * TYPE SET BY

R0826	00105	**	ACTMARK SYSTEM IN USE	AOTMARK
R0827	00107		MORE THAN 5 MARK PAIRS	AOTMARK
R0828	00111		MARK MISSING	AOTMARK
R0829	00112		MARK OR MARK REJECT NOT BEING ACCEPTED	AOTMARK
R0830	00113		NO INBITS	AOTMARK
R0831	00114		MARK MADE BUT NOT DESIRED	AOTMARK
R0832	00115		NO MARKS IN LAST PAIR TO REJECT	AOTMARK
R0833	00206		ZERO ENCCDE NOT ALLOWED WITH COARSE ALIGN	IMU MODE SWITCHING
R0834	00206		+ GIMBAL LOCK.	
R0835	00207		ISS TURNON REQUEST NOT PRESENT FOR 90 SEC	T4RUPT
R0836	00210		IMU NOT OPERATING	IMU MODE SWITCH, IMU-2, R02, P51, P57
R0838	00211		COARSE ALIGN ERROR	IMU MODE SWITCH
R0839	00212		PIPA FAIL BUT PIPA IS NOT BEING USED	IMU MODE SWITCH,T4RPT
R0840	00213		IMU NOT OPERATING WITH TURN-ON REQUEST	T4RUPT
R0841	00214		PROGRAM USING IMU WHEN TURNED OFF	T4RUPT
R0842	00217		BAD RETURN FROM IMUSTALL	P51,P52,P57
R0843	00220		IMU NOT ALIGNED - NO REFSMMAT	R02,R47
R0844	00401		DESIRED GIMBAL ANGLE YIELDS GIMBAL LOCK	INF ALIGN, IMU-2,
R0845				FINDCDUW
R0846	00402		FINDCDUW NOT CONTROLLING ATTITUDE	FINDCDUW
R0847	00404		TWO STARS NOT AVAILABLE IN ANY DETENT	R59, LUNAR SURFACE
R0848	00405		TWO STARS NOT AVAILABLE	P52
R0849	00421		W-MATRIX OVERFLOW	INTEGRV
R0850	00501	P	RADAR ANTENNA OUT OF LIMITS	R23
R0851	00502		BAD RADAR GIMBAL ANGLE INPUT	V4IN72
R0852	00503	P	RADAR ANTENNA DESIGNATE FAIL	R21, NON-P IN V4IN72
R0853	00510		RADAR AUTO DISCRETE NOT PRESENT	R25
R0854	00511		LR NOT IN POSITION 2 OR REPOSITIONING	SERVICER
R0855	00514	P	RR GOES OUT OF AUTO MODE WHILE IN USE	P20
R0856	00515		RR CDU FAIL DISCRETE PRESENT	R25
R0857	00520		RADAR RUPT NOT EXPECTED AT THIS TIME	RADAR READ
R0858	00521		COULD NOT READ RADAR	P20
R0859	00522		LANDING RADAR POSITION CHANGE	RADAR READ
R0860	00523	P	LR ANTENNA DIDN'T ACHIEVE POSITION 2	SERVICER, V60 (NON-P IN V60)
R0862	00525	P	DELTA THETA GREATER THAN 3 DEGREES	R22
R0863	00526	P	RANGE GREATER THAN 400 NAUT. MILES	P20,P22
R0864	00527	P	LCS NOT IN MODE II COVERAGE WHILE ON	R21,R24
R0865			LUNAR SURFACE	
R0866			OR VEHICLE MANEUVER REQUIRED	R24 (20)
R0867	00600		IMAGINARY ROOTS ON FIRST ITERATION	P32, P72
R0868	00601		PERIGEE ALTITUDE CSI LT PMIN1	P32,P72,
R0869	00602		PERIGEE ALTITUDE CDH LT PMIN2	P32,P72,
R0870	00603		CSI TO CDH TIME LT TMIN12	P32,P72,P33,P73
R0871	00604		CDH TO TPI TIME LT TMIN23	P32,P72,

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R0872	OR COMPUTED CDH TIME GREATER THAN INPUT TPI TIME	
R0873	0C605 NUMBER OF ITERATIONS EXCEEDS LOOP MAXIMUM	P32, P72
R0874	00606 DV EXCEEDS MAXIMUM	P32,P72,
R0875	0C611 NC TIG FOR GIVEN ELEV ANGLE	P34,P74
R0876	00701 ILLEGAL OPTION CODE SELECTED (504 ONLY)	P57
R0877	00777 PIPA FAIL CAUSED THE ISS WARNING	T4RUPT
R0878	01102 AGC SELF TEST ERROR	SELF CHECK
R0879	01103 ** UNUSED CCS BRANCH EXECUTED	ABORT
R0880	01104 * DELAY ROUTINE BUSY	EXEC
R0881	01105 DCNLINK TOO FAST	T4RUPT
R0882	01106 UPLINK TOO FAST	T4RUPT
R0883	01107 PHASE TABLE FAILURE. ASSUME	RESTART
R0884	ERASABLE MEMORY IS SUSPECT.	RESTART
R0885	01201 * EXECUTIVE OVERFLOW-NO VAC AREAS	EXFC
R0886	01202 * EXECUTIVE OVERFLCw-NO CORE SETS	EXEC
R0887	01203 * WAITLIST OVERFLOW-TOO MANY TASKS	WAITLIST
R0888	01204 ** WAITLIST, VARDELAY, FIXDELAY, OR LONGCALL	WAITLIST ROUTINES
R0889	CALLED WITH ZERO OR NEGATIVE DELTA-TIME	
R0890	01206 ** SECOND JOB ATTEMPTS TO GO TO SLEEP	PINBALL
R0891	01206 VIA KYBC AND DISPLAY PROGRAM	
R0892	01207 * NO VAC AREAS FOR MARKS	AOTMARK
R0893	01210 * TWO PROGRAMS USING DEVICE AT SAME TIME	MODE SWITCHING
R0894	01211 * ILLEGAL INTERRUPT OF EXTENDED VERB	AOTMARK
R0895	01301 ARCSIN-ARCCOS ARGUMENT TOO LARGE	INTERPRETER
R0896	01302 ** SQRT CALLED WITH NEGATIVE ARGUMENT	INTERPRETER
R0897	01406 ** BAD RETURN FROM ROOTPSRS	LANDING GUIDANCE EQS.
R0898	01407 VG INCREASING (DELTA-V ACCUMULATED	S40.8
R0899	.GT. 90 DEGREES AWAY FROM DESIRED THRUST	S40.8
R08995	VECTOR.)	S40.8
R0900	01410 UNINTENTIONAL OVERFLOW IN GUIDANCE	DESCENT GUIDANCE EQS.
R0901	01412 DESCENT IGNALG NOT CONVERGING	P63
R0902	01501 ** KEYBOARD AND DISPLAY ALARM DURING	PINBALL
R0903	01501 INTERNAL USE(NVSUB).ABORT	
R0904	01502 ** ILLEGAL FLASHING DISPLAY	GOPLAY
R0905	01520 V37 REQUEST NOT PERMITTED AT THIS TIME	V37
R0906	01600 OVERFLOW IN DRIFT TEST	IMU 4
R0907	01601 BAD IMU TORQUE	OPT PRE ALIGN CALIB
R0908	01601	IMU 4 (LEM)
R0909	01703 IGNITION TIME SLIPPED	MIDTDAVE
R0910	01706 INCORRECT PROGRAM REQUESTED FOR VEHICLE	
R0911	CONFIGURATION	P40, P42
R0912	02000 * DAP STILL IN PROGRESS AT NEXT TIME5 RUPT	DAP
R0913	02001 JET FAILURES HAVE DISABLED Y-Z TRANS.	DAP
R0914	02002 JET FAILURES HAVE DISABLED X TRANSLATION	DAP
R0915	02003 JET FAILURES HAVE DISABLED P-ROTATION	DAP
R0916	02004 JET FAILURES HAVE DISABLED U-V ROTATION	DAP
R0917	03777 ICDU FAIL CAUSED THE ISS WARNING	T4RUPT
R0918	04777 ICDU , PIPA FAILS CAUSED THE ISS WARNING	T4RUPT
R0919	07777 IMU FAIL CAUSED THE ISS WARNING	T4RUPT
R0920	10777 IMU , PIPA FAILS CAUSED THE ISS WARNING	T4RUPT

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R0921 13777 IMU , ICDU FAILS CAUSED THE ISS WARNING T4RUPT
R0922 14777 IMU,ICDU,PIPA FAILS CAUSED THE ISSWNING T4RUPT
R0923 * INDICATES AN ABORT CODE THAT RESULTS IN A SOFTWARE RESTART.

R0924 ** INDICATES A MORE SERIOUS ABORT CODE THAT RESULTS IN THE
R0925 PROGRAM GOING TO R00.

R0926 P INDICATES A PRIORITY ALARM.

R0927 ALL OTHERS ARE NON-ABORTIVE

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P0928 CHECKLIST CODES FOR LUMINARY

R0929 *9 *17 *26

*9 COLUMN

R0931 RICODE ACTION TO BE EFFECTED

PROGRAM

R0933 00013 KEY IN NORMAL OR GYRO TORQUE COARSE ALIGN

P52

R0935 00014 KEY IN FINE ALIGN OPTION

R51,P63,P57

R0937 00015 PERFORM CELESTIAL BODY ACQUISITION

R51,P51

R0939 00062 SWITCH AGC POWER DOWN

P06

R0941 00201 SWITCH RR MODE TO AUTOMATIC

P20,P22,R04

R0943 00203 SWITCH GUID CONTROL TO GNC, MODE TO AUTO...

P12,P42,P71

R0945 ALSO THR CONT TO AUTO

P40,P63,P70

R0947 00205 PERFORM MANUAL ACQUISITION OF RR

R23

R0949 00500 SWITCH LR ANTENNA TO POSITION 1

P63

R0951

SWITCH DENOTES CHANGE POSITION OF A CONSOLE SWITCH

R0952

PERFORM DENOTES START OR END OF A TASK

R0953

KEY IN DENOTES KEY IN OF DATA THRU THE DSKY

R0954

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P0955 OPTION CODES FOR LUMINARY

R0956 THE SPECIFIED OPTION CODES WILL BE FLASHED IN COMPONENT R1 IN
 R0957 CONJUNCTION WITH V04N06 OR V04N12 (FOR EXTENDED VERBS) TO REQUEST THE
 R0958 ASTRONAUT TO LOAD INTO COMPONENT R2 THE OPTION HE DESIRES.

R0959	*9	*17	*52	*11	*25	COLUMN
R0961	OPTION					
R0962	CODE	PURPOSE	INPUT FOR COMPONENT 2	PROGRAM(S)		APPLICABILITY
R0964	00001	SPECIFY IMU ORIENTATION	1=PREF 2=NOM 3=REFSMAT	P52		ALL
R0966			4=LAND SITE			
R0967	00002	SPECIFY VEHICLE	1=THIS 2=OTHER	P21,R30		ALL
R0969	00003	SPECIFY TRACKING ATTITUDE	1=PREFERRED 2=OTHER	R63		ALL
R0971	00004	SPECIFY RADAR	1=RR 2=LR	R04		SUNDANCE + LUMINARY
R0973	00005	SPECIFY SDR PHASE	1=FIRST 2=SECOND	P33		COLOSSUS + LUMINARY
R0975	00006	SPECIFY RR COARSE ALIGN OPTION	1=LOCKON 2=CONTINUOUS DESIG.	V4IN72		SUNDANCE + LUMINARY
R0977	00010	SPECIFY ALIGNMENT MODE	0=ANY TIME 1=REFSMAT +G	P57		LUMINARY
R0979			2=TWO BODIES 3=ONE BODY + G			
R0980	00012	SPECIFY CSM ORBIT OPTION	1=NO ORBIT CHANGE 2=CHANGE	P22		LUMINARY
R0982			ORBIT TO PASS OVER LM			

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

USER'S PAGE NO. 1 E0

0001 REF 1 COUNT BANK SUM
R0002 MCDULF 1 CONTAINS BANKS 0 THROUGH 5

0003		4000		BLOCK	02
0004		4000	RADARFF	EQUALS	
0005		4000	FFTAG1	EQUALS	
0006		4000	FFTAG2	EQUALS	
0007		4000	FFTAG3	EQUALS	
0008		4000	FETAG4	EQUALS	
0009		4000	FETAG7	EQUALS	
0010		4000	FFTAG8	EQUALS	
0011		4000	FFTAG9	EQUALS	
0012		4000	FFTAG10	EQUALS	
0013		4000	FFTAG11	EQUALS	
0014		4000	FFTAG12	EQUALS	
0015		4000	FFTAG13	EQUALS	
0016	9 WORDS LEFT	5766	05766 0	BNKSUM	02
0016		5767	05767 1		

0017		6000		BLOCK	03
0018		6000	FFTAG5	EQUALS	
0019		6000	EFTAG6	EQUALS	
0020	18 WORDS LEFT	7755	07755 1	BNKSUM	03
0020		7756	07756 1		

0021		00,2000		BANK	00
0022		00,2000	DLAYJOB	EQUALS	
0023	3 WORDS LEFT	00,3774	03774 0	BNKSUM	00
0023		00,3775	03775 1		

0024		01,2000		BANK	01
0025		01,2000	RESTART	EQUALS	
0026		01,2000	LOADDAP1	EQUALS	
0027	4 WORDS LEFT	01,3773	03773 1	BNKSUM	01
0027		01,3774	03774 0		

0028		04,2000		BANK	04
0029		04,2000	R02	EQUALS	
0030		04,2000	VERB37	EQUALS	
0031		04,2000	PINBALL4	EQUALS	
0032		04,2000	CONICS1	EQUALS	
0033		04,2000	KEYRUPT	EQUALS	
0034		04,2000	R36LM	EQUALS	
0035		04,2000	UPDATE2	EQUALS	
0036		04,2000	E/PROG	EQUALS	
0037	53 WORDS LEFT	04,3712	03712 0	BNKSUM	04
0037		04,3713	03713 1		

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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0038		05,2000		BANK	05
0039		05,2000		FRANDRES	EQUALS
0040		05,2000		DOWNTLM	EQUALS
0041		05,2000		AOTMARK2	EQUALS
0042		05,2000		EPHEM1	EQUALS
0043	58 WORDS LEFT	05,3705	03705 0	BNKSUM	05
0043		05,3706	03706 0		

R0044 MODULE 2 CONTAINS BANKS 6 THROUGH 13

0045		06,2000		BANK	06
0046		06,2000		IMUCOMP	EQUALS
0047		06,2000		T4RUP	EQUALS
0048		06,2000		RCSMONT	EQUALS
0049	50 WORDS LEFT	06,3715	03715 1	BNKSUM	06
0049		06,3716	03716 1		

0050		07,2000		BANK	07
0051		07,2000		AOTMARK1	EQUALS
0052		07,2000		MODESW	EQUALS
0053	25 WORDS LEFT	07,3746	03746 1	BNKSUM	07
0053		07,3747	03747 0		

0054		10,2000		BANK	10
0055		10,2000		RTBCODES	EQUALS
0056		10,2000		DISPLAYS	EQUALS
0057		10,2000		PHASETAB	EQUALS
0058		10,2000		MIDDGIM	EQUALS
0059	24 WORDS LEFT	10,3747	03747 0	BNKSUM	10
0059		10,3750	03750 0		

0060		11,2000		BANK	11
0061		11,2000		ORBITAL	EQUALS
0062		11,2000		ORBITAL1	EQUALS
0063		11,2000		INTVEL	EQUALS
0064		11,2000		INTPRET2	EQUALS
0065	45 WORDS LEFT	11,3722	03722 0	BNKSUM	11
0065		11,3723	03723 1		

0066		12,2000		BANK	12
0067		12,2000		CONICS	EQUALS
0068	30 WORDS LEFT	12,3741	03741 0	BNKSUM	12
0068		12,3742	03742 0		

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

USER'S PAGE NO. 3 EO

0069	13,2000		BANK	13
0070	13,2000		LATLONG	EQUALS
0071	13,2000		INTINIT	EQUALS
0072	13,2000		LFMGOM	EQUALS
0073	13,2000		P76LOC	EQUALS
0074	13,2000		ORBITAL2	EQUALS
0075	13,3751	03751 1	BNKSUM	13
0075	13,3752	03752 1		

22 WORDS LEFT

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

USFR'S PAGE NO. 4 EO

P0076 MCDULE 3 CONTAINS BANKS 14 THROUGH 21

0077		14,2000			BANK 14
0078		14,2000		P50S1	EQUALS
0079		14,2000		STARTAB	EQUALS
0080	54 WORDS LEFT	14,3711	03711 0		BNKSUM 14
0080		14,3712	03712 0		

0081		15,2000			BANK 15
0082		15,2000		P50S	EQUALS
0083		15,2000		EPHEM	EQUALS
0084	2 WORDS LEFT	15,3775	03775 1		BNKSUM 15
0084		15,3776	03776 1		

0085		16,2000			BANK 16
0086		16,2000		DAPS1	EQUALS
0087	18 WORDS LEFT	16,3755	03755 0		BNKSUM 16
0087		16,3756	03756 0		

0088		17,2000			BANK 17
0089		17,2000		DAPS2	EQUALS
0090	12 WORDS LEFT	17,3763	03763 0		BNKSUM 17
0090		17,3764	03764 1		

0091		20,2000			BANK 20
0092		20,2000		DAPS3	EQUALS
0093		20,2000		LOADDAP	EQUALS
00935		20,2000		RODTRAP	EQUALS
0094	77 WORDS LEFT	20,3662	03662 0		BNKSUM 20
0094		20,3663	03663 1		

0095		21,2000			BANK 21
0096		21,2000		DAPS4	EQUALS
0097		21,2000		F2DPS#21	EQUALS
0098		21,2000		R10	EQUALS
0099		21,2000		R11	EQUALS
0100	4 WORDS LEFT	21,3773	03773 1		BNKSUM 21
0100		21,3774	03774 0		

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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P0101 MODULE 4 CONTAINS BANKS 22 THROUGH 27

0102		22,2000		BANK 22
0103		22,2000	KALCMON1	EQUALS
0104		22,2000	KALCMON2	EQUALS
0105		22,2000	R30LOC	EQUALS
0106		22,2000	RENDEZ	EQUALS
0107	38 WORDS LEFT	22,3731	03731 1	BNKSUM 22
0107		22,3732	03732 1	

0108		23,2000		BANK 23
0109		23,2000	POWFLITE	EQUALS
0110		23,2000	POWFLIT1	EQUALS
0111		23,2000	INFLIGHT	EQUALS
0112		23,2000	APOPERI	EQUALS
0113		23,2000	R61	EQUALS
0114		23,2000	R62	EQUALS
0115		23,2000	INTPRET1	EQUALS
0116		23,2000	MEASINC	EQUALS
0117		23,2000	MEASINC1	EQUALS
0118		23,2000	EXTVB1	EQUALS
0119	44 WORDS LEFT	23,3723	03723 1	BNKSUM 23
0119		23,3724	03724 0	

0120		24,2000		BANK 24
0121		24,2000	PLANTIN	EQUALS
0122		24,2000	P20S	EQUALS
0123	36 WORDS LEFT	24,3733	03733 0	BNKSUM 24
0123		24,3734	03734 1	

0124		25,2000		BANK 25
0125		25,2000	P20S1	EQUALS
0126		25,2000	P20S2	EQUALS
0127		25,2000	RADARUPT	EQUALS
0128		25,2000	RRLFADIN	EQUALS
0129		25,2000	R29S1	EQUALS
0130	70 WORDS LEFT	25,3671	03671 1	BNKSUM 25
0130		25,3672	03672 1	

0131		26,2000		BANK 26
0132		26,2000	P20S3	EQUALS
0133		26,2000	BAWLANGS	EQUALS
0134		26,2000	MANUVER	EQUALS
0135		26,2000	MANUVER1	EQUALS
01355 *		26,2000	PLANTIN1	EQUALS
0136	45 WORDS LEFT	26,3722	03722 0	BNKSUM 26
0136		26,3723	03723 1	

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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0137		27,2000		BANK	27
0138		27,2000		TOF-FF	EQUALS
0139		27,2000		TOF-FF1	EQUALS
0140		27,2000		P40S1	EQUALS
0141		27,2000		VECPT	EQUALS
0142		27,2000		ASENT1	EQUALS
0143	27 WORDS LEFT	27,3744	03744 0	BNKSUM	27
0143		27,3745	03745 1		

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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P0144 MODULE 5 CONTAINS BANKS 30 THROUGH 35

0145		30,2000		BANK	30
0146		30,2000		LOWSUPER	EQUALS
0147		30,2000		P12	EQUALS
0148		30,2000		ASENT	EQUALS
0149		30,2000		FCDUW	EQUALS
0150	25 WORDS LEFT	30,3746	03746 1	BNKSUM	30
0150		30,3747	03747 0		

0151		31,2000		BANK	31
0152		31,2000		FTHROT	EQUALS
0153		31,2000		F2DPS*31	EQUALS
0154		31,2000		VB67	EQUALS
0155	7 WORDS LEFT	31,3770	03770 1	BNKSUM	31
0155		31,3771	03771 0		

0156		32,2000		BANK	32
0157		32,2000		P20S4	EQUALS
0158		32,2000		F2DPS*32	EQUALS
0159		32,2000		ABORTS	EQUALS
0160		32,2000		LRS22	EQUALS
0161		32,2000		FLNGSUB	EQUALS
0162		32,2000		SERV2	EQUALS
0163		32,2000		R47	EQUALS
0164	9 WORDS LEFT	32,3766	03766 0	BNKSUM	32
0164		32,3767	03767 1		

0165		33,2000		BANK	33
0166		33,2000		SERVICES	EQUALS
0167		33,2000		R29/SERV	EQUALS
0168	18 WORDS LEFT	33,3755	03755 0	BNKSUM	33
0168		33,3756	03756 0		

0169		34,2000		BANK	34
0170		34,2000		STBLEORB	EQUALS
0171		34,2000		P30S1	EQUALS
0172		34,2000		CSI/CDH1	EQUALS
0173		34,2000		ASCFILT	EQUALS
01735		34,2000		R12STUFF	EQUALS
0174	15 WORDS LEFT	34,3760	03760 0	BNKSUM	34
0174		34,3761	03761 1		

0175		35,2000		BANK	35
0176		35,2000		CSI/CDH	EQUALS

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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0177		35,2000		P30S	EQUALS
0178		35,2000		GLM	EQUALS
0179		35,2000		P40S2	EQUALS
0180	33 WORDS LEFT	35,3736	03736 0		BNKSUM 35
0180		35,3737	03737 1		

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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P0181 MODULE 6 CONTAINS BANKS 36 THROUGH 43

0182		36,2000		BANK 36
0183		36,2000	P40S	EQUALS
0184	23 WORDS LEFT	36,3750	03750 0	BNKSUM 36
0184		36,3751	03751 1	

0185		37,2000		BANK 37
0186		37,2000	P05P06	EQUALS
0187		37,2000	IMU2	EQUALS
0188		37,2000	IMU4	EQUALS
0189		37,2000	R31	EQUALS
0190		37,2000	IMUSUPER	EQUALS
0191		37,2000	SERV1	EQUALS
0192	15 WORDS LEFT	37,3760	03760 0	BNKSUM 37
0192		37,3761	03761 1	

0193		40,2000		BANK 40
0194		40,2000	PINBALL1	EQUALS
0195		40,2000	SELSUPR	EQUALS
0196		40,2000	PINSUPER	EQUALS
0197	69 WORDS LEFT	40,3672	03672 1	BNKSUM 40
0197		40,3673	03673 0	

0198		41,2000		BANK 41
0199		41,2000	PINBALL2	EQUALS
0200	38 WORDS LEFT	41,3731	03731 1	BNKSUM 41
0200		41,3732	03732 1	

0201		42,2000		BANK 42
0202		42,2000	SHAND	EQUALS
0203		42,2000	PINBALL3	EQUALS
0204	9 WORDS LEFT	42,3766	03766 0	BNKSUM 42
0204		42,3767	03767 1	

0205		43,2000		BANK 43
0206		43,2000	EXTVERBS	EQUALS
0207		43,2000	SELFCHFC	EQUALS

0208	15 WORDS LEFT	43,3760	03760 0	BNKSUM 43
0208		43,3761	03761 1	

L TAGS FOR RELATIVE SETLOC AND BLANK BANK CARDS

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0209	REF	1		23,2423	HI6ZEROS EQUALS ZEROVECS	ZERO VECTOR ALWAYS IN HIGH MEMORY
0210	REF	1		11,2274	LO6ZEROS EQUALS ZEROVEC	ZERO VECTOR ALWAYS IN LOW MEMORY
0211	REF	1		23,2421	HIDPHALF EQUALS UNITX	
0212	REF	1		11,2272	LODPHALF EQUALS XUNIT	
0213	REF	1		23,2413	HIDP1/4 EQUALS DPL/4TH	
0214	REF	1		04,2757	LODP1/4 EQUALS D1/4	2DEC .25
0215	REF	2	LAST	36 23,2421	HIUNITX EQUALS UNITX	
0216	REF	1		23,2417	HIUNITY EQUALS UNITY	
0217	REF	1		23,2415	HIUNITZ EQUALS UNITZ	
0218	REF	2	LAST	36 11,2272	LOUNITX EQUALS XUNIT	2DEC .5
0219	REF	1		11,2270	LOUNITY EQUALS YUNIT	2DEC 0
0220	REF	1		11,2266	LOUNITZ EQUALS ZUNIT	2DEC 0

R0221

0222	REF	1		22,3541	DELR SPL EQUALS SPLRET	COL PGM, ALSO CALLED BY R30 IN LUMINARY
R0223	ROPE-SPECIFIC ASSIGNS OBVIATING NEED TO				CHECK COMPUTER FLAG IN	DETERMINING INTEGRATION AREA ENTRIES.

0225	REF	1		13,2734	ATOPTHIS EQUALS ATOPLEM	
0226	REF	1		13,2661	ATOPOTH EQUALS ATOPCSM	
0227	REF	1		13,3043	OTHPREC EQUALS CSMPREC	
0228	REF	1		0174	MOONTHIS EQUALS LMJCNFLG	
0229	REF	1		0173	MOONOTH EQUALS CMONFLG	
0230	REF	1		13,2747	MOVATHIS EQUALS MOVEALEM	
0231	REF	1		11,2305	RMM = LODPMAX	
0232	REF	1		11,2307	RME = LOOPMAX1	
0233	REF	1		13,3057	THISPREC EQUALS LEMPREC	
0234	REF	2	LAST	36 23,2415	THISAXIS = UNITZ	
0235	REF	1		23,2415	NBINB2 EQUALS THISAXIS	FOR R31
0236	REF	1		5011	ERASID EQUALS BITS2-10	DOWNLINK ERASABLE DUMP ID
0237	REF	1		4752	DELAYNUM EQUALS TWO	

L PADLOADS

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R0001 ***** FORMAT *****

R0002 NAMETAG LENGTH TYPE ?? (GSOP NAME) PROGRAMS

A0004 SAMPLE VALUE / UNITS

A0005 DESCRIPTION

R0006 INCRE PRESENT ESTIMATED LGC SCALING SOURCE OF VALUE

R0007 -MENT LENGTH AND VALUE

A0008

R0009 ????? POSSIBLE TYPES ?????

R0010 HOW INITIATED: P = PADLOADED

R0011 U = UPLINKED

R0012 D = DSKY (ASTRONAUT)

R0013 IF MODIFIED, HOW: (I) = INVARIANT

R0014 (PGM)= PROGRAM GENERATED

R0015 (F) = FRESH START REINITIALIZED

R0016 (U) = UPLINKED

R0017 (D) = DSKY (ASTRONAUT)

A0018

R0019 ***** EXAMPLF *****

R0020 FREAKCUT (2D) P (I) (F-OMEGA) P88'S-RENDESVOUS AVOIDANCE

A0022 (2 MICROGRAMS)

A0023 RESULTANT QUANTITY AFTER LONG EXPOSURE

R0024 +0 1OCT 00534 E3 B-12 (SUN)LITE DAWNS

R0025 +1 1OCT 07381 E-4 B-12

A0026

R0027 *****

A0028

R0029 FLGWRD10 (1D) P (PGM) MANY PROGRAMS, DAP-R03

A0031

A0032

A0033

A0034

R0035

A0036

OCT 00000

R0037 FLAGWRD3 (1D) P (PGM) MANY PROGRAMS

A0039

A0040

R0041

R0042

A0043

OCT 00000

OR OCT 10000

(00000 FOR DESCENT, 10000 FOR ASCENT)
 MUST BE SET TO ONE VALUE OR OTHER DEPEND
 ING ON MISSION PHASE BECAUSE APSFLAG IS
 NOT INITIALIZED IN FRESH START AS ARE
 OTHER FLAGBITS. MUST USE DSKY OR R03

(10000 FOR REFSMMAT GOOD; 00000 FOR NO
 GOOD) REFSMFLG IS NOT INITIALIZED BY
 FRESH START AS OTHER BITS ARE.

L PACLOADS

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R0044 A0046 A0047 R0048 A0049	FLAGWRD8 (1D)	P (PGM)	MANY PROGRAMS	(THERE ARE 8 POSSIBLE CONFIGURATIONS) CMOON, LMOON, & SURFFLAG ARE NOT INITIAL IZED BY FRESH START AS OTHER BITS ARE.
			OCT; BITS 8,11,12 NEED TO BE SET AS YOU DESIRE	
R0050 A0052 R0053 A0054	HIASCENT (1D)	P (F)	(HIASCENT)	DIGITAL AUTOPILOT (5000 KG.; 11,100 LBS.) INITIAL STAGED MASS
		1DEC	5050 8-16	SUNLITER # 147
R0055 A0057 A0058 R0059 A0060	DKTRAP (1D)	P (F)	(-THETA-MAX-C)	DAP STATE ESTIMATOR PARAM. (.14 DEG SCALED AT 4.5 DEG OR -510 DEC) LEM-CSM DOCKED, THRESHOLD FOR MEASURE- MENT INCORPORATION
		1OCT	77001	R557 GSOP SEC 3.3.2.3 JUNE68
R0061 A0063 R0064 A0065	DKCMEGAN (1D)	P (F)	(N-OMEGA-C)	DAP STATE ESTIMATOR PARAM. (10 DEC) LEM-CSM DOCKED, RATE GAIN CONSTANT
		1CCT	00012	R557 GSOP SEC 3.3.2.3 JUN68
R0066 A0068 A0069 R0070 A0071	DKKAOSNN (1D)	P (F)	(N-ALPHA-C)	DAP STATE ESTIMATOR PARAM. (60 DEC) LEM-CSM DOCKED, ACCELERATION GAIN CONSTANT
		1OCT	00074	R557 GSOP SEC 3.3.2.3 JUNE68
R0072 A0074 A0075 R0076 A0077	LMTRAP (1D)	P (F)	(-THETA-MAX-L)	DAP STATE ESTIMATOR PARAM. (.14 DEG SCALED AT 4.5 DEG) LEM-ALONE, THRESHOLD FOR MEASUREMENT INCORPORATION
		1OCT	77001	R557 GSOP SEC 3.3.2.3 JUNE68
R0078 A0080 R0081 A0082	LMCMEGAN (1D)	P (F)	(N-OMEGA-L)	DAP STATE ESTIMATOR PARAM. (0 DEC) LEM-ALONE, RATE GAIN CONSTANT
		1OCT	00000	R557 GSOP SEC 3.3.2.3 JUNE68
R0083 A0085 R0086 A0087	LMKAOSN (1D)	P (F)	(N-ALPHA-L)	DAP STATE ESTIMATOR PARAM. (60 DEC) LEM-ALONE, ACCELERATION GAIN CONSTANT
		1OCT	00074	R557 GSOP SEC 3.3.2.3 JUNE68
R0088 A0090 A0091 R0092 A0093	DKDB (1D)	P (F)		DAP (1.4 DEGREES EXPRESSED IN RADIANS) WIDTH OF DEADBAND FOR DOCKED RCS AUTO- PILOT (PI/DKDB RADIANS = DEADBAND)
		1OCT	00200	LUMINARY ERASABLES

L	PADLOADS				USER'S PAGE NO. 3 E0
R0094 A0096 R0097 A0098	RCLTIME (1D)	P (D)	(R-TRIM)	D.A.P. AND R03	(3000 CENTISECONDS OR 30 SECS.) TIME TO TRIM DESCENT Z GIMBAL (ROLL)
		1DEC	3000	SUNDANCE PADLOAD MEMO	
R0099 A0101 R0102 A0103	PITTIME (1D)	P (D)	(P-TRIM)	D.A.P. AND R03	(3000 CENTISECONDS OR 30 SECS.) TIME TO TRIM DESCENT Z GIMBAL (ROLL)
		1DEC	3000	SUNDANCE PADLOAD MEMO	
R01031 A010321 R010322 A010324	POSTORKP (1D)	P (PGM)	(POSTORKP)	DAP	ACCUMULATED JET TORQUE ABOUT +P AXIS SCALED AT 32 JET-SEC, OR ABOUT 2.0 JET- MSEC PER BIT. PERMITTED TO OVERFLOW.
		1OCT	00000	PCR 616	
R01033 A010332 R010333 A010334	NEGORKP (1D)	P (PGM)	(NEGORKP)	DAP	ACCUMULATED JET TORQUE ABOUT -P AXIS SCALED AS POSTORKP.
		1OCT	00000	PCR 616	
R01034 A010342 R010343 A010344	POSTORKU (1D)	P (PGM)	(POSTORKU)	DAP	ACCUMULATED JET TORQUE ABOUT +U AXIS. SCALED AS POSTORKP.
		1OCT	00000	PCR 616	
R01035 A010352 R010353 A010354	NEGORKU (1D)	P (PGM)	(NEGORKU)	DAP	ACCUMULATED JET TORQUE ABOUT -U AXIS SCALED AS POSTORKP.
		1OCT	00000	PCR 616	
R01036 A010362 R010363 A010364	POSTORKV (1D)	P (PCM)	(POSTORKV)	DAP	ACCUMULATED JET TORQUE ABOUT +V AXIS SCALED AS POSTORKP
		1OCT	00000	PCR 616	
R0104 A0106 A0107 R0108 A0109	ZCCMTIME (1D)	P (2)	(TAU-T)	P40'S , LUNAR LANDING	(26 SEC) TIME BETWEEN ENGINE ON AND THROTTLE UP COMMAND IN ANY DPS BURN
		1DEC	2600 CSEC.	SUNDANCE PADLOAD MEMO	
R0110 A0112 A0113 R0114 A0115	MASS (2D)	P (U)	(M)	ALL P40'S, SERVICER	(FULL LOADED VALUE APPROX. 15,043.8 KG.) VALUE FOR DESCENT STAGE WITH VARYING FUEL LOADS
		2DEC	B-16		
R0116 A0118 R0119	PIPASCFX (1D)	P (I)	(SFE1)	IMU COMPENSATION PARAMETERS	(PARTS PER MILLION) SCALE FACTOR ERROR CORRECTION FACTOR
		1OCT	75155 B-9	SUNDANCE PADLOAD MEMO	

L PACLOADS

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A0120

R0121	PIPASCFY (1D)	P (I)	{SFE2}	IMU COMPENSATION PARAMETERS	{ PARTS PER MILLION)
A0123					SCALE FACTOR ERROR CORRECTION FACTOR
R0124		1OCT	77403	B-9	SUNDANCE PADLOAD MEMO
A0125					

R0126	PIPASCFZ (1D)	P (I)	{SFE3}	IMU COMPENSATION PARAMETERS	{ PARTS PER MILLION)
A0128					SCALE FACTOR ERROR CORRECTION FACTOR
R0129		1OCT	65532	B-9	SUNDANCE PADLOAD MEMO
A0130					

R0131	PBIASX (1D)	P (I)	{BIAS1}	IMU COMPENSATION PARAMETERS	{PIPA PULSES PER CSEC OR CM PER SEC**2)
A0133					PIPA BIASES
R0134		1OCT	04554	B-5	SUNDANCE PADLOAD MEMO
A0135					

R0136	PBIASY (1D)	P (I)	{BIAS2}	IMU COMPENSATION PARAMETERS	{PIPA PULSES PER CSEC OR CM PER SEC**2)
A0138					PIPA BIASES
R0139		1OCT	06433	B-5	SUNDANCE PADLOAD MEMO
A0140					

R0141	PBIASZ (1D)	P (I)	{BIAS3}	IMU COMPENSATION PARAMETERS	{PIPA PULSES PER CSEC OR CM PER SEC**2)
A0143					PIPA BIASES
R0144		1OCT	77220	B-5	SUNDANCE PADLOAD MEMO
A0145					

R0146	ADIAX (1D)	P (I)	{ADIAX}	IMU COMPENSATION PARAMETERS	{ GYRO PULSES PER PIPA PULSE)
A0148					{MILLI-EARTH-RATE UNIT (MERU) / GRAVITY)
A0149					GYRO DRIFTS DUE TO ACCELERATION ALONG
A0150					INPUT AXIS
R0151		1OCT	00436	B-6	SUNDANCE PADLOAD MEMO
A0152					

R0153	ADIAY (1D)	P (I)	{ADIAY}	IMU COMPENSATION PARAMETERS	{ GYRO PULSES PER PIPA PULSE)
A0155					{MILLI-EARTH-RATE UNIT (MERU) / GRAVITY)
A0156					GYRO DRIFTS DUE TO ACCELERATION ALONG
A0157					INPUT AXIS
R0158		1OCT	76277	B-6	SUNDANCE PADLOAD MEMO
A0159					

R0160	ADIAZ (1D)	P (I)	{ADIAZ}	IMU COMPENSATION PARAMETERS	{ GYRO PULSES PER PIPA PULSE)
A0162					{MILLI-EARTH-RATE UNIT (MERU) / GRAVITY)
A0163					GYRO DRIFTS DUE TO ACCELERATION ALONG
A0164					INPUT AXIS
R0165		1OCT	00064	B-6	SUNDANCE PADLOAD MEMO
A0166					

R0167	ADSRAX (1D)	P (I)	{ADSRAX}	IMU COMPENSATION PARAMETERS	{ GYRO PULSES PER PIPA PULSE)
A0169					{MILLI-EARTH-RATE UNIT (MERU) / GRAVITY)

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A0170
A0171
R0172 10CT 00064 B-6 SUNDANCE PADLOAD MEMO
A0173

GYRO DRIFTS DUE TO ACCELERATION ALONG
SPIN REFERENCE AXIS

R0174 AOSRAY (10) P(1) (ADSRAY) IMU COMPENSATION PARAMETERS (GYRO PULSES PER PIPA PULSE)
A0176 (MILLI-EARTH-RATE UNIT (MERU) / GRAVITY)
A0177 GYRO DRIFTS DUE TO ACCELERATION ALONG
A0178 SPIN REFERENCE AXIS
R0179 10CT 00116 B-6 SUNDANCE PADLOAD MEMO
A0180

R0181 ADSRAZ (10) P(1) (ADSRZ) IMU COMPENSATION PARAMETERS (GYRO PULSES PER PIPA PULSE)
A0183 (MILLI-EARTH-RATE UNIT (MERU) / GRAVITY)
A0184 GYRO DRIFTS DUE TO ACCELERATION ALONG
A0185 SPIN REFERENCE AXIS
R0186 10CT 00064 B-6 SUNDANCE PADLOAD MEMO
A0187

R0188 NBDX (10) P(1) (NBDX) IMU COMPENSATION PARAMETERS (GYRO PULSES PER CSEC.)
A0190 OR (MILLI-EARTH-RATE UNIT CALLED 'MERU')
A0191 GYRO BIAS DRIFTS
R0192 10CT 77332 B-5 SUNDANCE PADLOAD MEMO
A0193

R0194 NBDY (10) P(1) (NBDY) IMU COMPENSATION PARAMETERS (GYRO PULSES PER CSEC.)
A0196 OR (MILLI-EARTH-RATE UNIT CALLED 'MERU')
A0197 GYRO BIAS DRIFTS
R0198 10CT 77415 B-5 SUNDANCE PADLOAD MEMO
A0199

R0200 NBDZ (10) P(1) (NBDZ) IMU COMPENSATION PARAMETERS (GYRO PULSES PER CSEC.)
A0202 OR (MILLI-EARTH-RATE UNIT CALLED 'MERU')
A0203 GYRO BIAS DRIFTS
R0204 10CT 00000 B-5 SUNDANCE PADLOAD MEMO
A0205

R0206 WRENDOPOS (10) P(D-V67) (W-RR) P20 - RENDEZVOUS NAVIGATION (2440 METERS)
A0208 W-MATRIX INERTIAL DIAGONAL ELEMENT
A0209 PRESELECTED ERROR TRANSITION
R0210 VALUE UNCERTAIN
A0211

R0212 WRENDVEL (10) P(O-V67) (W-RV) P20 - RENDEZVOUS NAVIGATION (.0244 METERS PER CSEC.)
A0214 W-MATRIX INERTIAL DIAGONAL ELEMENT
A0215 PRESELECTED ERROR TRANSITION
R0216 VALUE UNCERTAIN
A0217

R0218 WSHAFT (10) P(1) (W-THETA) P20-RENDEZVOUS NAVIGATION (10 MILLIRADIANS)

L PACLOADS

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A0220
A0221
R0222
A0223

VALUE UNCERTAIN

W-MATRIX INERTIAL DIAGONAL ELEMENT
SHAFT PRESELECTED ERROR TRANSITIONR0224 WTRUN (1D) P(I) (W-BETA)
A0226
A0227
R0228
A0229
VALUE UNCERTAIN

P20-RENDESVOUS NAVIGATION

(10 MILLIRADIANS -MR-)
W-MATRIX INERTIAL DIAGONAL ELEMENT
TRUNNION PRESELECTED ERROR TRANSITIONR0230 RMAX (1D) P(I) (DELTA-RMAX)
A0232
R0233
A0234
VALUE UNCERTAIN

P20-RENDESVOUS NAVIGATION

(9.26 TIMES 10 TO 4TH POWER)
THRESHOLD LIMIT FOR POSITION CORRECTIONR0235 VMAX (1D) P(I) (DELTA-VMAX)
A0237
R0238
A0239
VALUE UNCERTAIN

P20-RENDESVOUS NAVIGATION

(9.144 TIMES 10 METERS PER SECOND)
THRESHOLD LIMIT FOR VELOCITY CORRECTIONR0240 SHAFTVAR (1D) P(U) (VAR-BETA)
A0242
R0243
A0244
VALUE UNCERTAIN

P22-RENDESVOUS RADAR

(10 TO 6TH POWER SQUARE RADIAN)
RR SHAFT ANGLE ERROR VARIANCER0245 TRUNVAR (1D) P(U) (VAR-THETA)
A0247
R0248
A0249
VALUE UNCERTAIN

P22-RENDESVOUS RADAR

(10 TO 6TH POWER SQUARE RADIAN)
RR TRUNNION ANGLE ERROR VARIANCER0250 WSURFPCS (1D) P(D-V67) (W-LR)
R0251
A0252
A0253
A0254

P20'S-LUNAR SURFACE NAVIGAT

W-MATRIX INFRTIAL DIAGONAL ELEMENT
LUNAR ANALOG OF WRENPOSR0255 WSURFVEL (1D) P(D-V67) (W-LV)
R0256
A0257
A0258
A0259

P20'S-LUNAR SURFACE NAVIGAT

W-MATRIX INERTIAL DIAGONAL ELEMENT
LUNAR ANALOG OF WRENVELR0260 RANGEVAR (2D) P(I) (VAR-R))
A0262
A0263
A0264
R0265
A0266
2DEC* .111111111 E-4 812*P20 NAVIGATION'S STATE VECTOR INCORPORATION ROUTINE
(1/3 % QUANTITY SQUARED OR .11111111 E-4
RANGE ERROR VARIANCE CORRESPONDING TO
A PERCENTAGE ERROR

GSOP

L	PADLOADS	USER'S PAGE NO.	7	E0
R0267 A0269 A0270 A0271 R0272 A0273	RATEVAR (2D) P(I) (VAR-V))	P20 NAVIGATION'S STATE VECTOR INCORPORATION ROUTINE (1.3/3 % QUANTITY SQUARED OR 1.8777 E-5 VELOCITY ERROR VARIANCE CORRESPONDING TO A PERCENTAGE ERROR		
	2DEC 1.87777 E-5 B12	GSOP		
R0274 A0276 A0277 R0278 A0279	RVARMIN (1D) P(I) (VAR-RMIN)	P20 NAVIGATION'S STATE VECTOR INCORPORATION ROUTINE (80/3 FT QUANTITY SQUARED) MIN. RENDESVOUS RADAR POSITION VARIANCE		
	1DEC 66.0 B-12 METERS**2	GSOP		
R0280 A0282 A0283 R0284 A0285	VVARMIN (1D) P(I) (VAR-VMIN)	P20 NAVIGATION'S STATE VECTOR INCORPORATION ROUTINE (METERS/CSEC)**2 (1.3 /3 FT PER SEC QUANTITY SQUARED) MINIMUM VELOCITY VARIANCE		
	DEC .17445 E-5 B12	GSOP		
R0286 A0288 A0289 R0290 R0291 R0292 A0293	X789 (6D) P(PGM) (DELTA-BETA, DELTA-THETA, ZERO)	P20S, MEAS. INCORP2 (MILLIRADIANS) 7,8,9TH COMPONENT NAVIGATION STATEVECTOR ALSO SHAFT + TRUNNION BIAS ESTIMATES		
	+0 2DEC 0 INITIALLY			
	+2 2DEC 0 INITIALLY	LUMINARY LISTING		
	+4 2DEC 0 ALWAYS			
R0294 A0296 A0297 R0298 A0299	ATIGINC (2D) P(I) (DELTA-TAU-3)	P35 (7 MINUTES) ACTIVE VEHICLE TIME REQUIRED TO PREPARE FOR A TPM MANEUVER		
	2DEC 42000 B-28 (CSEC)	SUNDANCE PADLOAD MEMO		
R0300 A0302 A0303 R0304 A0305	PTIGINC (2D) P(I) (DELTA-TAU-7)	P75 (12 MINUTES) PASSIVE VEHICLE TIME REQUIRED TO PREPARE FOR A TPM MANEUVER		
	2DEC 72000 B-28 (CSEC)	SUNDANCE PADLOAD MEMO		
R0306 A0308 A0309 A0310 R0311 R0312 R0313 A0314	AOTAZ (3D) P(I) (AZ1, AZ2, AZ3)	AOTMARK (ALIGNMENT OPTICAL TELESCOPE) (-60 DEG, 0, +60 DEG) ANGLES BETWEEN THE LM NAVIGATION BASE Z AXIS AND AOT LINE OF SIGHT FOR DETENT1, 2,3. (AZIMUTH, 3 FORWARD VIEWING POSIT.)		
	+0 OCT 65252			
	+1 OCT 0	SUNDANCE PADLOAD MEMO		
	+2 OCT 12525			
R0315 A0317	AOTEL (3D) P(I) (EL1, EL2, EL3)	AOTMARK (ALIGNMENT OPTICAL TELESCOPE) (EACH IS 45 DEGREES) ANGLES BETWEEN THE LM NAVIGATION BASE		

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A0318
A0319
R0320
R0321
R0322
A0323+0 OCT 10000
+1 OCT 10000
+2 OCT 10000

SUNDANCE PADLOAD MEMO

Y-Z PLANE & AOT LINE OF SIGHT FOR
DETENT1,2,3. (ELEVATION, 3 FORWARD POS.)

R0324 DUMPCNT (1D) P(I)

DOWNLINK TELEMETRY

HOLDS THE NUMBER 'N' INDICATING THAT A
DOWNLINK ERASABLE DUMP WILL SEND ALL OF
ERASABLE STORAGE N TIMES (N=1 TO 4)A0326
A0327
R0328
R0329
R0330
A0331OCT 20000 IF 4 ERASABLE DUMPS DESIRED
OCT 10000 IF 2 COMPLETE DUMPS DESIRED
OCT 04000 IF 1 COMPLETE ERASABLE DUMPLUMINARY
LISTING

R0332 AGSK (2D) P(U)

V47(R47) AGS INITIALIZATION (MINS ?)

GROUND ELAPSED TIME OF LATEST AGS CLOCK
ZEROA0334
A0335
A0336

R0337 RBRFG (6D) P(I)

(R-DFG)

LUNAR LANDING TARGET PARAMETERS (METERS)

RANGE VECTOR, BRAKING PHASE, HIGHGATE

A0339
R0340
R0341
R0342
A0343+0 2DEC* +2.92362643 E+ 3 B-24 *
+2 2DEC* +0.00000000 E+ 0 B-24 *
+4 2DEC* -1.00839629 E+ 4 B-24 *

23A LUNAR LANDING PGM

R0344 VBRFG (6D) P(I)

(V-DFG)

LUNAR LANDING TARGET PARAMETERS (METERS PER CSEC)

VELOCITY VECTOR, BRAKING PHASE, HIGHGATE

A0346
R0347
R0348
R0349
A0350+0 2DEC* -4.83907728 E- 1 B-10 *
+2 2DEC* +0.00000000 E+ 0 B-10 *
+4 2DEC* +1.71785605 E+ 0 B-10 *

23A LUNAR LANDING PGM

R0351 ABRFG (6D) P(I)

(A-DFG)

LUNAR LANDING TARGET PARAMETERS (METERS PER CSEC SQUARED)

HIGHGATE
ACCELERATION VECTOR, BRAKING PHASEA0353
R0354
R0355
R0356
A0357+0 2DEC* -5.22722473 E- 5 B+04 *
+2 2DEC* +0.00000000 E+ 0 B+04 *
+4 2DEC* -2.86621213 E- 4 B+04 *

23A LUNAR LANDING PGM

R0358 VBRFG* (2D) P(I)

LUNAR LANDING TARGET PARAMETERS (METERS PER CSEC)

VELOCITY SCALAR, BRAKING PHASE, HIGHGATE

A0360
R0361
A0362

2DEC* +3.86517612 E+ 0 B-10 *

23A LUNAR LANDING PGM

R0363 ABRFG* (2D) P(I)

LUNAR LANDING TARGET PARAMETERS (METERS PER CSEC SQUARED)

HIGH GATE
ACCELERATION SCALAR, BRAKING PHASEA0365
R0366
A0367

2DEC* -1.71972727 E- 3 B+04 *

23A LUNAR LANDING PGM

L	PACLOADS				USER'S PAGE NO. 9	EO
R0368 A0370 R0371 A0372	JBRFG* (2D)	P(I)	(J-OFZG)	LUNAR LANDING TARGET PARAMETERS (METERS PER CSEC CUBED) JERK SCALAR, BRAKING PHASE, HIGHGATE		
		2DEC*	-2.90216724 E- 8 B+18 *	23A LUNAR LANDING PGM		
R0373 A0375 R0376 R0377 R0378 A0379	RAPFG (6D)	P(I)	(R-1FG)	LUNAR LANDING TARGET PARAMETERS (METERS) RANGE VECTOR, APPROACH PHASE, LOWGATE		
	+C	2DEC*	+2.35092239 E+ 1 B-24 *			
	+2	2DEC*	+0.00000000 E+ 0 B-24 *	23A LUNAR LANDING PGM		
	+4	2DEC*	-5.28319999 E- 1 B-24 *			
R0380 A0382 R0383 R0384 R0385 A0386	VAPFG (6D)	P(I)	(V-1FG)	LUNAR LANDING TARGET PARAMETERS (METERS PER CSEC) VELOCITY VECTOR, APPROACH PHASE, LOWGATE		
	+0	2DEC*	-9.44879999 E- 3 B-10 *			
	+2	2DEC*	+0.00000000 E+ 0 B-10 *	23A LUNAR LANDNNG PGM		
	+4	2DEC*	+3.96239999 E- 3 B-10 *			
R0387 A0389 R0390 R0391 R0392 A0393	AAPFG (6D)	P(I)	(A-1FG)	LUNAR LANDING TARGET PARAMETERS (METERS PFR CSEC SQUARED) LOW GATE ACCELERATION VECTOR, APPROACH PHASE		
	+0	2DEC*	+1.52399999 E- 6 B+04 *			
	+2	2DEC*	+0.00000000 E+ 0 B+04 *	23A LUNAR LANDING PGM		
	+4	2DEC*	-1.98119999 E- 5 B+04 *			
R0394 A0396 R0397 A0398	VAPFG* (2D)	P(I)		LUNAR LANDING TARGET PARAMETERS (METERS PER CSEC) VELOCITY SCALAR, APPROACH PHASE, LOWGATE		
		2DEC*	+8.91539999 E- 3 B-10 *	23A LUNAR LANDING PGM		
R0399 A0401 R0402 A0403	AAPFG* (2D)	P(I)		LUNAR LANDING TARGET PARAMETERS (METERS PER CSEC SQUARED) LOW GATE ACCELERATION SCALAR, APPROACH PHASE		
		2DEC*	-1.18871999 E- 4 B+04 *	23A LUNAR LANDING PGM		
R0404 A0406 R0407 A0408	JAPFG* (2D)	P(I)	(J-1FZG)	LUNAR LANDING TARGET PARAMETERS (METERS PER CSEC CURED) JERK SCALAR, APPROACH PHASE, LOWGATE		
		2DEC*	+8.37249023 E- 8 B+18 *	23A LUNAR LANDING PGM		
R0409 A0411 R0412 A0413	VIGN (2D)	P(I)	(V-IGG)	LUNAR LANDING TARGET PARAMETERS (16.99 METERS PER SECOND) DESIRED SPEED FOR IGNITION		
		2DEC*	+1.69952182 E+ 1 B-10 *	23A LUNAR LANDING PGM		
R0414 A0416 A0417 R0418	RIGNX (2D)	P(I)	(R-IGXG)	LUNAR LANDING TARGET PARAMETERS (40127 METERS) DESIRED X-COMPONENT IN GUIDANCE COORDIN- ATES FOR IGNITION ("ALTITUDE")		
		2DEC*	-4.09432231 E+ 4 B-24 *	23A LUNAR LANDING PGM		

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A0419

R0420 RIGNZ (2D) P(I) (R-1GZG) LUNAR LANDING TARGET PARAMETERS (437347 METERS)
 A0422 DESIRED Z-COMPONENT IN GUIDANCE COORDIN-
 A0423 ATES FOR IGNITION ("GROUND RANGE")
 R0424 2DEC* -4.40014934 E+ 5 B-24 * 23A LUNAR LANDING PGM
 A0425

R0426 KIGNX/B4 (2D) P(I) (K-X) LUNAR LANDING TARGET PARAMETERS
 A0427 IGNITION ALGORITHM SENSITIVITY COEF.
 R0428 2DEC -.022499999 23A LUNAR LANDING PGM
 A0429

R0430 KIGNY/B8 (2D) P(I) (K-Y) LUNAR LANDING TARGET PARAMETERS
 A0431 IGNITION ALGORITHM SENSITIVITY COEF.
 R0432 2DEC -.174716605 23A LUNAR LANDING PGM
 A0433

R0434 KIGNV/B4 (2D) P(I) (K-V) LUNAR LANDING TARGET PARAMETERS
 A0435 IGNITION ALGORITHM SENSITIVITY COEF.
 R0436 2DEC -.165939331 23A LUNAR LANDING PGM
 A0437

R0438 LOWCRIT (1D) P(I) LUNAR LANDING TARGET PARAMETERS (2.7 LBS/BIT) (57% NOMINAL MAX THRUST)
 A0440 LOWER LIMIT BEYOND WHICH THROTTLE SET TO
 A0441 EITHER MAXIMUM OR TRUE VALUE
 R0442 1OCT 04251
 A0443

R0444 HIGHCRIT (1D) P(I) LUNAR LANDING TARGET PARAMETERS (LBS / BIT ; 63% NOMINAL MAX THRUST)
 A0446 UPPER LIMIT BEYOND WHICH THROTTLE SET TO
 A0447 EITHER MAXIMUM OR TRUE VALUE ?
 R0448 1OCT 04622
 A0449

R0450 TENCAPPR (1D) P(I) LUNAR LANDING TARGET PARAMETERS (10 SECONDS)
 A0452 TIME CRITERION FOR SWITCHING OUT OF
 A0453 APPROACH PHASE QUADRATIC GUIDANCE
 R0454 DEC +10 E2 B-17 (BOTH ONEAND TWO-PHASE)
 A0455

LUM MEMO # 45

R0456 TENCBRK (1D) P(I) LUNAR LANDING TARGET PARAMETER (200 SECONDS)
 A0458 TIME CRITERION FOR SWITCH TO APPROACH
 A0459 PHASE (P64)
 R0460 DEC +20 E2 B-17 (TWO-PHASE LANDING MODE) LUM MEMO
 R0461 DEC +200 E2 B-17 (ONE-PHASE LANDING MODE) #45
 A0462

R0463 RPCRTIME (1D) P(I) LUNAR LANDING TARGET PARAMETERS (300 SECONDS)
 A0465 TIME CRITERION FOR REPOSITIONING LR

L PADLOADS

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A0466					ANTENNA
R0467	DEC	+5	E2 B-17	(TWO-PHASE LANDING MODE)	LUM MEMO
R0468	DEC	+300	F2 B-17	(ONE-PHASE LANDING MODE)	#45
A0469					
R0470	RPCRTCSW (1D)	P(2)		LUNAR LANDING TARGET PARAMETERS	(COS 45 DEGREES SCALED AT B+1)
A0472					X COMPONENT OF X-AXIS OF VEHICLE IN
A0473					STABLE MEMBER COORDINATES; CRITERION FOR
A0474					REPOSITIONING LR ANTENNA
R0475	DEC	00000		(TWO-PHASE LANDING MODE)	SUNLITER
R0476	DEC	.35356		(ONE-PHASE LANDING MODE)	# 260
A0477					
R0478	LRALPHA (1D)	P(1)	(ALPHA-1)	LANDING RADAR	P63-67 (6 DEGREES)
A0480					POSITION 1, X ROTATION
R0481	1CCT	01042			SUNLITER # 168
A0482					
R0483	LRBETA1 (1D)	P(1)	(BETA-1)	LANDING RADAR	P63-67 (24 DEGREES)
A0485					POSITION 1, Y ROTATION
R0486	1OCT	04210			
A0487					
R0488	LRALPHA2 (1D)	P(1)	(ALPHA-2)	LANDING RADAR	P63-67 (6 DEGREES)
A0490					POSITION 2, X ROTATION
R0491	1OCT	01042			SUNLITER # 168
R0492					
R0493	LRBETA2 (1D)	P(1)	(BETA-2)	LANDING RADAR	P63-67 (0 DEGREES)
A0495					POSITION 2, Y ROTATION
R0496	1DCT	00000			SUNLITER # 168
A0497					
R0498	LRHMAX (1D)	P(1)	(H-M)	LANDING RADAR	P63-67 (50,000 FEET)
A0500					ALTITUDE WEIGHTING FUNCTION PARAMETER
R0501	1DEC	15240			PCR # 253
A0502					
R0503	LRVMAX (1D)	P(1)	(V-M)	LANDING RADAR	P63-67 (2000 FT PER SECOND)
A0505					VELOCITY WEIGHTING FUNCTION PARAMETER
R0506	1DEC	.047625			SUNLITER # 168
A0507					
R0508	LRWH (1D)	P(1)	(K-H)	LANDING RADAR	P63-67 (.35 DEC)
A0510					ALTITUDE WEIGHTING FUNCTION PARAMETER
R0511	1DEC	.35			PCR # 253
A0512					
R0513	LRWVZ (1D)	P(1)	(K-VZ)	LANDING RADAR	P63-67 (.7 DEC)
A0515					Z VELOCITY WEIGHTING FUNCTION PARAMETER

L PADLOADS

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R0516 A0517		1 DEC	.7	SUNLITER # 168	
R0518 A0520 R0521 A0522	LRWVY (1D)	P (I)	(K-VY)	LANDING RADAR P63-67	(.7 DEC) Y VELOCITY WEIGHTING FUNCTION PARAMETER
		1 DEC	.7	SUNLITER # 168	
R0523 A0525 R0526 A0527	LRWVX (1D)	P (I)	(K-VX)	LANDING RADAR P63-67	(.4 DEC) X VELOCITY WEIGHTING FUNCTION PARAMETER
		1 DEC	.4	SUNLITER # 168	
R05271 A05273 R05274 A05275	DELQFIX (2D)	P (I)	DELQFIX	R12	50 FEET LR ALT DATA REASONABLENESS TEST PARAM.
		2 DEC	15.24 B-24	PCRS 639 & 248	
R0528 A0530 R0531 A0532	TBRKPNT (1D)	P (I)		P70-71 ASCENT	(540 SEC OR 54000 CSEC) TFI BRANCH TIME; ABORT TARGET
		1 DEC	54000 B-17	PCR # 133	
R0533 A0535 A0536 A0537 R0538 A0539	ABTVINJ1 (2D)	P (I)		P70-71 ASCENT	(5551 FEET / SEC) DESIRED INJECTION VELOCITY FOR TFI BRANCH TIME LESS THAN TBRKPNT; VELOCITY REQUIRED TO GAIN 60 NM APOLONE ORBIT
		2 DEC	16.91945 B-7	PCR # 133	
R0540 A0542 A0543 A0544 R0545 A0546	ABTVINJ2 (2D)	P (I)		P70-71 ASCENT	(5510 FEET / SEC) DESIRED INJECTION VELOCITY FOR TFI BRANCH TIME GREATER THAN TBRKPNT; VEL REQUIRED TO GAIN 30 NM APOLONE ORBIT
		2 DEC	16.79448 B-7	PCR # 133	
R0547 A0549 R0550 A0551	TLAND (2D)	P (U)		LUNAR LANDING TARGET PARAMETERS (2DEC 34573411 <CSEC>)	BRAKING PHASE TIME OF LANDING ON MOON
			LAUNCH DATE DEPENDENT		
R0552 A0554 A0555 R0556 A0557	RLS (6D)	P (U)	(R-LS)	P20-22 LUNAR SURFACE NAVIGATION	(1.7 TIMES 10**6 METERS; 0 M; 0 METER) SAMPLE VALUE AT 0 DEG LATITUDE & LONGITUD LANDING SITE VECTOR, MOON REFERENCE
			LAUNCH DATE DEPENDENT		
R0558 A0560	504LM (6D)	P (I)	(L-M)	PLANETARY INERTIAL ORIENTATION	(RADIANS) 8.5 X 10**-5 73.9 X 10**-5

L PADLOADS

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A0561
 A0562
 A0563
 R0564
 A0565
 LAUNCH DATE DEPENDENT
 6.6 X 10**⁻⁵
 MOON LIBRATION VECTOR EXPRESSED AT MID-
 POINT OF MISSION IN MOON FIXED COORDIN.

R0566 TEPFEM (3D) P(U) (T-O) LUNAR + SOLAR EPHEMERIDES,P50S (2.23452 X 10**⁻⁹ CSEC)
 A0568
 A0569
 A0570
 A0571
 R0572 +0 DEC LAUNCH DATE DEPENDENT
 R0573 +1 2DEC
 A0574

R0575 AXD (2D) P(I) (A-X-TLO) PLANETARY INERTIAL ORIENTATION (4.65 X 10**⁻⁵ RADIANS)
 A0577
 A0578
 A0579
 A0580
 A0581
 R0582
 A0583
 LAUNCH DATE DEPENDENT
 EARTH ANALOGS OF 504LM
 FUNCTION OF LAUNCH TIME USED BY NAVIGA-
 TION PROGRAMS
 SMALL ANGLE ABOUT THE X-AXIS OF BASIC
 REFERENCE COORDINATE SYSTEM.....

R0584 -AYD (2D) P(I) (A-Y-TLO) PLANETARY INFRTIAL ORIENTATION (2.147 X 10**⁻⁵ RADIANS)
 A0586
 A0587
 A0588
 A0589
 A0590
 R0591
 A0592
 LAUNCH DATE DEPENDENT
 SEE AXO COMMENTS
 SMALL ANGLE ABOUT THE Y AXIS OF BASIC
 REFERENCE COORDINATE SYSTEM THAT DES-
 CRIBES THE PRECESSION AND NUTATION OF
 THE EARTH'S POLAR AXIS

R0593 AZD (2D) P(I) (A-Z-O) PLANETARY INERITAL ORIENTATION (.7753 REVOLUTIONS)
 A0595
 A0596
 A0597
 A0598
 R0599
 A0600
 LAUNCH DATE DEPENDENT
 ANGLE BETWEEN THE X AXIS OF BASIC REF
 COORDINATE SYSTEM AND THE X AXIS OF THE
 EARTH-FIXED COORDINATE SYSTEM AT
 --,196- UNIVERSAL TIME

R0601 REFSMMAT (18D) PGM P50'S COMPUTE; MOST MAJOR PGMS. (ORTHOGONAL UNIT VECTORS) SEE BELOW
 A0603
 A0604
 A0605
 R0606 A S V +0 2DEC +.155540134
 R0607 A A +2 2DEC -.441118568
 R0608 M L +4 2DEC -.176696562
 R0609 P U +6 2DEC -.001190874
 R0610 L E +10 2DEC -.186282563
 23A LUNAR LANDING PGM

L PALOADS

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R0611 E . +12 2 DEC +.464001495
 R0612 . . +14 2 DEC -.475190328
 R0613 . . +16 2 DEC -.143920862
 R0614 . . +20 2 DEC -.058999463
 A0615

R0616 RRECTCSM (6D) U(PGM) (R-C0) INTEGRATION INITIALIZATION (METERS, B-29 OR B-27 IF EARTH OR MOON)
 A0618 PERMANENT STATE VECTORS AND TIMES
 A0619 RECTIFICATION POSITION VECTOR FOR CSM
 A0620

R0621 RRECTLEM (6D) U(PGM) (R-L-0) INTEGRATION INITIALIZATION (METERS, B-29 OR B-27 IF EARTH OR MOON)
 A0623 PERMANENT STATE VECTORS AND TIMES
 A0624 RECTIFICATION POSITION VECTOR FOR LEM
 A0625

R0626 VRECTCSM (6D) U(PGM) (V-C-0) INTEGRATION INITIALIZATION (M/CSEC, B-7 OR B-5 IF EARTH OR MOON)
 A0628 PERMANENT STATE VECTORS AND TIMES
 A0629 RECTIFICATION VELOCITY VECTOR FOR CSM
 A0630

R0631 VRECTLEM (6D) U(PGM) (V-L-0) INTEGRATION INITIALIZATION (M/CSEC, B-7 OR B-5 IF EARTH OR MOON)
 A0633 PERMANENT STATE VECTORS AND TIMES
 A0634 RECTIFICATION VELOCITY VECTOR FOR LEM
 A0635

R0636 RCVCSM (6D) U(PGM) (R-C-CON) INTEGRATION INITIALIZATION (METERS, B-29 OR B-27 IF EARTH OR MOON)
 A0638 PERMANENT STATE VECTORS AND TIMES
 A0639 CONIC POSITION VECTOR FOR CSM
 A0640 EQUALS RRECTCSM IF TCCSM = 0
 A0641

R0642 RCVLEM (6D) U(PGM) (R-L-CON) INTEGRATION INITIALIZATION (METERS, B-29 OR B-27 IF EARTH OR MOON)
 A0644 PERMANENT STATE VECTORS AND TIMES
 A0645 CONIC POSITION VECTOR FOR LEM
 A0646 EQUALS RRECTLEM IF TCLEM = 0
 A0647

R0648 VCVCSM (6D) U(PGM) (V-C-CON) INTEGRATION INITIALIZATION (M/CSEC, B-7 OR B-5 IF EARTH OR MOON)
 A0650 PERMANENT STATE VECTORS AND TIMES
 A0651 CONIC VELOCITY VECTOR FOR CSM
 A0652 EQUALS VRECTCSM IF TCCSM = 0
 A0653

R0654 VCVLEM (6D) U(PGM) (V-L-CON) INTEGRATION INITIALIZATION (M/CSEC, B-7 OR B-5 IF EARTH OR MOON)
 A0656 PERMANENT STATE VECTORS AND TIMES
 A0657 CONIC VELOCITY VECTOR FOR LEM
 A0658 EQUALS VRECTLEM IF TCLEM = 0
 A0659

L	PACLOADS				USER'S PAGE NO. 15	EO
R0660 A0662 A0663 A0664 R0665 A0666	DELTACSM (6D)	P(U)	(DELTA-C)	INTEGRATION INITIALIZATION	(METERS, B-22 OR B-18 IF EARTH OR MOON) PERMANENT STATE VECTORS AND TIMES POSITION DEVIATION VECTOR FOR CSM = 0 IF TCCSM = 0	
		6DEC	0	LUMINARY LIST, INT. INIT.		
R0667 A0669 A0670 A0671 R0672 A0673	DELTALEM (6D)	P(U)	(DELTA-L)	INTEGRATION INITIALIZATION	(METERS, B-22 OR B-18 IF EARTH OR MOON) PERMANENT STATE VECTORS AND TIMES POSITION DEVIATION VECTOR FOR LEM = 0 IF TCLFM = 0	
		6DEC	0	LUMINARY LIST, INT. INIT.		
R0674 A0676 A0677 A0678 R0679 A0680	NUVCSM (6D)	P(U)	(UPSILON-C)	INTEGRATION INITIALIZATION	(M/CSEC, B-3 OR B-(-1) IF EARTH OR MOON) PERMANENT STATE VECTORS AND TIMES VELOCITY DEVIATION VECTOR FOR CSM = 0 IF TCCSM = 0	
		6DEC	0	LUMINARY LIST, INT. INIT.		
R0681 A0683 A0684 A0685 R0686 A0687	NUVLEM (6D)	P(U)	(UPSILON-L)	INTEGRATION INITIALIZATION	(M/CSEC, B-3 OR B-(-1) IF EARTH OR MOON) PERMANENT STATE VECTORS AND TIMES VELOCITY DEVIATION VECTOR FOR LEM = 0 IF TCLFM = 0	
		6DEC	0	LUMINARY LIST, INT. INIT.		
R0688 A0690 A0691 A0692 A0693 A0694 R0695 A0696	TCCSM (2D)	P(U)	(TAU-C)	INTEGRATION INITIALIZATION	(0 CSEC, B-28) PERMANENT STATE VECTORS AND TIMES TIME SINCE RECTIFICATION FOR CSM TIME ASSOCIATED WITH CSM CONIC POSITION, CONIC VELOCITY, POSITION DEVIATION AND VELOCITY DEVIATION VECTORS	
		2DEC	0	LUMINARY LIST, INT. INIT.		
R0697 A0699 A0700 A0701 R0702 A0703	TCLFM (2D)	P(U)	(TAU-L)	INTEGRATION INITIALIZATION	(0 CSEC, B-28) PERMANENT STATE VECTORS AND TIMES TIME SINCE RECTIFICATION FOR LEM TIME ASSOCIATED WITH LEM CONICS AS ABOVE	
		2DEC	0	LUMINARY LIST, INT. INIT.		
R0704 A0706 A0707 A0708 A0709	TETCSM (2D)	U(PGM)	(T-C)	INTEGRATION INITIALIZATION	(CSEC, B-28) PERMANENT STATE VECTORS AND TIMES THE TIME THAT STATE VECTOR IS VALID; LUNAR ORBIT DEPENDENCE ON REAL TIME	

L PADLOADS

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R0710 TETLEM (2D) U(PGM) (T-L)
A0712
A0713
A0714
A0715

INTEGRATION INITIALIZATION

(CSEC, B-28)
PERMANENT STATE VECTORS AND TIMES
THE TIME THAT STATE VECTOR IS VALID;
LUNAR ORBIT DEPENDENCE ON REAL TIME

R0716 XKEPCSM (2D) P(U) (X-C)
A0718
A0719
A0720
R0721 2DEC 0
A0722

INTEGRATION INITIALIZATION

(M**1/2, B-17 OR B-16 IF EARTH OR MOON)
PERMANENT STATE VECTORS AND TIMES
ROOT OF KEPLER'S EQUATION FOR CSM
= 0 IF TCCSM = 0

LUMINARY LIST, INT. INIT.

R0723 XKEPLEM (2D) P(U) (X-L)
A0725
A0726
A0727
R0728 2DEC 0
A0729

INTEGRATION INITIALIZATION

(M**1/2, B-17 OR B-16 IF EARTH OR MOON)
PERMANENT STATE VECTORS AND TIMES
ROOT OF KEPLER'S EQUATION FOR LFM
= 0 IF TCLEM = 0

LUMINARY LIST, INT. INIT.

L CONTROLLED CONSTANTS

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P0001 DPS AND APS ENGINE PARAMETERS

0002	REE	1	36,2000	SETLOC P40S
0003			36,2000	BANK
0004	REE	1		COUNT* \$\$/P40

R0005 *** THE ORDER OF THE FOLLOWING SIX CONSTANTS MUST NOT BE CHANGED ***

0006			36,2000	01056 0	FDP5	2DEC	4.3670 B-7	9817.5 LBS FORCE IN NEWTONS
0006			36,2001	37167 0				
0007			36,2002	00457 1	MDQTDPS	2DEC	0.1480 B-3	32.62 LBS/SEC IN KGS/CS.
0007			36,2003	03250 0				
0008			36,2004	77777 0	DTDECAY	2DEC	-38	
0008			36,2005	77731 1				
0009			36,2006	00307 0	EAPS	2DEC	1.5569 B-7	3500 LBS FORCE IN NEWTONS
0009			36,2007	11040 0				
0010			36,2010	00151 1	MDQTAPS	2DEC	0.05135 B-3	11.32 LBS/SEC IN KGS/CS
0010			36,2011	05214 0				
0011			36,2012	77777 0	ATDECAY	2DEC	-10	
0011			36,2013	77765 0				

R0012 *****

0013			36,2014	00026 0	FRCS4	2DEC	0.17792 B-7	400 LBS FORCE IN NEWTONS
0013			36,2015	30605 1				
0014			36,2016	00013 0	FRCS2	2DEC	0.08896 B-7	200 LBS FORCE IN NEWTONS
0014			36,2017	14303 1				
0015	REF	1	27,2000		SETLOC P40S1			
0016			27,2000		BANK			
0017	REF	1			COUNT* \$\$/P40			

R0018 *** APS IMPULSE DATA FOR P42 *****

0019			27,2000	00000 1	K1VAL	2DEC	124.55 B-23	2800 LB-SEC
0019			27,2001	07622 0				
0020			27,2002	00000 1	K2VAL	2DEC	31.138 B-24	700 LB-SEC
0020			27,2003	00762 1				
0021			27,2004	00030 1	K3VAL	2DEC	1.5569 B-10	FAPS (3500 LBS THRUST)
0021			27,2005	35104 1				

R0022 *****

0023			27,2006	00016 0	S40.136	2DEC	.4671 B-9	.4671 M NEWTONS (DPS)
0023			27,2007	36237 1				
0024			27,2010	35711 0	S40.136	2DEC	.4671 B+1	S40.136 SHIETED LEFT 10.
0024			27,2011	35663 1				
0025	REF	1	32,2000		SFTLOC ABORTS			
0026			32,2000		BANK			
0027	REF	1			COUNT* \$\$/P70			

0028			32,2000	03631 0	(1/DV)A	2DEC	15.20 B-7	2 SECONDS WORTH OF INITIAL ASCENT
0028			32,2001	23146 0				

L CONTROLLED CONSTANTS

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A0029								STAGE ACCELERATION -- INVERTED (M/CS)
A0030								1) PREOICATED ON A LIFTOFF MASS OF
A0031								4869.9 KG (SNA-8-D-027 7/11/68)
A0032								2) PREOICATED ON A CONTRIBUTION TO VEH-
A0033								ICLE ACCELERATION FROM RCS THRUSTERS
A0034								EQUIV. TO 1 JET ON CONTINUOUSLY.
0035		32,2002	33226 1	K(1/OV)	2DEC	436.70	B-9	DPS ENGINE THRUST IN NEWTONS / 100 CS.
0035		32,2003	14632 0					
0036		32,2004	05306 1	(AT)A	2DEC	3.2883	E-4 B9	INITIAL ASC. STG. ACCELERATION ** M/CS.
0036		32,2005	15503 0					
A0037								ASSUMPTIONS SAME AS FOR (1/DV)A.
0038		32,2006	26337 1	(TBUP)A	2DEC	91902	B-17	ESTIMATED BURN-UP TIME OF THE ASCENT STG
0038		32,2007	30000 1					
A0039								ASSUMPTIONS SAME AS FOR (1/DV)A WITH THE
A0040								ADDITIONAL ASSUMPTION THAT NET MASS-FLOW
A0041								RATE = 5.299 KG/SEC = 5.135 (APS) +
A0042								.164 (1 RCS JET).
0043	REF	1	30,2000					SETLOC ASENT
0044			30,2000					BANK
0045	REF	1						COUNT* \$\$/ASENT
0046			30,2000	02445 0	AT/RCS	2DEC	.0000785	B+10 4 JETS IN A DRY LEM
0046			30,2001	00274 0				
0047	REF	1	33,2000					SETLOC SERVICES
0048			33,2000					BANK
0049	REF	1						COUNT* \$\$/SERV
R0050	*** THE ORDER OF THE FOLLOWING TWO CONSTANTS MUST NOT BE CHANGED *****							
0051			33,2000	41545 0	APSVEX	OEC	-3030	E-2 B-5 9942 FT/SEC IN M/CS.
0052			33,2001	42365 1	DPSVEX	DEC	-2952	E-2 B-5 9684 FT/SEC IN M/CS.
R0053	*****							
0054	REF	1	31,2000					SETLOC F2DPS*31
0055			31,2000					BANK
0056	REF	1						COUNT* \$\$/F20PS
0057			31,2000	00233 0	TRIMACCL	2DEC*	+3.7055	E-5 B+8* ACCELERATION DURING TRIM PHASE.
0057			31,2001	15340 1				

L CONTROLLED CONSTANTS

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P0058 THROTTILING AND THRUST DETECTION PARAMETERS

0059	REF	2	LAST	53	36,2000			SETLOC P40S		
0060					36,2020			BANK		
0061	REF	2	LAST	53	TO 53:	16	16*	COUNT*	\$\$/P40	
0062					36,2020	00030	1	THRESH1	DEC	24
0063					36,2021	00014	1	THRESH3	DEC	12
0064	REF	1			4737			HIRTHROT	=	BIT13
0065	REF	1			6000			SETLOC FFTAG5		
0066					6000			BANK		
0067	REF	1						COUNT*	\$\$/P40	
0068					6000	00464	1	THRESH2	DEC	308
0069	REF	1			31,2000			SETLOC FTHPCT		
0070					31,2002			BANK		
0071	REF	1						COUNT*	\$\$/THROT	
0072					31,2002	07432	0	FMAXODD	DEC	+3866
0073					31,2003	07012	0	FMAXPOS	DEC	+3594
0074					31,2004	00024	1	THROTLAG	DEC	20
										FMAX 43245 NEWTONS
										EMPIRACALLY DETERMINED THROTTLE LAG TIME
0075	REF	1			32,2000			SETLOC F2DPS*32		
0076					32,2010			BANK		
0077	REF	1						COUNT*	\$\$/F2DPS	
0078					32,2010	00044	1	DPSTHRSH	DEC	36
										(THRESH1 + THRESH3 FOR P63)

L CONTROLLED CONSTANTS

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P0082 LM HARDWARE-RELATED PARAMETERS

0083	REF	1		25,2000			SETLOC RADARUPT		
0084				25,2000			BANK		
0085	REF	1					COUNT* \$\$/RPUPT		
0086				25,2000	47777 0	LVELBIAS DEC	-12288		LANDING RADAR BIAS FOR 153.6 KC.
0087				25,2001	00001 0	RDOTBIAS 2DEC	17000		BIAS COUNT FOR RR RANGE RATE.
0087				25,2002	01150 1				
0088	REF	1		32,2000			SETLOC LRS22		
0089				32,2011			BANK		
0090	REF	1					COUNT* \$\$/LRS22		
0091				32,2011	70123 0	RDOTCONV 2DEC	-0.0019135344	B7	CONVERTS RR RDOT READING TO M/CS AT 2(7)
0091				32,2012	40702 0				
0092				32,2013	13337 1	RANGCONV 2DEC	2.859024	B-3	CONVERTS RR RANGE READING TO M. AT 2(-29
0092				32,2014	10776 0				
0093	REF	2	LAST	55	31,2000		SETLOC FTHRCT		
0094					31,2005		BANK		
0095	REF	2	LAST	55 TO	55:	3	3*		COUNT* \$\$/THROT
0096				31,2005	00317 1	SCALEFAC 2DEC	51.947	B-12	SCALES A (AT 2(-4) M/CS/CS) TIMES MASS
0096				31,2006	31157 0				(AT 2(16) KGS.) TO PULSE UNITS.
A0097									
0098	REF	2	LAST	54	33,2000		SETLOC SEPVICES		
0099					33,2002		BANK		
0100	REF	2	LAST	54 TO	54:	2	2*		COUNT* \$\$/SERV
0101				33,2002	61000 0	HBEAMANT 2DEC	-0.4687018041		RANGE BEAM IN LR ANTENNA COORDINATES.
0101				33,2003	71210 1				
0102				33,2004	00000 1		2DEC	0	
0102				33,2005	00000 1				
0103				33,2006	72333 1		2DEC	-0.1741224271	
0103				33,2007	45546 1				
0104				33,2010	65363 1	HSCAL 2DEC	-0.3288792		SCALES 1.079 FT/BIT TO 2(22)M.
0104				33,2011	64451 0				
R0105	***** THE SEQUENCE OF THE FOLLOWING CONSTANTS MUST BE PRESERVED *****								
0106				33,2012	21241 0	VZSCAL 2DEC	+0.5410829105		SCALES .8668 FT/SEC/BIT TO 2(18) M/CS.
0106				33,2013	03216 1				
0107				33,2014	30153 0	VYSCAL 2DEC	+0.7565672446		SCALES 1.212 FT/SEC/BIT TO 2(18) M/CS.
0107				33,2015	23101 0				
0108				33,2016	63105 0	VXSCAL 2DEC	-0.4020043770		SCALES -0.644 FT/SEC/BIT TO 2(18) M/CS.
0108				33,2017	61733 1				

L CONTROLLED CONSTANTS

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R0109 *****

0110		33,2020	01507 1	KPIP	DEC	.0512	SCALES DELV TO UNITS OF 2(5) M/CS.
0111		33,2021	00321 1	KPIP1	2DEC	.0128	SCALES DELV TO UNITS OF 2(7) M/CS.
0111		33,2022	26706 1				
0112		33,2023	00150 0	KPIP2	2DEC	.0064	SCALES DELV TO UNITS OF 2(8) M/CS.
0112		33,2024	33343 0				
0113		33,2025	02630 0	ALTCONV	2DEC	1.399078846	B-4 CONVERTS M*2(-24) TO BIT UNITS *2(-28).
0113		33,2026	25010 1				
0114		33,2027	24402 1	ARCONV1	2DEC	656.167979	B-10 CONV. ALTRATE COMP. TO BIT UNITS<
0114		33,2030	26003 0				
0115	REF	1	21,2000			SETLOC R10	
0116			21,2000			BANK	
0117	REF	1				COUNT* \$\$/P10	
0118			21,2000	24402 1	ARCONV	OCT	24402 656.1679798B-10 CONV ALTRATE TO BIT UNIT
0119			21,2001	01551 1	ARTOA	DEC	.1066098 B-1 .25/2.345 B-1 4X/SEC CYCLE RATE.
0120			21,2002	21357 0	ARTOA2	DEC	.0021322 B8 (.5)/(2.345)(100)
0121			21,2003	22316 0	VELCONV	OCT	22316 588.914 B-10 CONV VEL. TO BIT UNITS.
0122			21,2004	01507 1	KPIPI(5)	DEC	.0512 SCALES DELV TO M/CS*2(-5).
0123			21,2005	00547 1	MAXVBITS	OCT	00547 MAX. DISPLAYED VELOCITY 199.9989 FT/SEC.
0124	REF	1	20,2000			SETLOC DAPS3	
0125			20,2000			BANK	
0126	REF	1				COUNT* \$\$/DAPAD	
0127			20,2000	01150 1	TORKJET1	DEC	.03757 550 / .2 SCALED AT (+16) 64 / 180

L CONTROLLED CONSTANTS

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P0128 PARAMETERS RELATING TO MASS, INERTIA, AND VEHICLE DIMENSTIONS

0129	REF	1		05,2000				SETLOC FRANDRES		
0130				05,2000				BANK		
0131	REF	1						COUNT* \$\$/START		
0132				05,2000	02357	1	FULLAPS	DEC	5050 B-16	NOMINAL FULL ASCENT MASS -- 2(16) KG.
0133	REF	1		01,2000				SETLOC LOADDAP1		
0134				01,2000				BANK		
0135	REF	1						COUNT* \$\$/R03		
0136				01,2000	76466	1	MINLMD	DEC	-2850 B-16	MIN. DESCENT STAGE MASS -- 2(16) KG.
0137				01,2001	76731	0	MINMINLM	DEC	-2200 B-16	MIN ASCENT STAGE MASS -- 2(16) KG.
0138	REF	1		4741			MINCSM	=	BIT11	MIN CSM MASS (OK FOR 1/ACCS) = 9050 LBS
0139	REF	2	LAST	57	20,2000			SETLOC DAPS3		
0140					20,2001			BANK		
0141	REF	2	LAST	57 TO	58:	1	1*	COUNT* \$\$/DAPAD		
0142				20,2001	01046	1	LOASCENT	DEC	2200 B-16	MIN ASCENT LEM MASS -- 2(16) KG.
0143				20,2002	07361	1	HIDESCNT	DEC	15300 B-16	MAX DESCENT LEM MASS -- 2(16) KG.
0144				20,2003	00666	1	LODESCNT	DEC	1750 B-16	MIN DESCENT STAGE (ALONE) -- 2(16) KG.

L CONTROLLED CONSTANTS

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P0145 PHYSICAL CONSTANTS (TIME - INVARIANT)

0146	REF	1	37,2000			SETLOC IMU2
0147			37,2000			BANK
0148	REF	1				COUNT* \$\$/P07
0149			37,2000	07623 1	OMEG/MS	2DEC .24339048
0149			37,2001	26552 1		
0150	REF	1	22,2000			SETLOC R30LOC
0151			22,2000			BANK
0152	REF	1				COUNT* \$\$/R30

R0153 *** THE ORDER OF THE FOLLOWING TWO CONSTANTS MUST BE PRESERVED *****

0154			22,2000	27533 1	1/RTMUM	2DEC* .45162595 E-4 B14*
0154			22,2001	07571 0		
0155			22,2002	25004 1	1/RTMUE	2DEC* .50087529 E-5 B17*
0155			22,2003	06702 1		

R0156 *****

0157	REF	2	LAST	53	27,2000	SETLOC P40S1
0158					27,2012	BANK
0159	REF	1				COUNT* \$\$/S40.9

0160			27,2012	55340 0	EARTHMU	2DEC* -3.986032 E10 B-36*	M(3)/CS(2)
0160			27,2013	61710 0			
0161	REF	2	LAST	54	31,2000	SETLOC F2DPS*31	
0162			31,2007			BANK	
0163	REF	2	LAST	54 TO	55: 2 2*	COUNT* \$\$/F2DPS	

0164			31,2007	77765 0	MOONG	2DEC -1.6226 E-4 B2
0164			31,2010	53556 1		
0165	REF	1	30,2000			SETLOC P12
0166			30,2002			BANK
0167	REF	1				COUNT* \$\$/P12

0168			30,2002	00072 1	MUM(-37)	2DEC* 4.9027780 E8 B-37*
0168			30,2003	16206 1		
0169			30,2004	00344 1	MOONRATE	2DEC* .26616994890062991 E-7 B+19* RAD/CS.
0169			30,2005	24331 0		
0170	REF	3	LAST	56	33,2000	SETLOC SERVICES
0171			33,2031			BANK
0172	REF	3	LAST	56 TO	57: 23 25*	COUNT* \$\$/SRV

R0173 *** THE ORDER OF THE FOLLOWING TWO CONSTANTS MUST BE PRESERVED *****

0174			33,2031	61377 0	-MUOT	2DEC* -7.9720645 E+12 B-44*
0174			33,2032	55754 1		
0175			33,2033	77644 1	-MUOT1	2DEC* -9.8055560 E+10 B-44*
0175			33,2034	65556 1		

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R0176 *****

0177			33,2035	64453 1	-MUDTMUN 2DEC*	-9.8055560 E+10 B-38*
0177			33,2036	55670 0		
0178			33,2037	00002 0	RESQ 2DEC*	40.6809913 F12 B-58*
0178			33,2040	11777 0		
0179			33,2041	01023 1	20J 2DEC	3.24692010 E-2
0179			33,2042	37155 1		
0180			33,2043	00065 1	2J 2DEC	3.24692010 E-3
0180			33,2044	06244 0		
0181	REF	1	14,2000		SETLOC	P50S1
0182			14,2000		BANK	
0183	REF	1			COUNT*	\$\$/LOSAM
0184			14,2000	26723 0	RSUBEM 2DEC	384402000 B-29
0184			14,2001	00450 0		
0185			14,2002	00065 1	RSUBM 2DEC	1738090 B-29
0185			14,2003	01265 1		
0186			14,2004	00302 0	RSUBE 2DEC	6373166 B-29
0186			14,2005	24533 1		
0187			14,2006	00052 0	RDE 2DEC	.00257125
0187			14,2007	04047 0		
0188	REF	1	04,2000		SETLOC	CONICS1
0189			04,2000		BANK	
0190	REF	1			COUNT*	\$\$/LT-LG
0191			04,2000	00302 0	ERAD 2DEC	6373338 B-29 PAD RADIUS
0191			04,2001	17755 0		
0192			04,2002	00065 1	504RM 2DEC	1738090 B-29 METERS B-29 (EQUATORIAL MOON RADIUS)
0192			04,2003	01265 1		
0193	REF	2 LAST 60	04,2000		SETLOC	CONICS1
0194			04,2004		BANK	
0195	REF	1			COUNT*	\$\$/CCNIC

R0196 *** THE ORDER OF THE FOLLOWING CONSTANTS MUST BE PRESERVED *****

0197		04,2004	22437 1	MUTABLE 2DEC*	3.986032 E10 B-36* MUE
0197		04,2005	16067 1		
0198		04,2006	15625 1	2DEC*	.25087606 E-10 B+34* 1/MUE
0198		04,2007	21042 1		
0199		04,2010	30276 1	2DEC*	1.99650495 E5 B-18* SQRT(MUE)
0199		04,2011	04773 0		
0200		04,2012	25004 1	2DEC*	.50087529 E-5 B+17* 1/SQRT(MUE)
0200		04,2013	06702 1		
0201		04,2014	16471 1	2DEC*	4.902778 F8 B-30* MUM
0201		04,2015	01352 1		
0202		04,2016	21412 0	2DEC*	.203966 E-8 B+28* 1/MUM
0202		04,2017	20500 0		

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0203		04,2020	25477 1	2DEC*	2.21422176 E4 B-15*	SQRT(MUM)
0203		04,2021	03367 0			
0204		04,2022	27533 1	2DEC*	.45162595 E-4 B+14*	1/SQRT(MUM)
0204		04,2023	07571 0			

R0205 *****

0206	REF	1	13,2000		SETLOC INITIAT	
0207			13,2000		BANK	
0208	REF	1			COUNT* \$\$/INTIN	
0209			13,2000	07112 1	OMEGMOON 2DEC*	2.66169947 E-8 B+23*
0209			13,2001	06620 0		
0210	REF	1	13,2000		SETLOC ORBITAL2	
0211			13,2002		BANK	
0212	REF	1			COUNT* \$\$/ORBIT	

R0213 *** THE ORDER OF THE FOLLOWING CONSTANTS MUST NOT BE CHANGED *****

0214			13,2002	27446 1	2DEC*	1.32715445 E16 B-54*	S
0214			13,2003	14620 0			
0215			13,2004	16471 1	MUM 2DEC*	4.9027780 E8 B-30*	M
0215			13,2005	01352 1			
0216			13,2006	22437 1	MUEARTH 2DEC*	3.986032 E10 B-36*	
0216			13,2007	16067 1			
0217			13,2010	00000 1	2DEC	0	
0217			13,2011	00000 1			
0218			13,2012	02302 1	J4REQ/J3 2DEC*	.4991607391 E7 B-26*	
0218			13,2013	24736 0			
0219			13,2014	00000 1	2DEC	0	
0219			13,2015	00000 1			
0220			13,2016	77776 1	2J3RE/J2 2DEC*	-.1355426363 E5 B-27*	
0220			13,2017	53032 0			
0221			13,2020	10407 0	2DEC*	.3067493316 E18 B-60*	
0221			13,2021	05344 1			
0222			13,2022	13710 0	J2REQSQ 2DEC*	1.75501139 E21 B-72*	
0222			13,2023	35320 0			
0223			13,2024	12160 0	3J22R2MU 2DEC*	9.20479048 E16 B-58*	
0223			13,2025	12124 0			

R0224 *****

0225	REF	1	27,2000		SETLOC TOF-FF1	
0226			27,2014		BANK	
0227	REF	1			COUNT* \$\$/TFF	
0228			27,2014	24775 1	1/RTMU 2DEC*	.5005750271 E-5 B17* MODIFIED EARTH MU
0228			27,2015	30424 0		
0229	REF	1	42,2000		SETLOC SBAND	
0230			42,2000		BANK	
0231	REF	1			COUNT* \$\$/P05	

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0232	42,2000	26723 0	REMDIST	2DEC	384402000 B-29	MEAN DISTANCE BETWEEN EARTH AND MOON.
0232	42,2001	00450 0				

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P0233 PHYSICAL CONSTANTS (TIME - VARIANT)

0234	REF	1	14,2000	SETLOC	STARTAB			
0235			14,2010	BANK				
0236	REF	1		COUNT*	\$/STARS			
0237			14,2010	15261	0	2DEC	+.8341953207	B-1 STAR 37 X
0237			14,2011	27231	1			
0238			14,2012	74126	1	20EC	-.2394362567	B-1 STAR 37 Y
0238			14,2013	61161	0			
0239			14,2014	70032	1	20EC	-.4967780649	B-1 STAR 37 Z
0239			14,2015	54470	0			
0240			14,2016	15013	1	20EC	+.8138753897	B-1 STAR 36 X
0240			14,2017	10432	0			
0241			14,2020	67066	0	20EC	-.5559063490	B-1 STAR 36 Y
0241			14,2021	40370	1			
0242			14,2022	02550	0	20EC	+.1690413589	B-1 STAR 36 Z
0242			14,2023	31133	1			
0243			14,2024	07207	0	2DEC	+.4540570017	B-1 STAR 35 X
0243			14,2025	24243	1			
0244			14,2026	67275	0	20EC	-.5393383149	B-1 STAR 35 Y
0244			14,2027	67544	0			
0245			14,2030	13261	0	2DEC	+.7091871552	B-1 STAR 35 Z
0245			14,2031	25121	1			
0246			14,2032	05075	0	2DEC	+.3200014224	B-1 STAR 34 X
0246			14,2033	16350	0			
0247			14,2034	70715	0	20EC	-.4436740480	B-1 STAR 34 Y
0247			14,2035	55404	1			
0248			14,2036	62466	1	2DEC	-.8371095679	B-1 STAR 34 Z
0248			14,2037	54577	0			
0249			14,2040	10650	0	2DEC	+.5518160037	B-1 STAR 33 X
0249			14,2041	17202	1			
0250			14,2042	63234	1	20EC	-.7934422090	B-1 STAR 33 Y
0250			14,2043	43704	0			
0251			14,2044	73710	0	20EC	-.2568045150	B-1 STAR 33 Z
0251			14,2045	50170	1			
0252			14,2046	07203	1	20EC	+.4535361097	B-1 STAR 32 X
0252			14,2047	13612	0			
0253			14,2050	61746	0	2DEC	-.8780537171	B-1 STAR 32 Y
0253			14,2051	77370	0			
0254			14,2052	02343	1	2DEC	+.1527307006	B-1 STAR 32 Z
0254			14,2053	05340	0			
0255			14,2054	03235	0	2DEC	+.2067145272	B-1 STAR 31 X
0255			14,2055	14762	1			
0256			14,2056	62030	0	20EC	-.8720349419	B-1 STAR 31 Y
0256			14,2057	51212	1			
0257			14,2060	70715	0	20EC	-.4436486945	B-1 STAR 31 Z
0257			14,2061	64117	1			
0258			14,2062	01744	1	2DEC	+.1216171923	B-1 STAR 30 X
0258			14,2063	11157	1			
0259			14,2064	63531	0	20EC	-.7703014754	B-1 STAR 30 Y
0259			14,2065	66055	1			

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0260	14,2066	12007 0	2DEC	+.6259751556	B-1	STAR 30	Z
0260	14,2067	37503 0					
0261	14,2070	76145 0	2DEC	-.1126265542	B-1	STAR 29	X
0261	14,2071	53477 0					
0262	14,2072	60372 1	2DEC	-.9694679589	B-1	STAR 29	Y
0262	14,2073	43624 0					
0263	14,2074	03370 0	2DEC	+.2178236347	B-1	STAR 29	Z
0263	14,2075	15121 1					
0264	14,2076	76123 0	2DEC	-.1147906312	B-1	STAR 28	X
0264	14,2077	64245 0					
0265	14,2100	72437 1	2DEC	-.3399437395	B-1	STAR 28	Y
0265	14,2101	45623 1					
0266	14,2102	61041 0	2DEC	-.9334138229	B-1	STAR 28	Z
0266	14,2103	57124 1					
0267	14,2104	72275 1	2DEC	-.3518772846	B-1	STAR 27	X
0267	14,2105	55365 1					
0268	14,2106	62641 0	2DEC	-.8239967165	B-1	STAR 27	Y
0268	14,2107	72150 0					
0269	14,2110	70712 1	2DEC	-.4440853383	B-1	STAR 27	Z
0269	14,2111	41542 1					
0270	14,2112	67363 0	2DEC	-.5328042377	B-1	STAR 26	X
0270	14,2113	50441 0					
0271	14,2114	64426 0	2DEC	-.7159448596	B-1	STAR 26	Y
0271	14,2115	77263 0					
0272	14,2116	07157 0	2DEC	+.4511569595	B-1	STAR 26	Z
0272	14,2117	34056 0					
0273	14,2120	63326 0	2DEC	-.7862552143	B-1	STAR 25	X
0273	14,2121	77723 1					
0274	14,2122	67516 1	2DEC	-.5216265404	B-1	STAR 25	Y
0274	14,2123	72566 1					
0275	14,2124	05231 1	2DEC	+.3312227199	B-1	STAR 25	Z
0275	14,2125	14031 0					
0276	14,2126	64753 1	2DEC	-.6899901699	B-1	STAR 24	X
0276	14,2127	63156 0					
0277	14,2130	71237 1	2DEC	-.4180817959	B-1	STAR 24	Y
0277	14,2131	42272 0					
0278	14,2132	66427 0	2DEC	-.5908647707	B-1	STAR 24	Z
0278	14,2133	64260 1					
0279	14,2134	66546 0	2DEC	-.5811943804	B-1	STAR 23	X
0279	14,2135	73302 1					
0280	14,2136	73261 0	2DEC	-.2907877154	B-1	STAR 23	Y
0280	14,2137	73575 1					
0281	14,2140	14122 0	2DEC	+.7600365758	B-1	STAR 23	Z
0281	14,2141	07016 1					
0282	14,2142	61247 1	2DEC	-.9171065276	B-1	STAR 22	X
0282	14,2143	42015 0					
0283	14,2144	72314 1	2DEC	-.3500098785	B-1	STAR 22	Y
0283	14,2145	67004 1					
0284	14,2146	74744 0	2DEC	-.1908106439	B-1	STAR 22	Z
0284	14,2147	74104 1					

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0285	14,2150	70605 0	2DEC	-.4524416631 B-1	STAR 21 X
0285	14,2151	63103 0			
0286	14,2152	77154 1	2DEC	-.0492700670 B-1	STAR 21 Y
0286	14,2153	54113 0			
0287	14,2154	61601 1	2DEC	-.8904319187 B-1	STAR 21 Z
0287	14,2155	62472 1			
0288	14,2156	60604 0	2DEC	-.9525633510 B-1	STAR 20 X
0288	14,2157	63166 0			
0289	14,2160	77033 1	2DEC	-.0591313500 B-1	STAR 20 Y
0289	14,2161	63044 1			
0290	14,2162	73162 0	2DEC	-.2985406935 B-1	STAR 20 Z
0290	14,2163	53261 1			
0291	14,2164	60431 1	2DEC	-.9656240240 B-1	STAR 19 X
0291	14,2165	63350 1			
0292	14,2166	00660 1	2DEC	+.0528067543 B-1	STAR 19 Y
0292	14,2167	22763 0			
0293	14,2170	04045 1	2DEC	+.2545224762 B-1	STAR 19 Z
0293	14,2171	01424 1			
0294	14,2172	62165 1	2DEC	-.8606970465 B-1	STAR 18 X
0294	14,2173	45335 0			
0295	14,2174	07327 0	2DEC	+.4638127405 B-1	STAR 18 Y
0295	14,2175	21564 0			
0296	14,2176	03267 1	2DEC	+.2099484122 B-1	STAR 18 Z
0296	14,2177	34557 1			
0297	14,2200	63472 0	2DEC	-.7741360248 B-1	STAR 17 X
0297	14,2201	50705 0			
0298	14,2202	11661 0	2DEC	+.6154234025 B-1	STAR 17 Y
0298	14,2203	21433 0			
0299	14,2204	75501 1	2DEC	-.1482142053 B-1	STAR 17 Z
0299	14,2205	72421 0			
0300	14,2206	70431 0	2DEC	-.4656165921 B-1	STAR 16 X
0300	14,2207	65316 0			
0301	14,2210	07510 1	2DEC	+.4775804724 B-1	STAR 16 Y
0301	14,2211	12666 1			
0302	14,2212	13727 1	2DEC	+.7450624681 B-1	STAR 16 Z
0302	14,2213	21520 0			
0303	14,2214	72161 1	2DEC	-.3611937602 B-1	STAR 15 X
0303	14,2215	43161 0			
0304	14,2216	11144 0	2DEC	+.5748077840 B-1	STAR 15 Y
0304	14,2217	32323 1			
0305	14,2220	64200 1	2DEC	-.7342581827 B-1	STAR 15 Z
0305	14,2221	76476 0			
0306	14,2222	71323 0	2DEC	-.4116502629 B-1	STAR 14 X
0306	14,2223	70264 0			
0307	14,2224	16403 1	2DEC	+.9066387314 B-1	STAR 14 Y
0307	14,2225	05717 0			
0308	14,2226	01365 0	2DEC	+.0924676785 B-1	STAR 14 Z
0308	14,2227	17662 0			
0309	14,2230	75055 0	2DEC	-.1818957154 B-1	STAR 13 X
0309	14,2231	75101 0			

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0310	14,2232	17030 1	2DEC	+.9405318128 B-1	STAR 13	Y
0310	14,2233	32613 1				
0311	14,2234	73321 0	2DEC	-.2869039173 B-1	STAR 13	Z
0311	14,2235	65667 0				
0312	14,2236	77010 0	2DEC	-.0614360769 B-1	STAR 12	X
0312	14,2237	66714 0				
0313	14,2240	11515 0	2DEC	+.6031700106 B-1	STAR 12	Y
0313	14,2241	05314 1				
0314	14,2242	63215 1	2DEC	-.7952430739 B-1	STAR 12	Z
0314	14,2243	53630 1				
0315	14,2244	02145 0	2DEC	+.1373948084 B-1	STAR 11	X
0315	14,2245	21163 0				
0316	14,2246	12715 1	2DEC	+.6813398852 B-1	STAR 11	Y
0316	14,2247	21123 1				
0317	14,2250	13401 0	2DEC	+.7189566241 B-1	STAR 11	Z
0317	14,2251	26125 0				
0318	14,2252	03161 1	2DEC	+.2013426456 B-1	STAR 10	X
0318	14,2253	14610 0				
0319	14,2254	17401 1	2DEC	+.9689888101 B-1	STAR 10	Y
0319	14,2255	36465 0				
0320	14,2256	75552 1	2DEC	-.1432544058 B-1	STAR 10	Z
0320	14,2257	56556 1				
0321	14,2260	05473 1	2DEC	+.3509587451 B-1	STAR 9	X
0321	14,2261	01565 0				
0322	14,2262	16217 1	2DEC	+.8925545449 B-1	STAR 9	Y
0322	14,2263	31643 1				
0323	14,2264	04417 1	2DEC	+.2831507435 B-1	STAR 9	Z
0323	14,2265	22211 0				
0324	14,2266	06444 0	2DEC	+.4107492871 B-1	STAR 8	X
0324	14,2267	33354 0				
0325	14,2270	07765 1	2DEC	+.4987190610 B-1	STAR 8	Y
0325	14,2271	20153 1				
0326	14,2272	14154 1	2DEC	+.7632590132 B-1	STAR 8	Z
0326	14,2273	23613 1				
0327	14,2274	13202 0	2DEC	+.7033883645 B-1	STAR 7	X
0327	14,2275	05024 1				
0328	14,2276	13243 0	2DEC	+.7074274193 B-1	STAR 7	Y
0328	14,2277	07665 0				
0329	14,2300	01067 1	2DEC	+.0692188921 B-1	STAR 7	Z
0329	14,2301	01242 1				
0330	14,2302	10561 1	2DEC	+.5450662811 B-1	STAR 6	X
0330	14,2303	05666 1				
0331	14,2304	10401 0	2DEC	+.5313738486 B-1	STAR 6	Y
0331	14,2305	00357 0				
0332	14,2306	65477 0	2DEC	-.6484940879 B-1	STAR 6	Z
0332	14,2307	61124 1				
0333	14,2310	00154 1	2DEC	+.0131955837 B-1	STAR 5	X
0333	14,2311	03111 0				
0334	14,2312	00077 1	2DEC	+.0078043793 B-1	STAR 5	Y
0334	14,2313	35676 0				

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0335	14,2314	17777 0	2DEC	+.9998824772	B-1	STAR	5	Z
0335	14,2315	01142 1						
0336	14,2316	07674 0	2DEC	+.4917355618	B-1	STAR	4	X
0336	14,2317	11416 1						
0337	14,2320	03415 1	2DEC	+.2203784481	B-1	STAR	4	Y
0337	14,2321	12707 1						
0338	14,2322	62413 0	2DEC	-.8423950835	B-1	STAR	4	Z
0338	14,2323	43135 1						
0339	14,2324	07511 0	2DEC	+.4776746280	B-1	STAR	3	X
0339	14,2325	03423 1						
0340	14,2326	01672 0	2DEC	+.1164935557	B-1	STAR	3	Y
0340	14,2327	12054 0						
0341	14,2330	15735 1	2DEC	+.8707790771	B-1	STAR	3	Z
0341	14,2331	15405 1						
0342	14,2332	16745 0	2DEC	+.9342726691	B-1	STAR	2	X
0342	14,2333	21763 0						
0343	14,2334	02613 1	2DEC	+.1732973829	B-1	STAR	2	Y
0343	14,2335	24675 0						
0344	14,2336	73007 1	2DEC	-.3116128956	B-1	STAR	2	Z
0344	14,2337	50430 0						
0345	14,2340	15777 1	2DEC	+.8749183324	B-1	STAR	1	X
0345	14,2341	12457 1						
0346	14,2342	00324 1	2DEC	+.0258916990	B-1	STAR	1	Y
0346	14,2343	03265 0						
0347	14,2344	07571 0	2DEC	+.4835778442	B-1	STAR	1	Z
0347	14,2345	17020 0						
0348	14,2346	15325 1	CATLOG DEC	6869				

R0349 *****

0350	REF	1	05,2000	SETLOC EPHEM1
0351			05,2001	BANK
0352	REF	1		COUNT* \$\$/EPHEM

0353	05,2001	20000 0	KONMAT	2DEC	1.0 B-1	*****
0353	05,2002	00000 1				
0354	05,2003	00000 1		2DEC	0	*
0354	05,2004	00000 1				
0355	05,2005	00000 1		2DEC	0	*
0355	05,2006	00000 1				
0356	05,2007	00000 1		2DEC	0	*
0356	05,2010	00000 1				
0357	05,2011	16533 0		2DEC	.91745 B-1	K1 COS(OBL) *
0357	05,2012	30007 0				
0358	05,2013	77333 1		2DEC	-.03571 B-1	K2 SIN(OBL) SIN(IM) *
0358	05,2014	56654 0				
0359	05,2015	00000 1		2DEC	0	*
0359	05,2016	00000 1				
0360	05,2017	06273 1		2DEC	.39784 B-1	K3 SIN(OBL) *
0360	05,2020	03275 1				

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0361	05,2021	01242 1		2DEC	.082354 8-1	K4 COS(08L)SIN(IM)	*
0361	05,2022	24467 1					
0362	05,2023	00020 0	CSTODAY	2DEC	8640000 8-33		* NOTE *
0362	05,2024	17260 0					
0363	05,2025	00002 0	RCB-13	OCT	00002		* TABLES CONTAIN *
0364	05,2026	00000 1		OCT	00000		* CONSTANTS FOR *
0365	05,2027	22572 1	RATESP	2DEC	.03660098 8+4		* 1968 - 1969 *
0365	05,2030	27214 0					
0366	05,2031	01315 1		2DEC	.00273779 B+4	LOSR	*
0366	05,2032	26177 1					
0367	05,2033	77731 1		2DEC	-.00014719 B+4	LONR	*
0367	05,2034	55217 0					
0368	05,2035	16455 1		2DEC	.455880394	LOMO	*
0368	05,2036	04475 0					
0369	05,2037	10637 1		2DEC	.275337971	LOSO	*
0369	05,2040	04312 0					
0370	05,2041	01215 0		2DEC	.0398987882	LONO	*
0370	05,2042	26351 1					
0371	05,2043	01070 1	VAL67	2DEC	.017361944 8+1	AMOD	*
0371	05,2044	35243 1					
0372	05,2045	11126 1		2DEC	.286523072	AARG	*
0372	05,2046	14467 1					
0373	05,2047	02245 0		2DEC	.036291712 B+1	1/27	*
0373	05,2050	06475 1					
0374	05,2051	00163 0		2DEC	.003534722 8+1	8MOD	*
0374	05,2052	32331 1					
0375	05,2053	03476 1		2DEC	.113165625	BARG	*
0375	05,2054	03302 0					
0376	05,2055	02000 0		2DEC	.03125 8+1	1/32	*
0376	05,2056	00000 1					
0377	05,2057	00256 0		2DEC	.005330555 8+1	CMOD	*
0377	05,2060	25374 0					
0378	05,2061	77525 0		2DEC	-.010415660	CARG	VALUE COMPUTED USING 1/364.24
0378	05,2062	53143 1					
0379	05,2063	00131 1		2DEC	.002737925 8+1	1/365	*****
0379	05,2064	26730 1					

R0380 *****

0381	REF	1	24,2000
0382			24,2000
0383	REF	1	

SETLOC	PLANTIN
BANK	
COUNT*	\$/L UROT

0384	24,2000	17775 1	COSI	2DEC	.99964115 B-1	COS(1 DEG 32.1 MIN) 8-1
0384	24,2001	01734 0				
0385	24,2002	00333 1	SINI	2DEC	.02678760 B-1	SIN(1 DEG 32.1 MIN) 8-1
0385	24,2003	16153 1				
0386	24,2004	77665 1	NODDOT	2DEC	-.457335143 E-2	REVS/CSEC B+28=-1.07047016 E-8 RAD/SEC
0386	24,2005	42175 1				
0387	24,2006	22211 0	FDOT	2DEC	.570862491	REVS/CSEC B+27= 2.67240019 E-6 RAD/SEC
0387	24,2007	00265 0				

L CONTROLLED CONSTANTS

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0388	24, 2010	77777 0	B DOT	2DEC	-3.07500412 E-8	REVS/CSEC	B+28=-7.19756666 E-14	RAD/SEC
0388	24, 2011	77767 1						
0389	24, 2012	41215 1	NODID	2DEC	-.960101269	REVS B-0	= -6.03249419	RAD
0389	24, 2013	66331 0						
0390	24, 2014	15237 0	FSUBD	2DEC	.415998375	REVS B-0	= 2.61379488	RAD
0390	24, 2015	26751 0						
0391	24, 2016	02052 1	BSUBD	2DEC	.0651205006	REVS B-0	= 0.409164173	RAD
0391	24, 2017	35713 1						
0392	24, 2020	37116 0	WEARTH	2DEC	.973561855	REVS/CSEC	B+23=7.29211515 E-5	RAD/SEC
0392	24, 2021	32630 0						

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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A000001
R000002

*** CHANNEL DESCRIPTIONS F WORDS ARE ALLOCATED IN ERASABLE ASSIGNMENTS ***

R000005
A0001

CHANNEL 1 IDENTICAL TO COMPUTER REGISTER L (0001)

R0002
A0003

CHANNEL 2 IDENTICAL TO COMPUTER REGISTER Q (0002)

R0004
R0006
A0008

CHANNEL 3 HISCALAR; INPUT CHANNEL; MOST SIGNIFICANT 14 BITS FROM 33 STAGE BINARY COUNTER. SCALE FACTOR IS B23 IN CSEC, SO MAX VALUE ABOUT 23.3 HOURS AND LEAST SIGNIFICANT BIT 5.12 SECS.

R0009
R0011
R0013
A0015

CHANNEL 4 LOSCALAR; INPUT CHANNEL; NEXT MOST SIGNIFICANT 14 BITS FROM THE 33 STAGE BINARY COUNTER ASSOCIATED WITH CHANNEL 3. SCALE FACTOR IS B9 IN CSEC. SO MAX VAL IS 5.12 SEC AND LEAST SIGNIFICANT BIT IS 1/3200 SEC. SCALF FACTOR OF D.P. WORD WITH CHANNEL 3 IS B23 CSEC.

R0016
A0018

CHANNEL 5 PYJETS; OUTPUT CHANNEL; PITCH RCS JET CONTROL. (REACTION CONTROL SYSTEM) USES BITS 1-8.

R0019
A0021

CHANNEL 6 ROLLJETS; OUTPUT CHANNEL; ROLL RCS JET CONTROL. (REACTION CONTROL SYSTEM) USES BIT 1-8.

R0022
R0024
A0026

CHANNEL 7 SUPERBNK; OUTPUT CHANNEL; NOT RESET BY RESTART; FIXED EXTENSION BITS USED TO SELECT THE APPROPRIATE FIXED MEMORY BANK IF FBANK IS 30 OCTAL OR MORE. USES BITS 5-7.

R0027
R0029
R0031
A0033

CHANNEL 10 OUTO; OUTPUT CHANNEL; REGISTER USED TO TRANSMIT LATCHING-RELAY DRIVING INFORMATION FOR THE DISPLAY SYSTEM. BITS 15-12 ARE SET TO THE POW NUMBER (1-14 OCTAL) OF THE RELAY TO BE CHANGED AND BITS 11-1 CONTAIN THE REQUIRED SETTINGS FOR THE RELAYS IN THE ROW.

R0034
R0036
A0038
R0039
A0040

CHANNEL 11 DSALMOUT; OUTPUT CHANNEL; REGISTER WHOSE BITS ARE USED FOR ENGINE ON-OFF CONTROL AND TO DRIVE INDIVIDUAL INDICATORS OF THE DISPLAY SYSTEM. BITS 1-7 ARE A RELAYS.

R0041
A0042
R0043
A0044
R0045
A0046

BIT 1 ISS WARNING

BIT 2 LIGHT COMPUTER ACTIVITY LAMP

BIT 3 LIGHT UPLINK ACTIVITY LAMP

BIT 4 LIGHT TEMP CAUTION LAMP

R0047
A0048
R0049
A0050
R0051

BIT 5 LIGHT KEYBOARD RELEASE LAMP

BIT 6 FLASH VERB AND NOUN LAMPS

BIT 7 LIGHT OPERATOR ERROR LAMP

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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A0052		
R0053	BIT 8	SPARE
A0054		
R0055	BIT 9	TEST CONNECTOR OUTBIT
A0056		
R0057	BIT 10	CAUTION RESET
A0058		
R0059	BIT 11	SPARE
A0060		
R0061	BIT 12	SPARE
A0062		
R0063	BIT 13	ENGINE ON
A0064		
R0065	BIT 14	ENGINE OFF
A0066		
R0067	BIT 15	SPARE
A0068		
R0069	CHANNEL 12	CHAN12; OUTPUT CHANNEL; BITS USED TO DRIVE NAVIGATION AND SPACECRAFT HARDWARE
A0071		
R0072	BIT 1	ZERO RR CDU; CDU'S GIVE RRADAR INFORMATION FOR LM
A0073		
R0074	BIT 2	ENABLE CDU RADAR ERROR COUNTERS
A0075		
R0076	BIT 3	NOT USED
A0077		
R0078	BIT 4	COARSE ALIGN ENABLE OF IMU
A0079		
R0080	BIT 5	ZERO IMU CDU'S
A0081		
R0082	BIT 6	ENABLE IMU ERROR COUNTER, CDU ERROR COUNTER.
A0083		
R0084	BIT 7	SPARE
A0085		
R0086	BIT 8	DISPLAY INERTIAL DATA
A0087		
R0088	BIT 9	-PITCH GIMBAL TRIM (BELL MOTION) DESCENT ENGINE
A0089		
R0090	BIT 10	+PITCH GIMBAL TRIM (BELL MOTION) DESCENT ENGINE
A0091		
R0092	BIT 11	-ROLL GIMBAL TRIM (BELL MOTION) DESCENT ENGINE
A0093		
R0094	BIT 12	+ROLL GIMBAL TRIM (BELL MOTION) DESCENT ENGINE
A0095		
R0096	BIT 13	LR POSITION 2 COMMAND
A0097		
R0098	BIT 14	ENABLE RENDESVOUS RADAR LOCK-ON; AUTO ANGLE TRACK'G
A0099		
R0100	BIT 15	ISS TURN ON DELAY COMPLETE
A0101		

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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R0102	CHANNEL 13	CHAN13; OUTPUT CHANNEL	
A0103			
R0104	BIT 1	RADAR C	PROPER SETTING OF THE A,B,C MATRIX
R0105	BIT 2	RADAR B	SELECTS CERTAIN RADAR
R0106	BIT 3	RADAR A	PARAMETERS TO BE READ.
A0107			
R0108	BIT 4	RADAR ACTIVITY	
A0109			
R0110	BIT 5	NOT USED (CONNECTS AN ALTERNATE INPUT TO UPLINK)	
A0111			
R0112	BIT 6	BLOCK INPUTS TO UPLINK CELL	
A0113			
R0114	BIT 7	DOWNLINK TELEMETRY WORD ORDER CODE BIT	
A0115			
R0116	BIT 8	RHC COUNTER ENABLE (READ HAND CONTROLLER ANGLES)	
A0117			
R0118	BIT 9	START RHC READ INTO COUNTERS IF BIT 8 SET	
A0119			
R0120	BIT 10	TEST ALARMS, TEST DSKY LIGHTS	
A0121			
R0122	BIT 11	ENABLE STANDBY	
A0123			
R0124	BIT 12	RESET TRAP 31-A	ALWAYS APPEAR TO BE SET TO 0
A0125			
R0126	BIT 13	RESET TRAP 31-B	ALWAYS APPEAR TO BE SET TO 0
A0127			
R0128	BIT 14	RESET TRAP 32	ALWAYS APPEAR TO BE SET TO 0
A0129			
R0130	BIT 15	ENABLE T6 RUPT	
A0131			
R0132	CHANNEL 14	CHAN14; OUTPUT CHANNEL; USED TO CONTROL COMPUTER COUNTER CELLS (CDU,GYRO,SPACECRAFT FUNC.	
A0134			
R0135	BIT 1	OUTLINK ACTIVITY (NOT USED)	
A0136			
R0137	BIT 2	ALTITUDE RATE OR ALTITUDE SELECTOR	
A0138			
R0139	BIT 3	ALTITUDE METER ACTIVITY	
A0140			
R0141	BIT 4	THRUST DRIVE ACTIVITY FOR DESCENT ENGINE	
A0142			
R0143	BIT 5	SPARE	
A0144			
R0145	BIT 6	GYRO ENABLE POWER FOR PULSES	
A0146			
R0147	BIT 7	GYRO SELECT B	PAIR OF BITS IDENTIFIES AXIS OF -
R0148	BIT 8	GYRO SELECT A	GYRO SYSTEM TO BE TORQUED.
A0149			
R0150	BIT 9	GYRO TORQUING COMMAND IN NEGATIVE DIRECTION	
A0151			

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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R0152 BIT 10 GYRO ACTIVITY
A0153
R0154 BIT 11 DRIVE CDU S
A0155
R0156 BIT 12 DRIVE CDU T
A0157
R0158 BIT 13 DRIVE CDU Z
A0159
R0160 BIT 14 DRIVE CDU Y
A0161
R0162 BIT 15 DRIVE CDU X
A0163

R0164 CHANNEL 15 MNKEYIN; INPUT CHANNEL; KEY CODE INPUT FROM KEYBOARD OF DSKY, SENSED BY PROGRAM WHEN
R0166 PROGRAM INTERRUPT #5 IS RECEIVED. USES BITS 5-1
A0167

R0168 CHANNEL 16 NAVKEYIN; INPUT CHANNEL; OPTICS MARK INFORMATION AND NAVIGATION PANEL DSKY (CM) OR THRUST
R0170 CONTROL (LM) SENSED BY PROGRAM WHEN PROGRAM INTERRUPT #6 IS RECEIVED. USES BITS 3-7 ONLY.
A0172
R0173 BIT 1 NOT ASSIGNED
A0174
R0175 BIT 2 NOT ASSIGNED
A0176
R0177 BIT 3 OPTICS X-AXIS MARK SIGNAL FOR ALIGN OPTICAL TELESCOPE
A0178
R0179 BIT 4 OPTICS Y-AXIS MARK SIGNAL FOR AOT
A0180
R0181 BIT 5 OPTICS MARK REJECT SIGNAL
A0182
R0183 BIT 6 DESCENT+ ; CREW DESIRED SLOWING RATE OF DESCENT
A0184
R0185 BIT 7 DESCENT- ; CREW DESIRED SPEEDING UP RATE OF DESCENT
A0186

R0187 NOTE: ALL BITS IN CHANNELS 30-33 ARE INVERTED AS SENSED BY THE PROGRAM, SO THAT A VALUE OF ZERO MEANS
R0189 THAT THE INDICATED SIGNAL IS PRESENT.
A0190

R0191 CHANNEL 30 INPUT CHANNEL
A0192
R0193 BIT 1 ABORT WITH DESCENT STAGE
A0194
R0195 BIT 2 UNUSED
A0196
R0197 BIT 3 ENGINE ARMED SIGNAL
A0198
R0199 BIT 4 ABORT WITH ASCENT ENGINE STAGE
A0200
R0201 BIT 5 AUTO THROTTLE; COMPUTER CONTROL OF DESCENT ENGINE

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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A0202			
R0203	BIT 6	DISPLAY INERTIAL DATA	
A0204			
R0205	BIT 7	RR CDU FAIL	
A0206			
R0207	BIT 8	SPARE	
A0208			
R0209	BIT 9	IMU OPERATE WITH NO MALEUNCTION	
A0210			
R0211	BIT 10	LM COMPUTER (NOT AGS) HAS CONTROL OF LM	
A0212			
R0213	BIT 11	IMU CAGE COMMAND TO DRIVE IMU GIMBAL ANGLES TO 0.	
A0214			
R0215	BIT 12	IMU CDU EAIL (MALEUNCTION OF IMU CDU,S)	
A0216			
R0217	BIT 13	IMU EAIL (MALEUNCTION OF IMU STABILIZATION LOOPS)	
A0218			
R0219	BIT 14	ISS TURN ON REQUESTED	
A0220			
R0221	BIT 15	TEMPERATURE OF STABLE MEMBER WITHIN DESIGN LIMITS	
A0222			
R0223	CHANNEL 31	INPUT CHANNEL; BITS ASSOCIATED WITH THE ATTITUDE CONTROLLER, TRANSLATIONAL CONTROLLER, AND SPACECRAFT ATTITUDE CONTROL; USED BY RCS DAP	
R0225			
A0226			
R0227	BIT 1	ROTATION (BY RHC) COMMANDED IN POSITIVE PITCH DIRECTION; MUST BE IN MINIMUM IMPULSE MODE. ALSO POSITIVE ELEVATION CHANGE FOR LANDING POINT DESIGNATOR	
R0229			
A0231			
R0232	BIT 2	AS BIT 1 EXCEPT NEGATIVE PITCH AND ELEVATION	
A0233			
R0234	BIT 3	ROTATION (BY RHC) COMMANDED IN POSITIVE YAW DIRECTION; MUST BE IN MINIMUM IMPULSE MODE.	
A0236			
R0237	BIT 4	AS BIT 3 EXCEPT NEGATIVE YAW	
A0238			
R0239	BIT 5	ROTATION (BY RHC) COMMANDED IN POSITIVE ROLL DIRECTION; MUST BE IN MINIMUM IMPULSE MODE. ALSO POSITIVE AZIMUTH CHANGE FOR LANDING POINT DESIGNATOR	
R0241			
A0243			
R0244	BIT 6	AS BIT 5 EXCEPT NEGATIVE ROLL AND AZIMUTH	
A0245			
R0246	BIT 7	TRANSLATION IN +X DIRECTION COMMANDED BY THC	
A0247			
R0248	BIT 8	TRANSLATION IN -X DIRECTION COMMANDED BY THC	
A0249			
R0250	BIT 9	TRANSLATION IN +Y DIRECTION COMMANDED BY THC	
A0251			
R0252	BIT 10	TRANSLATION IN -Y DIRECTION COMMANDED BY THC	
A0253			
R0254	BIT 11	TRANSLATION IN +Z DIRECTION COMMANDED BY THC	
A0255			
R0256	BIT 12	TRANSLATION IN -Z DIRECTION COMMANDED BY THC	

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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A0257			
R0258	BIT 13	ATTITUDE HOLD MODE ON SCS MODE CONTROL SWITCH	
A0259			
R0260	BIT 14	AUTO STABILIZATION OF ATTITUDE ON SCS MODE SWITCH	
A0261			
R0262	BIT 15	ATTITUDE CONTROL OUT OF DETENT (RHC NOT IN NEUTRAL	
A0263			
R0264	CHANNEL 32	INPUT CHANNEL.	
A0265			
R0266	BIT 1	THRUSTERS 2 & 4 DISABLED BY CREW	
A0267			
R0268	BIT 2	THRUSTERS 5 & 8 DISABLED BY CREW	
A0269			
R0270	BIT 3	THRUSTERS 1 & 3 DISABLED BY CREW	
A0271			
R0272	BIT 4	THRUSTERS 6 & 7 DISABLED BY CREW	
A0273			
R0274	BIT 5	THRUSTERS 14 & 16 DISABLED BY CREW	
A0275			
R0276	BIT 6	THRUSTERS 13 & 15 DISABLED BY CREW	
A0277			
R0278	BIT 7	THRUSTERS 9 & 12 DISABLED BY CREW	
A0279			
R0280	BIT 8	THRUSTERS 10 & 11 DISABLED BY CREW	
A0281			
R0282	BIT 9	DESCENT ENGINE GIMBALS DISABLED BY CREW	
A0284			
R0285	BIT 10	APPARENT DESCENT ENGINE GIMBAL FAILURE	
A0286			
R0287	BIT 14	INDICATES PROCEED KEY IS DEPRESSFD	
A0288			
R0289	CHANNEL 33	CHAN33; INPUT CHANNEL; FOR HARDWARE STATUS AND COMMAND INFORMATION. BITS 15-11 ARE FLIP-	
R0291		FLOP BITS RESET BY A CHANNEL "WRITE" COMMAND THAT ARE RESET BY A RESTART & BY T4RUPT LOOP.	
A0293			
R0294	BIT 1	SPARE	
A0295			
R0296	BIT 2	RR AUTO-POWER ON	
A0297			
R0298	BIT 3	RR RANGE LOW SCALE	
A0299			
R0300	BIT 4	RR DATA GOOD	
A0301			
R0302	BIT 5	LR RANGE DATA GOOD	
A0303			
R0304	BIT 6	LR POS1	
A0305			
R0306	BIT 7	LR POS2	
A0307			

L INPUT/OUTPUT CHANNEL BIT DESCRIPTIONS

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R0308	BIT 8	LR VEL DATA GOOD
A0309		
R0310	BIT 9	LR RANGE LOW SCALE
A0311		
R0312	BIT 10	BLOCK UPLINK INPUT
A0313		
R0314	BIT 11	UPLINK TOO FAST
A0315		
R0316	BIT 12	DOWNLINK TOO FAST
A0317		
R0318	BIT 13	PIPA FAIL
A0319		
R0320	BIT 14	WARNING OF REPEATED ALARMS: RESTART,COUNTER FAIL, VOLTAGE FAIL,AND SCALAR DOUBLF.
A0322		
R0323	BIT 15	LGC OSCILLATOR STOPPED
A0324		
R0325	CHANNEL 34	DNT M1; OUTPUT CHANNEL; DOWNLINK 1 FIRST OF TWO WORDS SERIALIZATION.
R0328	CHANNEL 35	DNT M2; OUTPUT CHANNEL DOWNLINK 2 SOCOND OF TWO WORDS SERIALIZATION.
A0330		

L FLAGWORD ASSIGNMENTS

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A0001

R0002 FLAGWORDS 0-11 ARE DOWNLINKED AND CAN BE SET AND CLEARED BY UP-FLAG AND DOWN-FLAG INSTRUCTIONS IN THE
 R0004 INTERPRETER. THESE WERE PREVIOUSLY LISTED UNDER "INTERPRETIVE SWITCH BIT ASSIGNMENTS" IN
 R0006 THE ERASABLE LOG SECTION. FLAGWORDS 12 & 13 WERE PREVIOUSLY RADMODES AND DAPBOOLS AND
 R0008 ARE STILL DOWNLINKED UNDER THOSE NAMES.

A0009

R0010 ALPHABETICAL LIST OF FLAGWORDS

R0011	FLAGWORD	DEC. NUMBER	BIT AND FLAG	BIT NAME
R0012	ACCCKFLG	207	BIT 3 FLAG 13	ACCSOKAY
R0013	ACC4-2FL	199	BIT 11 FLAG 13	ACC4OR2X
R0014	ACMODFLG	032	BIT 13 FLAG 2	ACMODBIT
R0015	ALTSCALE	186	BIT 9 FLAG 12	ALTSCBIT
R0016	ANTENFLG	183	BIT 12 FLAG 12	ANTENBIT
R0017	ACRBSFLG	205	BIT 5 FLAG 13	AORBSYST
R0018	ACRBTFLG	200	BIT 10 FLAG 13	AORBITRAN
R0019	APSESW	130	BIT 5 FLAG 8	APSESBIT
R0020	APSFLAG	152	BIT 13 FLAG 10	APSFLBIT
R0021	ASTNFLAG	108	BIT 12 FLAG 7	ASTNBIT
R0022	ATTFLAG	104	BIT 1 FLAG 6	ATTFLBIT
R0023	ALTCMCDE	193	BIT 2 FLAG 12	AUTOMBIT
R0024	AUTR1FLG	209	BIT 1 FLAG 13	AUTRATE1
R0025	AUTR2FLG	208	BIT 2 FLAG 13	AUTRATE2
R0026	AUXFLAG	103	BIT 2 FLAG 6	AUXFLBIT
R0027	AVEGFLAG	115	BIT 5 FLAG 7	AVEGFBIT
R0028	AVEM1DSW	149	BIT 1 FLAG 9	AVEMDBIT
R0029	AVFLAG	040	BIT 5 FLAG 2	AVFLBIT
R0030	CALCMAN2	043	BIT 2 FLAG 2	CALC2BIT
R0031	CALCMAN3	042	BIT 3 FLAG 2	CALC3BIT
R0032	CDESFLAG	180	BIT 15 FLAG 12	CDESBIT
R0033	CMCCNFLG	123	BIT 12 FLAG 8	CMOONBIT
R0034	CCGAFLAG	131	BIT 4 FLAG 8	COGAFBIT
R0035	CCMPUTFR	082	BIT 8 FLAG 5	COMPTBIT
R0036	CPHIFLAG	000	BIT 15 FLAG 0	CPHIBIT
R0037	CSMDKFLG	197	BIT 13 FLAG 13	CSMDOCKD
R0038	CULTFLAG	053	BIT 7 FLAG 3	CULTBIT
R0039	CYCLESW	035	BIT 10 FLAG 2	CYCLFBIT
R0040	DAPBOCLS		FLGWRD13	
R0041	DBSELFLG	206	BIT 4 FLAG 13	DBSELECT
R0042	DESIGFLG	185	BIT 10 FLAG 12	DESIGBIT
R0043	DICFLAG	016	BIT 14 FLAG	DIDFLBIT
R0044	DIMOFLAG	059	BIT 1 FLAG 3	DIMOBIT
R0045	DMENFLG	081	BIT 9 FLAG 5	DMENFBIT

L FLAGWORD ASSIGNMENTS

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R0046	DRIFTDFL	202	BIT 8 FLAG 13	DRIFTBIT
R0047	DRIFTFLG	030	BIT 15 FLAG 2	DRFTBIT
R0048	DSKYFLAG	075	BIT 15 FLAG 5	DSKYFBIT
R0049	D6CR9FLG	058	BIT 2 FLAG 3	D6DR9BIT
R0050	ENGONFLG	083	BIT 7 FLAG 5	ENGONBIT
R0051	ERADFLAG	017	BIT 13 FLAG 1	ERADFBIT
R0052	ETPIFLAG	038	BIT 7 FLAG 2	ETPIBIT
R0054	FINALFLG	039	BIT 6 FLAG 2	FINALBIT
R0055	FIRSTFLG	094	BIT 11 FLAG 6	FIRSTBIT
R0056	FLAGWRD0	{000-014}	{STATE +0}	
R0057	FLAGWRD1	{015-029}	{STATE +1}	
R0058	FLAGWRD2	{030-044}	{STATE +2}	
R0059	FLAGWRD3	{045-059}	{STATE +3}	
R0060	FLAGWRD4	{060-074}	{STATE +4}	
R0061	FLAGWRD5	{075-089}	{STATE +5}	
R0062	FLAGWRD6	{090-104}	{STATE +6}	
R0063	FLAGWRD7	{105-119}	{STATE +7}	
R0064	FLAGWRD8	{120-134}	{STATE +8D}	
R0065	FLAGWRD9	{135-149}	{STATE +9D}	
R0066	FLAP	142	BIT 8 FLAG 9	FLAPBIT
R0067	FLGWRD10	{150-164}	{STATE +10D}	
R0068	FLGWRD11	{165-179}	{STATE +11D}	
R0069	FLGWRD12	{180-194}	{STATE +12D}	
R0070	FLGWRD13	{195-209}	{STATE +13D}	
R0071	FLPC	138	BIT 12 FLAG 9	FLPCBIT
R0072	FLPI	139	BIT 11 FLAG 9	FLPIBIT
R0073	FLRCS	149	BIT 10 FLAG 9	FLRCSBIT
R0074	FLUNDISP	125	BIT 10 FLAG 8	FLUNDBIT
R0075	FLVR	136	BIT 14 FLAG 9	FLVRBIT
R0076	FLZCNEO	144	BIT 6 FLAG 9	FLZONBIT
R0077	FREEFLAG	012	BIT 3 FLAG 0	FREEFBIT
R0078	GLCKFAIL	046	BIT 14 FLAG 3	GLOKFBIT
R0079	GMBDRVSW	095	BIT 10 FLAG 6	GMBDRBIT
R0080	GUESSW	028	BIT 2 FLAG 1	GUESSBIT
R0081	HFLSHFLG	179	BIT 1 FLAG 11	HFLSHBIT
R0082	IDLEFLAG	113	BIT 7 FLAG 7	IDLEFBIT
R0083	IGNFLAG	107	BIT 13 FLAG 7	IGNFLBIT
R0084	IMPULSW	036	BIT 9 FLAG 2	IMPULBIT
R0085	IMUSE	007	BIT 8 FLAG 0	IMUSEBIT
R0086	INFINFLG	128	BIT 7 FLAG 8	INFINBIT
R0087	INITALGN	133	BIT 2 FLAG 8	INITABIT
R0088	INTFLAG	151	BIT 14 FLAG 10	INTFLBIT
R0089	INTYPFLG	056	BIT 4 FLAG 3	INTYPRIT
R0090	ITSWICH	105	BIT 15 FLAG 7	ITSWBIT
R0091	JSWITCH	001	BIT 14 FLAG 0	JSWCHBIT
R0092	LETABCRT	141	BIT 9 FLAG 9	LETABBIT
R0093	LMCONFLG	124	BIT 11 FLAG 8	LMOONBIT
R0094	LOKCNWS	010	BIT 5 FLAG 0	LOKONBIT
R0095	LOSCMFLG	033	BIT 12 FLAG 2	LOSCMBIT
R0096	LRLTFLG	190	BIT 5 FLAG 12	LRLTBIT

EQUIVALENT FLAG NAME: OPTNSW

L FLAGWORD ASSIGNMENTS

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R0097	LREYPASS	165	BIT 15 FLAG 11	LRBYBIT
R0098	LRINH	172	BIT 8 FLAG 11	LRINHBIT
R0099	LRPOSFLG	189	BIT 6 FLAG 12	LRPOSBIT
R0100	LRVELFLG	187	BIT 8 FLAG 12	LRVELBIT
R0101	LUNAFLAG	048	BIT 12 FLAG 3	LUNABIT
R0102	MANUFLAG	106	BIT 14 FLAG 7	MANUFBIT
R0103	MGLVFLAG	088	BIT 2 FLAG 5	MGLVFBIT
R0104	MIDAVFLG	148	BIT 2 FLAG 9	MIDAVBIT
R0105	MICFLAG	002	BIT 13 FLAG 0	MIDFLBIT
R0106	MIC1FLAG	147	BIT 3 FLAG 9	MID1BIT
R0107	MKCVFLAG	072	BIT 3 FLAG 4	MKOVBIT
R0108	MCCNFLAG	003	BIT 12 FLAG 0	MOONBIT
R0109	MRKIDFLG	060	BIT 15 FLAG 4	MRKIDBIT
R0110	MRKNVFLG	066	BIT 9 FLAG 4	MRKNVBIT
R0111	MRUPTFLG	070	BIT 5 FLAG 4	MRUPTBIT
R0112	MUNFLAG	097	BIT 8 FLAG 6	MUNFLBIT
R0113	MWAITFLG	064	BIT 11 FLAG 4	MWAITBIT
R0114	NEEDLFLG	011	BIT 4 FLAG 0	NEEDLBIT
R0115	NEWIFLG	122	BIT 13 FLAG 8	NFWIBIT
R0116	NJETSFLG	015	BIT 15 FLAG	NJETSBIT
R0117	NODOFLAG	044	BIT 1 FLAG 2	NODOBIT
R0118	NOLRRREAD	170	BIT 10 FLAG 11	NOLRRBIT
R0119	NORMSW	110	BIT 10 FLAG 7	NORMSBIT
R0120	NCRRMCN	086	BIT 4 FLAG 5	NORRMBIT
R0121	NOR29FLG	049	BIT 11 FLAG 3	NR29FBIT
R0122	NCTHRCTL	078	BIT 12 FLAG 5	NOTHRBIT
R0123	NOUPFLAG	024	BIT 6 FLAG 1	NOUPFBIT
R0124	NRMNVFLG	067	BIT 8 FLAG 4	NRMNVBIT
R0125	NRMIDFLG	062	BIT 13 FLAG 4	NRMIDBIT
R0126	NRLPTFLG	071	BIT 4 FLAG 4	NRUPTBIT
R0127	NTARGFLG	102	BIT 3 FLAG 6	NTARGBIT
R0128	NWAITFLG	065	BIT 10 FLAG 4	NWAITBIT
R0129	OLDESFLG	014	BIT 1 FLAG 0	OLDESBIT
R0130	OPTNSW	038	BIT 7 FLAG 2	OPTNBIT
R0132	ORBWFLAG	054	BIT 6 FLAG 3	ORBWFBIT
R0133	ORDERSW	129	BIT 6 FLAG 8	ORDERBIT
R0134	OURRCFLG	198	BIT 12 FLAG 13	OURRCBIT
R0135	PDSPFLAG	063	BIT 12 FLAG 4	PDSPFBIT
R0136	PFRATFLG	041	BIT 4 FLAG 2	PFRATBIT
R0137	PINBRFLG	069	BIT 6 FLAG 4	PINBRBIT
R0138	POUTFLAG	098	BIT 7 FLAG 6	POUTBIT
R0139	PRECIFLG	052	BIT 8 FLAG 3	PRECIBIT
R0140	PRIODFLG	061	BIT 14 FLAG 1	PRIODBIT
R0141	PRCNVFLG	068	BIT 7 FLAG 4	PRONVBIT
R0142	PSTHIGAT	169	BIT 11 FLAG 11	PSTHIBIT
R0143	PULSEFLG	195	BIT 15 FLAG 13	PULSFS
R0144	P25FLAG	006	BIT 9 FLAG 0	P25FLBIT
R0145	P39/79SW	126	BIT 9 FLAG 8	P39SWBIT
R0146	QUITFLAG	145	BIT 5 FLAG 9	QUITBIT
R0147	RACMODES		FLGWRD12	

EQUIVALENT FLAG NAME: ETPIFLAG

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R0148	RASFLAG		FLGWRD10	
R0149	RCDFUFAIL	188	BIT 7 FLAG 12	RCDFUBIT
R0150	RCDFUFLG	182	BIT 13 FLAG 12	RCDFUBIT
R0151	READLR	174	BIT 6 FLAG 11	READLBIT
R0152	READRFLG	051	BIT 9 FLAG 3	READRBIT
R0154	READVEL	175	BIT 5 FLAG 11	READVBIT
R0155	RECFLAG	099	BIT 6 FLAG 6	RFDLBIT
R0156	REFSMFLG	047	BIT 13 FLAG 3	RFFSMBIT
R0157	REINTFLG	158	BIT 7 FLAG 10	REINTBIT
R0158	REMODFLG	181	BIT 14 FLAG 12	REMODBIT
R0159	RENDWFLG	089	BIT 1 FLAG 5	RENDWBIT
R0160	REPCSMCN	184	BIT 11 FLAG 12	REPOSBIT
R0161	RHCSCFLG	203	BIT 7 FLAG 13	RHCSCALE
R0162	RNDVZFLG	008	BIT 7 FLAG 0	RNDVZBIT
R0163	RNGEDATA	176	BIT 4 FLAG 11	RNGEDBIT
R0164	RNGSCFLG	080	BIT 10 FLAG 5	RNGSCBIT
R0165	RPCFLAG	120	BIT 15 FLAG 8	RPCFLBIT
R0166	RRDATAFL	191	BIT 4 FLAG 12	RRDATABT
R0167	RRNBSW	009	BIT 6 FLAG 0	RRNBBIT
R0168	RRRSFLAG	192	BIT 3 FLAG 12	RRRSBIT
R0169	RVSX	111	BIT 9 FLAG 7	RVSXBIT
R0170	R04FLAG	051	BIT 9 FLAG 3	R04FLBIT
R0172	R10FLAG	013	BIT 2 FLAG 0	R10FLBIT
R0173	R61FLAG	020	BIT 10 FLAG 1	R61FLBIT
R0174	R77FLAG	079	BIT 11 FLAG 5	R77FLBIT
R0175	SCAL3AD	177	BIT 3 FLAG 11	SCABBIT
R0176	SLCPESW	027	BIT 3 FLAG 1	SLOPEBIT
R0177	SNUFFER	077	BIT 13 FLAG 5	SNUFFBIT
R0178	SCLNSW	087	BIT 3 FLAG 5	SOLNSBIT
R0179	SRCHOPTN	031	BIT 14 FLAG 2	SRCHOBIT
R0180	STATEFLG	055	BIT 5 FLAG 3	STATEBIT
R0181	STEERSW	034	BIT 11 FLAG 2	STEERBIT
R0182	SURFFLAG	127	BIT 8 FLAG 8	SURFFBIT
R0183	SWANDISP	109	BIT 11 FLAG 7	SWANDBIT
R0184	S32.1F1	090	BIT 15 FLAG 6	S32BIT1
R0185	S32.1F2	092	BIT 14 FLAG 6	S32BIT2
R0186	S32.1F3A	092	BIT 13 FLAG 6	S32BIT3A
R0187	S32.1S3B	093	BIT 12 FLAG 6	S32BIT3B
R0188	TFFSW	119	BIT 1 FLAG 7	TFFSWBIT
R0189	TRACKFLG	025	BIT 5 FLAG 1	TRACKBIT
R0190	TURNONFL	194	BIT 1 FLAG 12	TURNONBT
R0191	ULLAGFLG	204	BIT 6 FLAG 13	ULLAGER
R0192	UPDATFLG	023	BIT 7 FLAG 1	UPDATBIT
R0193	UPLOCKFL	116	BIT 4 FLAG 7	UPLOCBIT
R0194	USEQRFLG	196	BIT 14 FLAG 13	USEQRJTS
R0195	VEHUPFLG	022	BIT 8 FLAG 1	VEHUPBIT
R0196	VELDATA	173	BIT 7 FLAG 11	VELOABIT
R0197	VERIFLAG	117	BIT 3 FLAG 7	VERIFBIT
R0198	VFLAG	050	BIT 10 FLAG 3	VFLAGBIT
R0199	VFLSHFLG	178	BIT 2 FLAG 11	VFLSHBIT

EQUIVALENT FLAG NAME: R04FLAG

EQUIVALENT FLAG NAME: READRFLG

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R0200	VINTFLAG	057	BIT 3	FLAG 3	VINTFBIT
R0201	VXINH	168	BIT 12	FLAG 11	VXINHBIT
R0202	V37FLAG	114	BIT 6	FLAG 7	V37FLBIT
R0203	V67FLAG	112	BIT 8	FLAG 7	V67FLBIT
R0204	V82EMFLG	118	BIT 2	FLAG 7	V82FMBIT
R0205	XDELVFLG	037	BIT 8	FLAG 2	XDELVBIT
R0206	XDSPFLAG	074	BIT 1	FLAG 4	XDSPBIT
R0207	XCRFLG	171	BIT 9	FLAG 11	XORFLBIT
R0208	XOVINFLG	201	BIT 9	FLAG 13	XOVINHIB
R0209	2PHASFLG	096	BIT 9	FLAG 6	2PHASBIT
R0210	3AXISFLG	084	BIT 6	FLAG 5	3AXISBIT
R0211	36CSW	134	BIT 1	FLAG 8	360SWBIT
A0212					

R0213 ASSIGNMENT AND DESCRIPTION OF FLAGWORDS

0214	REF	1	0074	FLAGWRD0 =	STATE +0	(000-014)	
A0215						(SET)	(RESET)
A0216					BIT 15 FLAG 0	(S)	
0217			0000	CPH1FLAG =	000D	OUTPUT OF CALCGA IS	OUTPUT OF CALCGA IS
0218	REF	1	4735	CPH1BIT =	BIT15	CPHIX	THETA0
A0219							
A0220					BIT 14 FLAG 0	(S)	
0221			0001	JSWITCH =	001D	INTEGRATION OF W	INTEGRATION OF STATE
0222	REF	1	4736	JSWCHBIT =	BIT14	MATRIX	VECTOR
A0223							
A0224					BIT 13 FLAG 0	(S)	
0225			0002	MIDFLAG =	002D	INTEGRATION WITH	INTEGRATION WITHOUT
A0226						SECONDARY BODY AND	SOLAR PERTURBATIONS
0227	REF	2 LAST	55 4737	MIDFLBIT =	BIT13	SOLAR PERTURBATIONS	
A0228							
A0229					BIT 12 FLAG 0	(L)	
0230			0003	MOONFLAG =	003D	MOON IS SPHERE OF	EARTH IS SPHERE OF
0231	REF	1	4740	MOONBIT =	BIT12	INFLUENCE	INFLUENCE
A0232							
A0233					BIT 11 FLAG 0		
A0234				=	004D		
A0235				=	BIT11		
A0236							
A0237					BIT 10 FLAG 0		
A0238				=	005D		

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A0239			=	BIT10		
A0240						
A0241				BIT 9 FLAG 0	(S)	
0242		0006	P25FLAG =	006D	P25 OPERATING	P25 NOT OPERATING
0243	REF 1	4743	P25FLBIT =	BIT9		
A0244						
A0245				BIT 8 FLAG 0	(S)	
0246		0007	IMUSE =	007D	IMU IN USE	IMU NOT IN USE
0247	REF 1	4744	IMUSEBIT =	BIT8		
A0248						
A0249				BIT 7 FLAG 0	(S)	
0250		0010	RNDVZFLG =	008D	P20 RUNNING (RADAR	P20 NOT RUNNING
0251	REF 1	4745	RNDVZBIT =	BIT7	IN USE)	
A0252						
A0253				BIT 6 FLAG 0	(S)	
0254		0011	RRNBSW =	009D	RADAR TARGET IN	RADAR TARGET IN
0255	REF 1	4746	RRNBBIT =	BIT6	NB COORDINATES	SM COORDINATES
A0256						
A0257				BIT 5 FLAG 0	(S)	
0258		0012	LOKONSW =	010D	RADAR LOCK-ON	RADAR LOCK-ON NOT
0259	REF 1	4747	LOKONBIT =	BIT5	DESIRED	DESIRED
A0260						
A0261				BIT 4 FLAG 0	(S)	
0262		0013	NEEDLFLG =	011D	TOTAL ATTITUDE	A/P FOLLOWING
0263	REF 1	4750	NEEDLBIT =	BIT4	ERROR DISPLAYED	ERROR DISPLAYED
A0264						
A0265				BIT 3 FLAG 0		
0266		0014	FREEFLAG =	012D	(USED BY P51-53 TEMP IN MANY DIFFERENT	
A0267					ROUTINES & BY LUNAR + SOLAR EPHEMERIDES)	
0268	REF 1	4751	FREEFBIT =	BIT3		
A0269						
A0270				BIT 2 FLAG 0		
0271		0015	R10FLAG =	013D	R10 OUTPUTS DATA TO	BESIDES OUTPUT WHEN
0272	REF 1	4752	R10FLBIT =	BIT2	ALTITUDE & ALTITUDE	SET, R10 ALSO OUTPUT
A0273					RATE METERS ONLY	TO FORWARD & LATERAL
A0274						VELOCITY CROSSPOINTR
A0275						
A0276				BIT 1 FLAG 0	(L)	
0277		0016	OLDESFLG =	014D	R29 GYRO CMD LOOP	R29 GYRO CMD LOOP
0278	REF 1	4753	OLDESBIT =	BIT1	REQUESTED	NOT REQUESTED

L FLAGWORD ASSIGNMENTS

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A0279									
0280	REF	2	LAST	81	0075	FLAGWRD1 =	STATE +1	(015-029)	
A0281								(SET)	(RESET)
A0282							8 IT 15 FLAG 1	(S)	
0283					0017	NJETSFLG =	015D	TWO JET RCS BURN	FOUR JET RCS BURN
0284	REF	2	LAST	81	4735	NJETSBIT =	BIT15		
A0285									
A0286							BIT 14 FLAG 1	(L)	
0287					0020	DIDFLAG =	016D	INERTIAL DATA IS	PERFORM DATA DISPLAY
0288	REF	2	LAST	81	4736	DIDFLBIT =	BIT14	AVAILABLE	INITIALIZATION FUNCS
A0289									
A0290							BIT 13 FLAG 1	(S)	
0291					0021	ERADFLAG =	017D	COMPUTE REARTH	USE CONSTANT REARTH
0292	REF	3	LAST	81	4737	ERADFBIT =	BIT13	FISCHER ELLIPSOID	PAD RADIUS
A0293									
A0294							BIT12 FLAG 1		
A0295						=	018D		
A0296						=	BIT12		
A0297									
A0298							BIT 11 FLAG 1		
A0299						=	019D		
A0300							BIT 10 FLAG 1	(L)	
0301					0024	R61FLAG =	020D	RUN R61 LEM	RUN R65 LEM
0302	REF	1			4742	R61FLBIT =	BIT10		
A0303									
A0304							8 IT 9 FLAG 1		
A0305						=	021D		
A0306						=	BIT9		
A0307									
A0308							BIT 8 FLAG 1	(S)	
0309					0026	VEHUPFLG =	022D	CSM STATE VECTOR	LEM STATE VECTOR
0310	REF	2	LAST	82	4744	VEHUPBIT =	BIT8	BEING UPDATED	BEING UPDATED
A0311									
A0312							BIT 7 FLAG 1	(S)	
0313					0027	UPDATFLG =	023D	UPDATING BY MARKS	UPDATING BY MARKS
0314	REF	2	LAST	82	4745	UPDATBIT =	BIT7	ALLOWED	NOT ALLOWED
A0315									
A0316							BIT 6 FLAG 1	(S)	

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A0317				0030	NOUPFLAG =	024D	NEITHER CSM	EITHER STATE
A0318							NOR LM STATE VECTOR	VECTOR MAY BE
A0319	REF	2	LAST	82	NOUPFBIT =	BIT6	MAY BE UPDATED	UPDATED
A0320								
A0321						8IT 5 FLAG 1	(S)	
A0322				0031	TRACKELG =	025D	TRACKING ALLOWED	TRACKING NOT ALLOWED
A0323	REF	2	LAST	82	TRACKBIT =	8IT5		
A0324				4747				
A0325						8IT 4 FLAG 1		
A0326					=	026D		
A0327					=	BIT4		
A0328								
A0329						BIT 3 ELAG 1	(S)	
A0330				0033	SLOPESW =	027D	ITERATE WITH 8IAS	ITERATE WITH REGULAR
A0331							METHOD IN ITERATOR	EALSI METHOD IN
A0332	REF	2	LAST	82	SLOPEBIT =	8IT3		ITERATOR
A0333				4751				
A0334						8IT 2 ELAG 1	(S)	
A0335				0034	GUESSW =	028D	NO STARTING VALUE	STARTING VALUE FOR
A0336	REF	2	LAST	82	GUESSBIT =	BIT2	FOR ITERATION	ITERATION EXISTS
A0337				4752				
A0338						8IT 1 FLAG 1		
A0339					=	029D		
A0340								
A0341	REF	3	LAST	83	ELAGWRD2 =	STATE +2	(030-044)	
A0342				0076			(SET)	(RESET)
A0343						BIT 15 ELAG 2	(S)	
A0344				0036	DRIETFLG =	030D	T3RUPT CALLS GYRO	T3RUPT DOES NO GYRO
A0345	REF	3	LAST	83	DRETBIT =	8IT15	COMPENSATION	COMPENSATION
A0346				4735				
A0347						BIT 14 FLAG 2	(S)	
A0348				0037	SRCHOPTN =	031D	RADAR IN AUTOMATIC	RADAR NOT IN AUTO-
A0349	REF	3	LAST	83	SRCHOBIT =	BIT14	SEARCH OPTION(R24)	MATIC SEARCH OPTION
A0350				4736				
A0351						BIT 13 FLAG 2	(S)	
A0352				0040	ACMODELG =	032D	MANUAL ACQUISITION	AUTO ACQUISITION
A0353	REF	4	LAST	83	ACMODBIT =	BIT13	BY RENDESVOUS RADAR	BY RENDESVOUS RADAR
A0354				4737				
A0355						8IT 12 FLAG 2	(S)	

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A0356				0041	LOSCMFLG =	0330	LINE OF SIGHT BEING	LINE OF SIGHT NOT
A0357	REF	2	LAST	4740	LOSCMBIT =	BIT12	COMPUTED (R21)	BEING COMPUTED
A0358								
A0359							IN R29 (L): RR GYRO	IN R29 (L): RR GYRO
A0360							CMD LOOP RUNNING	CMD LOOP OFF
A0361				0042	STEERSW =	BIT 11 FLAG 2	(S)	
A0362	REF	2	LAST	4741	STEERBIT =	0340	SUFFICIENT THRUST	INSUFFICIENT THRUST
A0363						BIT11	IS PRESENT	IS PRESENT
A0364								
A0365				0043	CYCLESW =	BIT 10 FLAG 2	(S)	
A0366	REF	2	LAST	4742	CYCLEBIT =	0350	LAMBERT VG CALCU-	LAMBERT CALCULATION
A0367						BIT10	LATION TO BE DONE	OMITTED
A0368								
A0369				0044	IMPULSW =	BIT 9 FLAG 2	(S)	
A0370						0360	MINIMUM IMPULSE	STEERING BURN (NO
A0371	REF	2	LAST	4743	IMPULBIT =	BIT9	BURN (CUTOFF TIME	CUTOFF TIME YET
A0372							SPECIFIED)	AVAILABLE)
A0373								
A0374				0045	XDELVFLG =	BIT 8 FLAG 2	(S)	
A0375	REF	3	LAST	4744	XDELVBIT =	0370	EXTERNAL DELTAV VG	LAMBERT (AIMPOINT)
A0376						BIT8	COMPUTATION	VG COMPUTATION
A0377								
A0378				0046	ETPIFLAG =	BIT 7 FLAG 2	(S)	
A0379						0380	ELEVATION ANGLE	TPI TIME SUPPLIED
A0380	REF	3	LAST	4745	ETPIBIT =	BIT7	SUPPLIED FOR	FOR P34,74 TO COMPUT
A0381							P34,74	ELEVATION
A0382								
A0383				0046	OPTNSW =	BIT 7 FLAG 2	(L)	
A0384	REF	1		4745	OPTNBIT =	ETPIFLAG	SQI PHASE OF P38/78	SQR PHASE OF P38/78
A0385	REF	4	LAST			BIT7		
A0386								
A0387				0047	FINALFLG =	BIT 6 FLAG 2	(S)	
A0388						0390	LAST PASS THROUGH	INTERIM PASS THROUGH
A0389	REF	3	LAST	4746	FINALBIT =	BIT6	RENDEZVOUS PROGRAM	RENDEZVOUS PROGRAM
A0390							COMPUTATIONS	COMPUTATIONS
A0391								
A0392				0050	AVFLAG =	BIT 5 FLAG 2	(S)	
A0393	REF	3	LAST	4747	AVFLBIT =	0400	LEM IS ACTIVE	CSM IS ACTIVE
A0394						BIT5	VEHICLE	VEHICLE
A0395								
A0396						BIT 4 FLAG 2	(S)	

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A0397 0398 A0399	REF 2 LAST 82	0051 4750	PFRATFLG = PFRATBIT =	041D BIT4	PREFERRED ATTITUDE COMPUTED	PREFERRED ATTITUDE NOT COMPUTED
A0400 0401 0402 A0403	REF 3 LAST 84	0052 4751	CALCMAN3 = CALC3BIT =	BIT 3 FLAG 2 042D BIT3	(S) NO FINAL ROLL	FINAL ROLL IS NECESSARY
A0404 0405 0406 A0407	REF 3 LAST 84	0053 4752	CALCMAN2 = CALC2BIT =	BIT 2 FLAG 2 043D BIT2	(S) PERFORM MANEUVER STARTING PROCEDURE	BYPASS STARTING PROCEDURE
A0408 0409 0410 A0411	REF 2 LAST 82	0054 4753	NODOFLAG = NODOBIT =	BIT 1 FLAG 2 044D BIT1	(S) V37 NOT PERMITTED	V37 PERMITTED
0412 A0413	REF 4 LAST 84	0077	FLAGWRD3 =	STATE +3	(045-059)	
A0414 A0415 A0416			=	BIT 15 FLAG 3 045D	(SET)	(RESET)
A0417 0418 0419 A0420	REF 4 LAST 84	0056 4736	GLOKFAIL = GLOKFBIT =	BIT 14 FLAG 3 046D BIT14	(S) GIMBAL LOCK HAS OCCURRED	NOT IN GIMBAL LOCK
A0421 0422 0423 A0424	REF 5 LAST 84	0057 4737	REFSMFLG = REFSMBIT =	BIT 13 FLAG 3 047D BIT13	*** PROTECTED FROM FRESH START *** REFSMMAT GOOD	REFSMMAT NO GOOD
A0425 0426 0427 A0428	REF 3 LAST 85	0060 4740	LUNAFLAG = LUNABIT =	BIT 12 FLAG 3 048D BIT12	(S) LUNAR LAT-LONG	EARTH LAT-LONG
A0429 0430 0431 A0432	REF 3 LAST 85	0061 4741	NOR29FLG = NR29FBIT =	BIT 11 FLAG 3 049D BIT11	(L) R29 NOT ALLOWED	R29 ALLOWED (RR DES- IGNATE, POWERED FLT)
A0433 0434 0435	REF 3 LAST 85	0062 4742	VFLAG = VFLAGBIT =	BIT 10 FLAG 3 050D BIT10	(S) LESS THAN TWO STARS IN FIELD OF VIEW	TWO STARS IN FIELD OF VIEW

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A0436

A0437						0063	R04FLAG =	BIT 9 FLAG 3 051D	(S) ALARM 521 SUPPRESSED	ALARM 521 ALLOWED
A0438										
A0439										
A0440	REF	3	LAST	85		4743	R04FLBIT =	BIT9		
A0441										

A0442								BIT 9 FLAG 3	(L)	
A0443	REF	1				0063	READRFLG =	R04FLAG	READING RR DATA	NOT READING RR DATA
A0444	REF	4	LAST	87		4743	READRBIT =	BIT9	PURSUANT TO R29	PURSUANT TO R29
A0445										

A0446								BIT 8 FLAG 3	(S)	
A0447						0064	PRECIFLG =	052D	NORMAL INTEGRATION	ENGAGES 4-TIME STEP
A0448									IN POO	(POO) LOGIC IN INTE-
A0449	REF	4	LAST	85		4744	PRECIRBIT =	BIT8		GRATION
A0450										

A0451								BIT 7 FLAG 3	(S)	
A0452						0065	CULTFLAG =	053D	STAR OCCULTED	STAR NOT OCCULTED
A0453	REF	5	LAST	85		4745	CULTBIT =	BIT7		
A0454										

A0455								BIT 6 FLAG 3	(S)	
A0456						0066	ORBWFLAG =	054D	W MATRIX VALID FOR	W MATRIX INVALID FOR
A0457	REF	4	LAST	85		4746	ORBWFBIT =	BIT6	ORBITAL NAVIGATION	ORBITAL NAVIGATION
A0458										

A0459								BIT 5 FLAG 3	(S)	
A0460						0067	STATEFLG =	055D	PERMANENT STATE	PERMANENT STATE
A0461	REF	4	LAST	85		4747	STATEBIT =	BIT5	VECTOR UPDATED	VECTOR NOT UPDATED
A0462										

A0463								BIT 4 FLAG 3	(S)	
A0464						0070	INTYPFLG =	056D	CONIC INTEGRATION	ENCKE INTEGRATION
A0465	REF	3	LAST	86		4750	INTYPBIT =	BIT4		
A0466										

A0467								BIT 3 FLAG 3	(S)	
A0468						0071	VINTFLAG =	057D	CSM STATE VECTOR	LEM STATE VECTOR
A0469	REF	4	LAST	86		4751	VINTFBIT =	BIT3	BEING INTEGRATED	BEING INTEGRATED
A0470										

A0471								BIT 2 FLAG 3	(S)	
A0472						0072	D6OR9FLG =	058D	DIMENSION OF W IS 9	DIMENSION OF W IS 6
A0473	REF	4	LAST	86		4752	D6OR9BIT =	BIT2	FOR INTEGRATION	FOR INTEGRATION
A0474										

A0475								BIT 1 FLAG 3	(S)	
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A0476 0477 A0478	REF	3	LAST	86	0073 4753	DIMOF FLAG = DIMOB IT =	059D BIT1	W MATRIX IS TO BE USED	W MATRIX IS NOT TO BE USED
0479 A0480	REF	5	LAST	86	0100	FLAGWRD4 =	STATE +4	(060-074)	
A0481 0482 0483 A0484	REF	4	LAST	84	0074 4735	MRKIDFLG = MRKIDBIT =	BIT 15 FLAG 4 060D BIT15	(S) MARK DISPLAY IN ENDIDLE	NO MARK DISPLAY IN ENDIDLE
A0485 0486 0487 A0488	REF	5	LAST	86	0075 4736	PRIODFLG = PRIODBIT =	BIT 14 FLAG 4 061D BIT14	(S) PRIORITY DISPLAY IN ENDIDLE	NO PRIORITY DISPLAY IN ENDIDLE
A0489 0490 0491 A0492	REF	6	LAST	86	0076 4737	NRMIDFLG = NRMIDBIT =	BIT 13 FLAG 4 062D BIT13	(S) NORMAL DISPLAY IN ENDIDLE	NO NORMAL DISPLAY IN ENDIDLE
A0493 0494 A0495 0496 A0497 A0498	REF	4	LAST	86	0077 4740	PDSPFLAG = PDSPFBIT =	BIT 12 FLAG 4 063D BIT12	(S) P20 SETS SO AS TO TURN A NORMAL DIS- PLAY INTO A PRIORITY DISPLAY IN R60	LEAVE AS NORMAL DISP
A0499 0500 A0501 0502 A0503	REF	4	LAST	86	0100 4741	MWAITFLG = MWAIBIT =	BIT 11 FLAG 4 064D BIT11	(S) HIGHER PRIORITY DISPLAY OPERATING WHEN MARK DISPLAY INITIATED	NO HIGHER PRIORITY DISPLAY OPERATING WHEN MARK DISPLAY INITIATED
A0504 0505 A0506 0507 A0508	REF	4	LAST	86	0101 4742	NWAITFLG = NWAIBIT =	BIT 10 FLAG 4 065D BIT10	(S) HIGHER PRIORITY DISPLAY OPERATING WHEN NORMAL DISPLAY INITIATED	NO HIGHER PRIORITY DISPLAY OPERATING WHEN NORMAL DISPLAY INITIATED
A0509 0510 A0511 0512 A0513	REF	5	LAST	87	0102 4743	MRKNVFLG = MRKNVBIT =	BIT 9 FLAG 4 066D BIT9	(S) ASTRONAUT USING KEYBOARD WHEN MARK DISPLAY INITIATED	ASTRONAUT NOT USING KEYBOARD WHEN MARK DISPLAY INITIATED
A0514 0515					0103	NRMNVFLG =	BIT 8 FLAG 4 067D	(S) ASTRONAUT USING	ASTRONAUT NOT USING

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A0516 0517 A0518	REF	5	LAST	87	4744	NRMNVBIT =	BIT8	KEYBOARD WHEN NORMAL DISPLAY INITIATED	KEYBOARD WHEN NORMAL DISPLAY INITIATED
A0519 0520 A0521 0522 A0523	REF	6	LAST	87	4745	PRONVFLG = PRONVBIT =	BIT 7 FLAG 4 068D BIT7	(S) ASTRONAUT USING KEYBOARD WHEN PRIORITY DISPLAY INITIATED	ASTRONAUT NOT USING KEYBOARD WHEN PRIORITY DISPLAY INITIATED
A0524 0525 A0526 0527 A0528	REF	5	LAST	87	4746	PINBRFLG = PINBRBIT =	BIT 6 FLAG 4 069D BIT6	(S) ASTRONAUT HAS INTERFERED WITH EXISTING DISPLAY	ASTRONAUT HAS NOT INTERFERED WITH EXISTING DISPLAY
A0529 0530 A0531 0532 A0533	REF	5	LAST	87	4747	MRUPTFLG = MRUPTBIT =	BIT 5 FLAG 4 070D BIT5	(S) MARK DISPLAY INTERRUPTED BY PRIORITY DISPLAY	MARK DISPLAY NOT INTERRUPTED BY PRIORITY DISPLAY
A0534 0535 A0536 0537 A0538	REF	4	LAST	87	4750	NRUPTFLG = NRUPTBIT =	BIT 4 FLAG 4 071D BIT4	(S) NORMAL DISPLAY INTERRUPTED BY PRIORITY OR MARK DISPLAY	NORMAL DISPLAY NOT INTERRUPTED BY PRIORITY OR MARK DISPLAY
A0539 0540 0541 A0542	REF	5	LAST	87	4751	MKOVFLAG = MKOVBIT =	BIT 3 FLAG 4 072D BIT3	(S) MARK DISPLAY OVER NORMAL	NO MARK DISPLAY OVER NORMAL
A0543 A0544 A0545						=	BIT 2 FLAG 4 073D		
A0546 0547 0548 A0549	REF	4	LAST	88	4753	XDSPFLAG = XDSPBIT =	BIT 1 FLAG 4 074D BIT1	(S) MARK DISPLAY NOT TO BE INTERRUPTED	NO SPECIAL MARK INFORMATION
0550 A0551	REF	6	LAST	88	0101	FLAGWORD =	STATE +5	(075-089) (SET)	(RESET)
A0552 0553 0554 A0555	REF	5	LAST	88	4735	DSKYFLAG = OSKYFBIT =	BIT 15 FLAG 5 075D BIT15	(S) DISPLAYS SENT TO OSKY	NO DISPLAYS TO DSKY

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[illegible]

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A0597						=	BIT 5 FLAG 5		
A0598							085D		
A0599									
A0600					0126	NORRMON =	BIT 4 FLAG 5	(S)	
0601					4750	NORRMBIT =	086D	BYPASS RR GIMBAL	PERFORM
0602	REF	5	LAST	89			BIT4	MONITOR	RR GIMBAL MONITOR
A0603									
A0604					0127	SOLNSW =	BIT 3 FLAG 5	(S)	
0605							087D	LAMBERT DOES NOT	LAMBERT CONVERGES OR
A0606					4751	SOLNSBIT =	BIT3	CONVERGE, OR TIME-RADIUS NON	CIRCULAR
0607	REF	6	LAST	89				NEARLY CIRCULAR	CIRCULAR
A0608									
A0609					0130	MGLVFLAG =	BIT 2 FLAG 5	(S)	
0610							088D	LOCAL VERTICAL	MIDDLE GIMBAL ANGLE
A0611					4752	MGLVFBIT =	BIT2	COORDINATES	COMPUTED
0612	REF	5	LAST	87				COMPUTED	
A0613									
A0614					0131	RENDWFLG =	BIT 1 FLAG 5	(S)	
0615							089D	W MATRIX VALID	W MATRIX INVALID
A0616					4753	RENDWBIT =	BIT1	FOR RENDEZVOUS	FOR RENDEZVOUS
0617	REF	5	LAST	89				NAVIGATION	NAVIGATION
A0618									
0619	REF	7	LAST	89	0102	FLAGWRD6 =	STATE +6	(090-104)	
A0620								(SET)	(RESET)
A0621					0132	S32.1F1 =	BIT 15 FLAG 6	(S)	
0622					4735	S32BIT1 =	090D	DELTA V AT CSI TIME	DVT1 LESS THEN MAX
0623	REF	6	LAST	89			BIT15	ONE EXCEEDS MAX	
A0624									
A0625					0133	S32.1F2 =	BIT 14 FLAG 6	(S)	
0626					4736	S32BIT2 =	091D	FIRST PASS OF	REITERATION OF
0627	REF	6	LAST	88			BIT14	NEWTON ITERATION	NEWTON
A0628									
A0629					0134	S32.1F3A =	BIT 13 FLAG 6	(S)	
0630					4737	S32BIT3A =	092D	BIT 13 AND BIT 12 FUNCTION AS AN ORDERED	
0631	REF	8	LAST	90			BIT13	PAIR (13,12) INDICATING THE POSSIBLE OC-	
A0632								CURRANCE OF 2NEWTON ITERATIONS FOR S32.1	
A0633								IN THE PROGRAM IN THE FOLLOWING ORDER:	
A0634					0135	S32.1F3B =	BIT 12 FLAG 6	(0,1) (I.E. BIT 13 RESET, BIT 12 SET)	
0635					4740	S32BIT3B =	093D	= FIRST NEWTON ITERATION BEING DONE	
0636	REF	6	LAST	90			BIT12	(0,0)= FIRST PASS OF SECOND NEWT. ITERAT.	
A0637								(1,1)= 50 FT/SEC STAGE OF SEC. NEWT. ITER	

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A0638
A0639

(1,0) = REMAINDER OF SECOND NEWTON ITERA.

A0640
0641
0642
A0643

REF 6 LAST 90

0136
4741FIRSTFLG =
FIRSTBIT =BIT 11 FLAG 6
094D
BIT11(S)
SUCCEEDING PASS
THRU S40.9FIRST PASS THRU
S40.9A0644
0645
0646
A0647

REF 6 LAST 90

0137
4742GMBDRVSW =
GMBDRBIT =BIT 10 FLAG 6
095D
BIT10(S)
TRIMGIMB OVER

TRIMGIMB NOT OVER

A0648
0649
0650
A0651
A0652
A0653

REF 7 LAST 90

0140
47432PHASFLG =
2PHASBIT =BIT 9 FLAG 6
096D
BIT92-PHASE GUIDANCE IE ONE-PHASE GUIDANCE
TTF GOES TO ZERO I.E. SWITCH OUT OF
BEFORE YOU ENTER BRAKING PHASE BEFORE
APPROACH PHASE TTF GETS SMALLA0654
0655
0656
A0657

REF 7 LAST 90

0141
4744MUNFLAG =
MUNFLBIT =BIT 8 FLAG 6
097D
BIT8(S)
SERVICER CALLS
MUNRVGSERVICER CALLS
CALCRVGA0658
0659
0660
A0661

REF 8 LAST 90

0142
4745POUTFLAG =
POUTBIT =BIT 7 FLAG 6
098D
BIT7(L)
PROHIBIT THROTTLE
PULSE-OUT (P60'S)PERMIT THROTTLE
PULSE-OUTA0662
0663
A0664
0665
A0666

REF 7 LAST 90

0143
4746REDFLAG =
REDFLBIT =BIT 6 FLAG 6
099D
BIT6(L)
LANDING SITE
REDESIGNATION
PERMITTEDLANDING SITE
REDESIGNATION NOT
PERMITTEDA0667
A0668
A0669=
BIT 5 FLAG 6
100DA0670
A0671=
BIT 4 FLAG 6
101DA0672
0673
A0674
0675
A0676

REF 7 LAST 91

0146
4751NTARGFLG =
NTARGBIT =BIT 3 FLAG 6
102D
BIT3(S)
ASTRONAUT DID
OVERWRITE DELTA
VELOCITY AT TPI
OR TPM (P34,35)ASTRONAUT DID NOT
OVERWRITE DELTA
VELOCITY

A0677

BIT 2 FLAG 6

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A0678 0679 A0680 A0681 A0682 A0683	REF	6	LAST	91	0147 4752	AUXFLAG = AUXFLBIT =	103D BIT2	PROVIDING IDLEFLAG IS NOT SET, SERVICER WILL EXERCISE DVMON ON ITS NEXT PASS.	SERVICER WILL SKIP DVMON ON ITS NEXT PASS EVEN IF THE IDLEFLAG IS NOT SET. IT WILL THEN SET AUXFLAG.
A0684 0685 A0686 0687 A0688	REF	6	LAST	91	0150 4753	ATTFLAG = ATTFLBIT =	BIT 1 FLAG 6 104D BIT1	{L} LEM ATTITUDE EXISTS IN MOON-FIXED COORDINATES	NO LEM ATTITUDE AVAILABLE IN MOON-FIXED COORDINATES
0689 A0690	REF	8	LAST	91	0103	FLAGWRD7 =	STATE +7	{105-119}	
A0691 0692 0693 A0694	REF	7	LAST	91	0151 4735	ITSWICH = ITSWBIT =	BIT 15 FLAG 7 105D BIT15	{S} P34;TPI TIME TO BE COMPUTED	TPI HAS BEEN COMPUTED
A0695 0696 A0697 0698 A0699	REF	7	LAST	91	0152 4736	MANUFLAG = MANUFBIT =	BIT 14 FLAG 7 106D BIT14	{S} ATTITUDE MANEUVER GOING DURING RR SEARCH	NO ATTITUDE MANEUVER DURING RR SEARCH
A0700 0701 0702 A0703	REF	9	LAST	91	0153 4737	IGNFLAG = IGNFLBIT =	BIT 13 FLAG 7 107D BIT13	{S} TIG HAS ARRIVED	TIG HAS NOT ARRIVED
A0704 0705 0706 A0707	REF	7	LAST	91	0154 4740	ASTNFLAG = ASTNBIT =	BIT 12 FLAG 7 108D BIT12	{S} ASTRONAUT HAS OKAYED IGNITION	ASTRONAUT HAS NOT OKAYED IGNITION
A0708 0709 0710 A0711	REF	7	LAST	92	0155 4741	SWANDISP = SWANDBIT =	BIT 11 FLAG 7 109D BIT11	{L} LANDING ANALOG DISPLAYS ENABLED	LANDING ANALOG DISPLAYS SUPPRESSED
A0712 0713 0714 A0715	REF	7	LAST	92	0156 4742	NORMSW = NORMSBIT =	BIT 10 FLAG 7 110D BIT10	{S} UNIT NORMAL INPUT TO LAMBERT	LAMBERT COMPUTES ITS OWN UNIT NORMAL
A0716 0717					0157	RVSW =	BIT 9 FLAG 7 111D	{S} DO NOT COMPUTE	COMPUTE FINAL STATE

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Line	Flagword	Assignment	Value	Bit/Flag	State	Vector	Time-Theta
A0718	REF	8 LAST 92	4743	RVS8IT =	BIT9	FINAL STATE VECTOR	VECTOR IN TIME-THETA
A0719						IN TIME-THETA	
A0720							
A0721			0160	V67FLAG =	8IT 8 FLAG 7	(S)	
A0722					1120	ASTRONAUT OVERWRITE	ASTRONAUT DOES NOT
A0723	REF	8 LAST 92	4744	V67FL8IT =	BIT8	W-MATRIX INITIAL	OVERWRITE W-MATRIX
A0724						VALUES	INITIAL VALUES
A0725							
A0726			0161	IDLEFLAG =	BIT 7 FLAG 7	(S)	
A0727	REF	9 LAST 92	4745	IDLEF8IT =	1130	NO DV MONITOR	CONNECT DV MONITOR
A0728					BIT7		
A0729							
A0730			0162	V37FLAG =	8IT 6 FLAG 7	(S)	
A0731	REF	8 LAST 92	4746	V37FLB1T =	1140	AVERAGEG (SERVICER)	AVERAGEG (SERVICER)
A0732					BIT6	RUNNING	OFF
A0733							
A0734			0163	AVEGFLAG =	BIT 5 FLAG 7	(S)	
A0735	REF	6 LAST 89	4747	AVEGFB1T =	1150	AVERAGEG (SERVICER)	AVERAGEG (SERVICER)
A0736					BIT5	DESIRED	NOT DESIRED
A0737							
A0738			0164	UPLOCKFL =	BIT 4 FLAG 7	(S)	
A0739	REF	6 LAST 91	4750	UPLOCBIT =	1160	K-KBAR-K FAIL	NO K-KBAR-K FAIL
A0740					BIT4		
A0741							
A0742			0165	VERIFLAG =	BIT 3 FLAG 7	(S)	
A0743	REF	8 LAST 92	4751	VERIFB1T =	1170	CHANGED WHEN V33E OCCURS	AT END OF P27
A0744					BIT3		
A0745							
A0746			0166	V82EMFLG =	BIT 2 FLAG 7	(L,C)	
A0747	REF	7 LAST 93	4752	V82EM81T =	1180	MOON VICINITY	EARTH VICINITY
A0748					BIT2		
A0749							
A0750			0167	TFFSW =	BIT 1 FLAG 7	(S)	
A0751	REF	7 LAST 93	4753	TFFSWBIT =	1190	CALCULATE TPERIGEE	CALCULATE TFF
A0752					BIT1		
A0753							
A0754	REF	9 LAST 93	0104	FLAGWRD8 =	STATF +8D	(120-134)	
A0755						(SET)	(RESET)
A0756					BIT 15 FLAG 8	(S)	

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A0757				0170	RPQFLAG =	120D	RPQ NOT COMPUTED	RPQ COMPUTED
A0758	REF	8	LAST	93			(RPQ = VECTOR BE-	
A0759				4735	RPQFLBIT =	BIT15	TWEEN SECONDARY BODY	
A0760							AND PRIMARY BODY	
A0761								
A0762						BIT 14 FLAG 8		
A0763						121D		
A0764						BIT14		
A0765								
A0766						BIT 13 FLAG 8	(S)	
A0767				0172	NEWIFLG =	122D	FIRST PASS THROUGH	SUCCEEDING ITERATION
A0768	REF	10	LAST	93	NFWIRBIT =	BIT13	INTEGRATION	OF INTEGRATION
A0769				4737				
A0770						BIT 12 FLAG 8	*** PROTECTED FROM FRESH START ***	
A0771				0173	CMOONFLG =	123D	PERMANENT CSM STATE	PERMANENT CSM STATE
A0772	REF	8	LAST	93	CMOONBIT =	BIT12	IN LUNAR SPHERE	IN EARTH SPHERE
A0773				4740				
A0774						BIT 11 FLAG 8	*** PROTECTED FROM FRESH START ***	
A0775				0174	LMOONFLG =	124D	PERMANENT LM STATE	PERMANENT LM STATE
A0776	REF	8	LAST	93	LMOONBIT =	BIT11	IN LUNAR SPHERE	IN EARTH SPHERE
A0777				4741				
A0778						BIT 10 FLAG 8	(L)	
A0779				0175	FLUNDISP =	125D	CURRENT GUIDANCE	CURRENT GUIDANCE
A0780	REF	8	LAST	93	FLUNDBIT =	BIT10	DISPLAYS INHIBITED	DISPLAYS PERMITTED
A0781				4742				
A0782						BIT 9 FLAG 8	(L)	
A0783				0176	P39/79SW =	126D	P39/79 OPERATING	P38/P78 OPERATING
A0784	REF	9	LAST	94	P39SWBIT =	BIT9		
A0785				4743				
A0786						BIT 8 FLAG 8	*** PROTECTED FROM FRESH START ***	
A0787				0177	SURFFLAG =	127D	LM ON LUNAR SURFACE	LM NOT ON LUNAR
A0788	REF	9	LAST	94	SURFFBIT =	BIT8	SURFACE	
A0789				4744				
A0790						BIT 7 FLAG 8	(S)	
A0791				0200	INFINFLG =	123D	NO CONIC SOLUTION	CONIC SOLUTION
A0792							(CLOSURE THROUGH	EXISTS
A0793	REF	10	LAST	94	INFINBIT =	BIT7	INFINITY REQUIRED)	
A0794				4745				
A0795						BIT 6 FLAG 8	(S)	
A0796				0201	ORDERSW =	129D	ITERATOR USES 2ND	ITERATOR USES 1ST
A0797	REF	9	LAST	94	ORDERBIT =	BIT6	ORDER MINIMUM MODE	ORDER STANDARD MODE
				4746				

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A0798							
A0799				0202	APSESW =	BIT 5 FLAG 8 130D	(S) RDESIRED OUTSIDE RDESIRED INSIDE
A0800							PERICENTER-APOCENTERPERICENTER-APOCENTER
A0801	REF	7	LAST	94	4747	APSFBSBIT =	RANGE IN TIME-RAD1 RANGE IN TIME-RADIUS
A0802							
A0803							
A0804							
A0805				0203	COGAFLAG =	BIT 4 FLAG 8 131D	(S) NO CONIC SOLUTION - CONIC SOLUTION
A0806							TOO CLOSE TO RECTI- EXISTS(COGA DOES NOT
A0807	REF	7	LAST	94	4750	COGAFBIT =	LINEAR(COGA OVRFLWS) OVERFLOW)
A0808							
A0809							
A0810					=	BIT 3 FLAG 8 132D	
A0811							
A0812				0205	INITALGN =	BIT 2 FLAG 8 133D	(L) INITIAL PASS THRU SECOND PASS THRU P57
A0813	REF	8	LAST	94	4752	INITABIT =	(CHECK RESET-MILLARD)
A0814							
A0815							
A0816				0206	360SW =	BIT 1 FLAG 8 134D	(S) TRANSFER ANGLE NEAR TRANSFER ANGLE NOT
A0817	REF	8	LAST	94	4753	360SWBIT =	360 DEGREFS NEAR 360 DEGREES
A0818							
A0819							
A0820	REF	10	LAST	94	0105	FLAGWRD9 =	STATE +9D (135 - 149)
A0821							(SET) (RESET)
A0822							
A0823					=	BIT 15 FLAG 9 135D	
A08231					=	BIT15	
A0824							
A0825				0210	FLVR =	BIT 14 FLAG 9 136D	(L) VERTICAL RISE NON-VERTICAL RISE
A0826	REF	8	LAST	93	4736	FLVRBIT =	(ASCENT GUIDANCE)
A0827							
A0828							
A0829					=	BIT 13 FLAG 9 137D	
A0830							
A0831							
A0832				0212	FLPC =	BIT 12 FLAG 9 138D	(L) NO POSITION CONTROL POSITION CONTROL
A0833	REF	9	LAST	95	4740	FLPCBIT =	(ASCENT GUIDANCE)
A0834							

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A0835 0836 0837 A0838	REF	9	LAST	95	0213 4741	FLPI = FLPIBIT =	BIT 11 FLAG 9 139D BIT11	(L) PRE-IGNITION PHASE (ASCENT GUIDANCE)	REGULAR GUIDANCE
A0839 0840 0841 A0842	REF	9	LAST	95	0214 4742	FLRCS = FLRCSBIT =	BIT 10 FLAG 9 140D BIT10	(L) RCS INJECTION MODE (ASCENT GUIDANCE)	MAIN ENGINE MODE
A0843 0844 0845 A0846	REF	10	LAST	95	0215 4743	LETABORT = LETABBIT =	BIT 9 FLAG 9 141D BIT9	(L) ABORT PROGRAMS ARE ENABLED	ABORT PROGRAMS ARE NOT ENABLED
A0847 0848 0849 0850 A0851	REF	10	LAST	95	0216 4744	FLAP = FLAPBIT =	BIT 8 FLAG 9 142D BIT8	(L) APS CONTINUED ABORT AFTER DPS STAGING (ASCENT GUIDANCE)	APS ABORT IS NOT A CONTINUATION
A0852 A0853						=	BIT 7 FLAG 9 143D	(L)	
A0854 0855 0856 A0857 A0858	REF	10	LAST	95	0220 4746	FLZONEO = FLZONBIT =	BIT 6 FLAG 9 144D BIT6	(L) EARLY ABORT TFI . 50 SECS. P70 --> P40 P71 --> P42	LATE ABORT TFI > 50 SECS.
A0859 0860 0861 A0862	REF	8	LAST	96	0221 4747	QUITFLAG = QUITBIT =	BIT 5 FLAG 9 145D BIT5	(S) DISCONTINUE INTEGR. CONTINUE INTEGRATION	
A0863 A0864 A0865 A0866						= =	BIT 4 FLAG 9 146D BIT4		
A0867 0868 0869 A0870	REF	9	LAST	94	0223 4751	MIDIFLAG = MIDIFBIT =	BIT 3 FLAG 9 147D BIT3	(L) INTEGRATE TO TDEC	INTEGRATE TO THE THEN-PRESENT TIME
A0871 0872 A0873 0874 A0875	REF	9	LAST	96	0224 4752	MIDAVFLG = MIDAVBIT =	BIT 2 FLAG 9 148D BIT2	(L) INTEGRATION ENTERED FROM ONE OF MIDTOAV PORTALS	INTEGRATION WAS NOT ENTERED VIA MIDTOAV

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A0876				0225	AVEMIDSW =	BIT 1 FLAG 9 149D	(S) AVETOMID CALLING NO AVETOMID W INTEGR
A0877							FOR W.MATRIX INTEGR ALLOW SET UP RN,VN,
A0878	REF	9	LAST	96	4753	AVEMDBIT =	DONT WRITE OVER RN, PIPTIME
A0879						BIT1	VN,PIPTIME
A0880							
A0881							
A0882	REF	1			0106	RASFLAG EQUALS FLGWRD10	WAS ONLY AN INSTALL- ERASTALL FLAG
A0883							
A0884	REF	11	LAST	96	0106	FLGWRD10 =	STATE +10D (150 - 164)
A0885							(SET) (RESET)
A0886						BIT 15 FLAG 10	
A0887						=	150D
A0888							
A0889						BIT 14 FLAG 10	(L,C)
A0890					0227	INTFLAG =	INTEGRATION IN
A0891	REF	9	LAST	96	4736	INTFLBIT =	INTEGRATION NOT IN
A0892						BIT14	PROGRESS
A0893						BIT 13 FLAG 10	(S,L)
A0894					0230	APSFLAG =	ASCENT STAGE
A0895	REF	11	LAST	95	4737	APSFLBIT =	DESCENT STAGE
A0896						BIT13	***PROTECTED FROM FRESH START ***
A0897						BIT 12 FLAG 10	
A0898						=	153D
A0899							
A0900						BIT 11 FLAG 10	
A0901						=	154D
A0902							
A0903						BIT 10 FLAG 10	
A0904						=	155D
A0905							
A0906						BIT 9 FLAG 10	
A0907						=	156D
A0908							
A0909						BIT 8 FLAG 10	
A0910						=	157D
A0911							
A0912						BIT 7 FLAG 10	(L,C)

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A0934

A0945	=	BIT 13 FLAG 11
A0946	=	167D
A0947	=	BIT13
A0948		

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A0949				0250	VXINH =	BIT 12 FLAG 11 168D	(L)(R12) IF Z VELOCITY DATA UNREASONABLE, BYPASS X VELOCITY UPDATE ON NEXT PASS	UPDATE X AXIS VELOCITY
A0950								
A0951	REF	10	LAST	96	4740	VXINHBIT =	BIT12	
A0952								
A0953								
A0954				0251	PSTHIGAT =	BIT 11 FLAG 11 169D	(L)(R12) PAST HIGATE	PREHIGATE
A0955	REF	10	LAST	97	4741	PSTHIBIT =	BIT11	
A0956								
A0957								
A0958				0252	NOLRREAD =	BIT 10 FLAG 11 170D	(L)(R12) LANDING RADAR REPOSITIONING; BYPASS UPDATE	LR NOT REPOSITIONING
A0959								
A0960	REF	10	LAST	97	4742	NOLRRBIT =	BIT10	
A0961								
A0962								
A0963				0253	XORFLG =	BIT 9 FLAG 11 171D	(L)(R12) BELOW LIMIT INHIBIT X AXIS OVERRIDE	ABOVE LIMIT DO NOT INHIBIT
A0964								
A0965	REF	11	LAST	97	4743	XORFLBIT =	BIT9	
A0966								
A0967								
A0968				0254	LRINH =	BIT 8 FLAG 11 172D	LANDING RADAR UP- DATES PERMITTED BY ASTRONAUT	LR UPDATES INHIBITED BY ASTRONAUT
A0969	REF	11	LAST	97	4744	LRINHBIT =	BIT8	
A0970								
A0971								
A0972								
A0973				0255	VELDATA =	BIT 7 FLAG 11 173D	(L)(R12) LR VELOCITY MEASUREMENT MADE	LR VELOCITY MEASURE NOT MADE
A0974	REF	12	LAST	99	4745	VELDABIT =	BIT7	
A0975								
A0976								
A0977				0256	READLR =	BIT 6 FLAG 11 174D	(L)(R12) OK TO READ LR RANGE DATA	DO NOT READ LR RANGE DATA
A0978	REF	11	LAST	97	4746	READLBIT =	BIT6	
A0979								
A0980								
A0981				0257	READVEL =	BIT 5 FLAG 11 175D	(L)(R12) OK TO READ LR VELOCITY DATA	DO NOT READ LR VELOCITY DATA
A0982	REF	9	LAST	97	4747	READVBIT =	BIT5	
A0983								
A0984								
A0985				0260	RNGEDATA =	BIT 4 FLAG 11 176D	(L)(R12) LR ALTITUDE MEASUREMENT MADE	LR ALTITUDE MEASURE NOT MADE
A0986	REF	8	LAST	96	4750	RNGEDBIT =	BIT4	
A0987								
A0988								
A0989						BIT 3 FLAG 11		

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A0990				0261	SCALBAD =	177D	LR LOW SCALE DIS-	LR SCALE DISCRETE
A0991	REF	10	LAST	97	4751	SCABBIT =	BIT3	CRETE NOT PRESENT
A0992								APPEARS OK
A0993								WHEN IT SHOULD BE
A0994							BIT 2 FLAG 11	(L)(R12)
A0995				0262	VFLSHFLG =	178D	LR VELOCITY FAIL	LR VEL FAIL LAMP
A0996	REF	10	LAST	97	4752	VFLSHBIT =	BIT2	LAMP SHOULD BE
A0997								SHOULDN'T FLASH
A0998								FLASHING
A0999							BIT 1 FLAG 11	(L)(R12)
A1000				0263	HFLSHFLG =	179D	LR ALTITUDE FAIL	LR ALTITUDE FAIL
A1001	REF	10	LAST	98	4753	HFLSHBIT =	BIT1	LAMP SHOULD BE
A1002								LAMP SHOULD NOT BE
A1003								FLASHING
A1004	REF	1			0110		RADMODES EQUALS	FLGWRD12
A1005								RADAR FLAG WORD
A1006	REF	13	LAST	99	0110		FLGWRD12 =	STATE +12D
A1007								(180 - 194) WAS RADMODES
								(SET) (RESET)
A1008							BIT 15 FLAG 12	
A1009				0264	CDESFLAG =	180D	CONTINUOUS DESIG-	LGC CHECKS FOR LOCK-
A1010	REF	10	LAST	99	4735	CDESBIT =	BIT15	NATE. LGC COMMANDS
A1011								ON WHEN ANTENNA
A1012								BEING DESIGNATED
A1013								LOCK-ON
A1014							BIT 14 FLAG 12	
A1015				0265	REMODFLG =	181D	CHANGE IN ANTENNA	NO REMODE REQUESTED
A1016	REF	10	LAST	98	4736	REMODBIT =	BIT14	MODE BEFN REQUESTED OR OCCURRING
A1017								I.E., REMODE
A1018								
A1019							BIT 13 FLAG 12	
A1020				0266	RCDUOFLG =	182D	RR CDU'S BEING	RR CDU'S NOT BEING
A1021	REF	12	LAST	98	4737	RCDUOBIT =	BIT13	ZEROD
A1022								ZEROD
A1023							BIT 12 FLAG 12	
A1024				0267	ANTENFLG =	183D	RR ANTENNA MODE IS	RR ANTENNA IN MODE 1
A1025	REF	11	LAST	100	4740	ANTENBIT =	BIT12	MODE 2
A1026								
A1027							BIT 11 FLAG 12	
A1028				0270	REPOSOMON =	184D	REPOSITION MONITOR.	NO REPOSITION TAKING
A1029	REF	11	LAST	100	4741	REPOSBIT =	BIT11	RR REPOSITION IS PLACE

EO S4

TAKING PLACE

```

A1067                                     BIT 2 FLAG 12
1068                                     193D      RR NDT IN AUTO MODE.  RR IN AUTD MODE
1069 REF 11 LAST 101 0301 AUTOMODE = 193D
A1070 4752 AUTDMBIT = BIT2      AUTO MODE DISCRETF
                                     IS NOT PRESENT

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L FLAGWORD ASSIGNMENTS

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A1071

A1072

1073

1074

A1075

A1076

A1077

1078

A1079

1080

A1081

A1082

1083

1084

A1085

A1086

A1087

1088

1089

A1090

A1091

1092

1093

A1094

A1095

1096

1097

A1098

A1099

1100

1101

A1102

A1103

1104

1105

A1106

A1107

1108

1109

REF 11 LAST 101

0302

4753

TURNONFL =

TURNONBT =

DAPBOOLS EQUALS FLGWRD13

0111

FLGWRD13 = STATE +13D

0111

REF 11 LAST 101

0303

4735

PULSEFLG =

PULSES =

USEQRFLG =

USFQRJTS =

0304

4736

REF 11 LAST 101

REF 13 LAST 101

0305

4737

CSMDKFLG =

CSMDOCKD =

REF 12 LAST 101

0306

4740

OURRCFLG =

OURRCBIT =

REF 12 LAST 101

0307

4741

ACC4-2FL =

ACC4OR2X =

REF 12 LAST 102

0310

4742

AORBTFLG =

AORBTTRAN =

REF 13 LAST 102

0311

4743

XOVINFLG =

XOVINHIB =

BIT 1 FLAG 12

194D

BIT1

RR TORN-ON SEQUENCE NO RR TURN-ON
IN PROGRESS. (ZERO SEQUENCE IN PROGRESS
CDU'S, FIX ANTENNA
MODE)

BIT 15 FLAG 13

195D

BIT15

MINIMUM IMPULSE NOT IN MINIMUM
COMMAND MODE IN IMPULSE COMMAND MODE
"ATT HOLD" (V76) (V77)

BIT 14 FLAG 13

196D

BIT14

GIMBAL UNUSABLE. TRIM GIMBAL MAY BE
USE JETS ONLY. USED.

BIT 13 FLAG 13

197D

BIT13

CSM DOCKED. USE CSM NOT DOCKED TO LM
BACKUP DAP

BIT 12 FLAG 13

198D

BIT12

CURRENT DAP PASS CURRENT DAP PASS IS
IS RATE COMMAND NOT RATE COMMAND

BIT 11 FLAG 13

199D

BIT11

4 JET X-AXIS TRANS- 2 JET X-AXIS TRANS-
LATION REQUESTED LATION REQUESTED

BIT 10 FLAG 13

200D

BIT10

B SYSTEM FOR X- A SYSTEM FOR X-
TRANSLATION TRANSLATION PREFERRED

BIT 9 FLAG 13

201D

BIT9

X-AXIS OVERRIDE X-AXIS OVERRIDE OKAY
LOCKED OUT

L FLAGWORD ASSIGNMENTS

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A1110

A1111						BIT 8 FLAG 13		
1112				0312	DRIFTDFL =	202D	ASSUME 0 OFESET	USE OFFSET ACCELERA-
1113	REF	13	LAST	102	DRIFTBIT =	BIT8	DRIFTING FLIGHT.	TION ESTIMATE
A1114				4744				

A1115						BIT 7 FLAG 13		
1116				0313	RHCSCFLG =	203D	NORMAL RHC SCALING	FINE RHC SCALING
1117	REF	14	LAST	102	RHCSCALE =	BIT7	REQUESTED	REQUESTED
A1118				4745				

A1119						BIT 6 FLAG 13		
1120				0314	ULLAGFLG =	204D	ULLAGE REQUEST BY	NO INTERNAL ULLAGE
1121	REF	13	LAST	102	ULLAGER =	BIT6	MISSION PROGRAM	REQUEST
A1122				4746				

A1123						BIT 5 FLAG 13		
1124				0315	AORBSFLG =	205D	P-AXIS COUPLES 7,15	P-AXIS COUPLES 4,12
1125	REF	11	LAST	102	AORBSYST =	BIT5	AND 8,16 PREFERRED	AND 3,11 PREFERRED
A1126				4747				

A1127						BIT 4 FLAG 13		
1128				0316	DBSELFGL =	206D	MAX DB SELECTED	MIN DB SELECTED BY
1129	REF	10	LAST	102	DBSELECT =	BIT4	BY CREW (5 DEG)	CREW (0.3 DEG)
A1130				4750				

A1131						BIT 3 FLAG 13		
1132				0317	ACCSOKFLG =	207D	CONTROL AUTHORITY	RESTART OR FRESH ST.
1133	REF	12	LAST	102	ACCSOKAY =	BIT3	VALUES FROM 1/ACCS	SINCE LAST 1/ACCS;
A1134				4751			USABLE	OUTPUTS SUSPECT.
A1135								

A1136						BIT 2 FLAG 13		
1137				0320	AUTR2FLG =	208D	THESE FLAGS ARE USED TOGETHER TO INDICAT	
1138	REF	12	LAST	102	AUTRATE2 =	BIT2	ASTRONAUT-CHOSEN KALCMANU MANEUVER RATES	
A1139				4752			(0,0)=(BIT2,BIT1)= 0.2 DEG/SEC	
A1140							(0,1)= 0.5 DEG/SEC	
A1141						BIT 1 FLAG 13		
1142				0321	AUTR1FLG =	209D	(1,0)= 2.0 DEG/SEC	
1143	REF	12	LAST	103	AUTRATE1 =	BIT1	(1,1)= 10.0 DEG/SEC	
A1144				4753				

L SUBROUTINE CALLS

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0001	*	0000	SUBRO	LUMERASE	102
0002	*	0000	SUBRO	LEMONAID	070
0003	*	0000	SUBRO	LEMP20S	114
0004	*	0000	SUBRO	LEMP30S	102
0005	*	0000	SUBRO	KISSING	040
0006	*	0000	SUBRO	FLY	109
0007	*	0000	SUBRO	LEMP50S	103
0008	*	0000	SUBRO	SKIPPER	070
0009	*	0000	SUBRO	LMDAP	012

*** END OF MAIN PROGRAM ***

L ERASABLE ASSIGNMENTS

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R0001 CONVENTIONS AND NOTATIONS UTILIZED FOR ERASABLE ASSIGNMENTS.

R0002 EQUALS IS USED IN TWO WAYS. IT IS OFTEN USED TO CHAIN A GROUP
R0003 OF ASSIGNMENTS SO THAT THE GROUP MAY BE MOVED WITH THE
R0004 CHANGING OF ONLY ONE CARD. EXAMPLE.

A0005	X	EQUALS START	
A0006	Y	EQUALS X	+SIZE.X
A0007	Z	EQUALS Y	+SIZE.Y

R0008 {X, Y, AND Z ARE CONSECUTIVE AND BEGIN AT START. }
R0009 {SIZE.X AND SIZE.Y ARE THE RESPECTIVE SIZES OF X AND Y, }
R0010 USUALLY NUMERIC, IE. 1, 2, 6, 180 ETC. }

R0011 EQUALS OFTEN IMPLIES THE SHARING OF REGISTERS (DIFFERENT NAMES
R0012 AND DIFFERENT DATA). EXAMPLE.

A0013	X	EQUALS Y
-------	---	----------

R0014 = MEANS THAT MULTIPLE NAMES HAVE BEEN GIVEN TO THE SAME DATA.
R0015 (THIS IS LOGICAL EQUIVALENCE, NOT SHARING) EXAMPLE.

A0016	X	=	Y
-------	---	---	---

R0017 THE SIZE AND UTILIZATION OF AN ERASABLE ARE OFTEN INCLUDED IN
R0018 THE COMMENTS IN THE FOLLOWING FORM. M(SIZE)N.

R0019 M REFERS TO THE MOBILITY OF THE ASSIGNMENT.
R0020 B MEANS THAT THE SYMBOL IS REFERENCED BY BASIC
R0021 INSTRUCTIONS AND THUS IS E-BANK SENSITIVE.
R0022 I MEANS THAT THE SYMBOL IS REFERENCED ONLY BY
R0023 INTERPRETIVE INSTRUCTIONS, AND IS THUS E-BANK
R0024 INSENSITIVE AND MAY APPEAR IN ANY E-BANK.

R0025 SIZE IS THE NUMBER OF REGISTERS INCLUDED BY THE SYMBOL.

R0026 N INDICATES THE NATURE OR PERMANENCE OF THE CONTENTS.
R0027 PL MEANS THAT THE CONTENTS ARE PAD LOADED.
R0028 DSP MEANS THAT THE REGISTER IS USED FOR A DISPLAY.
R0029 PRM MEANS THAT THE REGISTER IS PERMANENT, IE. IT
R0030 IS USED DURING THE ENTIRE MISSION FOR ONE
R0031 PURPOSE AND CANNOT BE SHARED.
R0032 TMP MEANS THAT THE REGISTER IS USED TEMPORARILY OR
R0033 IS A SCRATCH REGISTER FOR THE ROUTINE TO WHICH
R0034 IT IS ASSIGNED. THAT IS, IT NEED NOT BE SET
R0035 PRIOR TO INVOCATION OF THE ROUTINE NOR DOES IT
R0036 CONTAIN USEFUL OUTPUT TO ANOTHER ROUTINE. THUS

L ERASABLE ASSIGNMENTS

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R0037 IT MAY BE SHARED WITH ANY OTHER ROUTINE WHICH
R0038 IS NOT ACTIVE IN PARALLEL.
R0039 IN MEANS INPUT TO THE ROUTINE AND IT IS PROBABLY
R0040 TEMPORARY FOR A HIGHER-LEVEL ROUTINE/PROGRAM.
R0041 OUT MEANS OUTPUT FROM THE ROUTINE, PROBABLY
R0042 TEMPORARY FOR A HIGHER-LEVEL ROUTINE/PROGRAM.

L ERASABLE ASSIGNMENTS

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P0043 SPECIAL REGISTERS.

0044	0000	A	EQUALS 0	
0045	0001	L	EQUALS 1	L AND Q ARE BOTH CHANNELS AND REGISTERS.
0046	0002	Q	EQUALS 2	
0047	0003	EBANK	EQUALS 3	
0048	0004	FBANK	EQUALS 4	
0049	0005	Z	EQUALS 5	ADJACENT TO FBANK AND BBANK FOR DXCH Z
0050	0006	BBANK	EQUALS 6	(DTCB) AND DXCH FBANK (DTCF).
A0051				REGISTER 7 IS A ZERO-SOURCE, USED BY ZL.
0052	0010	ARUPT	EQUALS 10	
0053	0011	LRUPT	EQUALS 11	INTERRUPT STORAGE.
0054	0012	QRUPT	EQUALS 12	
0055	0013	SAMPTIME	EQUALS 13	SAMPLED TIME 1 & 2.
0056	0015	ZRUPT	EQUALS 15	(13 AND 14 ARE SPARES.)
0057	0016	BANKRUPT	EQUALS 16	USUALLY HOLDS FBANK OR BBANK.
0058	0017	BRUPT	EQUALS 17	RESUME ADDRESS AS WELL.
0059	0020	CYR	EQUALS 20	
0060	0021	SR	EQUALS 21	
0061	0022	CYL	EQUALS 22	
0062	0023	EDOP	EQUALS 23	EDITS INTERPRETIVE OPERATION CODE PAIRS.
0063	0024	TIME2	EQUALS 24	
0064	0025	TIME1	EQUALS 25	
0065	0026	TIME3	EQUALS 26	
0066	0027	TIME4	EQUALS 27	
0067	0030	TIME5	EQUALS 30	
0068	0031	TIME6	EQUALS 31	
0069	0032	CDUX	EQUALS 32	
0070	0033	CDUY	EQUALS 33	
0071	0034	CDUZ	EQUALS 34	
0072	0035	CDUT	EQUALS 35	REND RADAR TRUNNION CDU
0073	0036	CDUS	EQUALS 36	REND RADAR SHAFT CDU
0074	0037	PIPAX	EQUALS 37	
0075	0040	PIPAY	EQUALS 40	
0076	0041	PIPAZ	EQUALS 41	
0077	0042	Q-RHCCTR	EQUALS 42	RHC COUNTER REGISTERS
0078	0043	P-RHCCTR	EQUALS 43	
0079	0044	R-RHCCTR	EQUALS 44	
0080	0045	INLINK	EQUALS 45	
0081	0046	RNRAD	EQUALS 46	
0082	0047	GYROCMD	EQUALS 47	
0083	0050	CDUXCMD	EQUALS 50	
0084	0051	CDUYCMD	EQUALS 51	
0085	0052	CDUZCMD	EQUALS 52	
0086	0053	CDUTCMD	EQUALS 53	RADAR TRUNNION COMMAND
0087	0054	CDUSCMD	EQUALS 54	RADAR SHAFT COMMAND

L ERASABLE ASSIGNMENTS

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0088	0055	THRUST	EQUALS 55
0089	0056	LEMONM	EQUALS 56
0090	0057	OUTLINK	EQUALS 57
0091	0060	ALTM	EQUALS 60

R0092 INTERPRETIVE REGISTERS ADDRESSED RELATIVE TO VAC AREA.

0093	0042	LVSQUARE	EQUALS 34D	SQUARE OF VECTOR INPUT TO ABVAL AND UNIT
0094	0044	LV	EQUALS 36D	LENGTH OF VECTOR INPUT TO UNIT.
0095	0046	X1	EQUALS 38D	INTERPRETIVE SPECIAL REGISTERS RELATIVE
0096	0047	X2	EQUALS 39D	TO THE WORK AREA.
0097	0050	S1	EQUALS 40D	
0098	0051	S2	EQUALS 41D	
0099	0052	QPRET	EQUALS 42D	

R0100 INFLT/OUTPUT CHANNELS

*** CHANNEL ZERO IS TO BE USED IN AN INDEXED OPERATION ONLY. ***

A0101		0001	LCHAN	EQUALS 1	
0102	REF 1	0002	QCHAN	EQUALS 0	
0103	REF 1	0003	HISCALAR	EQUALS 3	
0104		0004	LOSCALAR	EQUALS 4	
0105		0005	CHAN5	EQUALS 5	
0106		0006	CHAN6	EQUALS 6	
0107		0007	SUPERBNK	EQUALS 7	SUPER-BANK.
0108		0010	OUT0	EQUALS 10	
0109		0011	DSALMOUT	EQUALS 11	
0110		0012	CHAN12	EQUALS 12	
0111		0013	CHAN13	EQUALS 13	
0112		0014	CHAN14	EQUALS 14	
0113		0015	MNKEYIN	EQUALS 15	
0114		0016	NAVKEYIN	EQUALS 16	
0115		0030	CHAN30	EQUALS 30	
0116		0031	CHAN31	EQUALS 31	
0117		0032	CHAN32	EQUALS 32	
0118		0033	CHAN33	EQUALS 33	
0119		0034	DNTM1	EQUALS 34	
0120		0035	DNTM2	EQUALS 35	
0121					
R0122	END OF CHANNEL ASSIGNMENTS				

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L ERASABLE ASSIGNMENTS

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P0123 INTERPRETIVE SWITCH BIT ASSIGNMENTS
A0124

R0125 ** FLAGWORDS AND BITS NOW ASSIGNED AND DEFINED IN THEIR OWN LOG SECTION. **

L ERASABLE ASSIGNMENTS

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R0127 GENERAL ERASABLE ASSIGNMENTS.

0128 0061 SETLOC 61
R0129 INTERRUPT TEMPORARY STORAGE POOL. (11D)

R0131 (ITEMP1 THROUGH RUPTREG4)

R0132 ANY OF THESE MAY BE USED AS TEMPORARIES DURING INTERRUPT OR WITH INTERRUPT INHIBITED. THE ITEMP SERIES
R0134 IS USED DURING CALLS TO THE EXECUTIVE AND WAITLIST - THE RUPTREGS ARE NOT.

0136 0061 0061 ITEMP1 ERASE
0137 REF 1 0061 WAITEXIT EQUALS ITEMP1
0138 REF 2 LAST 111 0061 EXECTEM1 EQUALS ITEMP1

0139 0062 0062 ITEMP2 ERASE
0140 REF 1 0062 WAITBANK EQUALS ITEMP2
0141 REF 2 LAST 111 0062 EXECTEM2 EQUALS ITEMP2

0142 0063 0063 ITEMP3 ERASE
0143 REF 1 0063 RUPTSTOR EQUALS ITEMP3
0144 REF 2 LAST 111 0063 WAITADR EQUALS ITEMP3
0145 REF 3 LAST 111 0063 NEWPRIO EQUALS ITEMP3

0146 0064 0064 ITEMP4 ERASE
0147 REF 1 0064 LOCCTR EQUALS ITEMP4
0148 REF 2 LAST 111 0064 WAITTEMP EQUALS ITEMP4

0149 0065 0065 ITEMP5 ERASE
0150 REF 1 0065 NFWLOC EQUALS ITEMP5

0151 0066 0066 ITEMP6 ERASE
A0152 NEWLOC+1 EQUALS ITEMP6 DP ADDRESS.

0153 0067 0067 NEWJOB SETLOC 67
0154 0067 ERASE MUST BE AT LOC 67 DUE TO WIRING.

0155 0070 0070 RUPTREG1 ERASE
0156 0071 0071 RUPTREG2 ERASE
0157 0072 0072 RUPTREG3 ERASE
0158 0073 0073 RUPTREG4 ERASE
0159 REF 1 0073 KEYTEMP1 EQUALS RUPTREG4
0160 REF 2 LAST 111 0073 DSRUPTEM EQUALS RUPTREG4

R0161 FLAGWORD RESERVATIONS. (16D)

0163 0074 0113 STATE FRASE +15D FLAGWORD REGISTERS.
A0164

R0165 P25 RADAR STORAGE. (MAY BE UNSHARED IN E7) (TEMP OVERLAY) (2D) OVERLAYS FLGWRD 14 & 15

L ERASABLE ASSIGNMENTS

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0167 REF 15 LAST 103 0112 LASTXCMD EQUALS STATE +140 B(1)PRM THESE ARE CALLED BY T4RUPT
 0168 REF 1 0113 LASTXCMD EQUALS LASTXCMD +1 B(1)PRM THEY MUST BE CONTIGUOUS, Y FIRST
 A0169

R0170 EXEC TEMPORARIES WHICH MAY BE USED BETWEEN CCS NEWJOBS. (32D) (INTB15+ THROUGH RUPTMXIM)
 0172 0114 0114 INTB15+ ERASE REFLECTS 15TH BIT OF INDEXABLE ADDRESSES
 0173 REF 1 0114 DSEXIT = INTB15+ RETURN FOR DSPIN
 0174 REF 2 LAST 112 0114 EXITEM = INTB15+ RETURN FOR SCALE FACTOR ROUTINE SELECT
 0175 REF 3 LAST 112 0114 BLANKRET = INTB15+ RETURN FOR 2BLANK

 0176 0115 0115 INTBIT15 ERASE SIMILAR TO ABOVE.
 0177 REF 1 0115 WRDRET = INTBIT15 RETURN FOR 5BLANK
 0178 REF 2 LAST 112 0115 WDRET = INTBIT15 RETURN FOR DSPWD
 0179 REF 3 LAST 112 0115 DECRET = INTBIT15 RETURN FOR PUTCOM(DEC LOAD)
 0180 REF 4 LAST 112 0115 21/22REG = INTBIT15 TEMP FOR CHARIN

R0181 THE REGISTERS BETWEEN ADDRWD AND PRIORITY MUST STAY IN THE FOLLOWING ORDER FOR INTERPRETIVE TRACE.

0183 0116 0116 ADDRWD ERASE 12 BIT INTERPRETIVE OPERAND SUB-ADDRESS.
 0184 0117 0117 POLISH ERASE HOLDS CADR MADE FROM POLISH ADDRESS.
 0185 REF 1 0117 UPDATRET = POLISH RETURN FOR UPDATNN, UPDATVS
 0186 REF 2 LAST 112 0117 CHAR = POLISH TEMP FOR CHARIN
 0187 REF 3 LAST 112 0117 ERCNT = POLISH COUNTER FOR ERROR LIGHT RESET
 0188 REF 4 LAST 112 0117 DECOUNT = POLISH COUNTER FOR SCALING AND DISPLAY (DEC)

 0189 0120 0120 FIXLOC ERASE WORK AREA ADDRESS.
 0190 0121 0121 OVFINO ERASE SET NON-ZERO ON OVERFLOW.

 0191 0122 0127 VBUF ERASE +5 TEMPORARY STORAGE USED FOR VECTORS.
 0192 REF 1 0122 SGNON = VBUF TEMP FOR +,- ON
 0193 REF 2 LAST 112 0122 NOUNTEM = VBUF COUNTER FOR MIXNOUN FETCH
 0194 REF 3 LAST 112 0122 DISTEM = VBUF COUNTER FOR OCTAL DISPLAY VERBS
 0195 REF 4 LAST 112 0122 DECTEM = VBUF COUNTER FOR FETCH (DEC DISPLAY VERBS)

 0196 REF 5 LAST 112 0123 SGNOFF = VBUF +1 TEMP FOR +,- ON
 0197 REF 6 LAST 112 0123 NVTEMP = VBUF +1 TEMP FOR NVSUB
 0198 REF 7 LAST 112 0123 SFTEMP1 = VBUF +1 STORAGE FOR SF CONST H1 PART(=SFTEMP2-1)
 0199 REF 8 LAST 112 0123 HITEMIN = VBUF +1 TEMP FOR LOAD OF HRS, MIN, SEC
 A0200 MUST = LOTEMIN-1.
 0201 REF 9 LAST 112 0124 CODE = VBUF +2 FOR DSPIN
 0202 REF 10 LAST 112 0124 SFTEMP2 = VBUF +2 STORAGE FOR SF CONST LO PART(=SFTEMP1+1)
 0203 REF 11 LAST 112 0124 LOTEMIN = VBUF +2 TEMP FOR LOAD OF HRS, MIN, SEC
 A0204 MUST = HITEMIN+1.
 0205 REF 12 LAST 112 0125 MIXTEMP = VBUF +3 FOR MIXNOUN DATA
 0206 REF 13 LAST 112 0125 SIGNRET = VBUF +3 RETURN FOR +,- ON

R0207 ALSO MIXTEMP+1 = VBUF+4, MIXTEMP+2 = VBUF+5.

0208 0130 0132 BUF ERASE +2 TEMPORARY SCALAR STORAGE.

L ERASABLE ASSIGNMENTS

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0209				0133	0134	BUF2	ERASE	+1		
0210	REF	1		0130		INDEXLOC	EQUALS	BUF		CONTAINS ADDRESS OF SPECIFIED INDEX.
0211	REF	2	LAST 113	0130		SWWORD	EQUALS	BUF		ADDRESS OF SWITCH WORD.
0212	REF	3	LAST 113	0131		SWBIT	EQUALS	BUF +1		SWITCH BIT WITHIN SWITCH WORD.
0213				0135	0135	MPTEMP	ERASE			TEMPORARY USED IN MULTIPLY AND SHIFT.
0214	REF	1		0135		DMPNTEMP	=	MPTEMP		DMPSUB TEMPORARY
0215				0136	0136	DOTINC	ERASE			COMPONENT INCREMENT FOR DOT SUBROUTINE.
0216	REF	1		0136		DVSIGN	EQUALS	DOTINC		DETERMINES SIGN OF DDV RESULT.
0217	REF	2	LAST 113	0136		ESCAPE	EQUALS	DOTINC		USED IN ARCSIN/ARCCOS.
0218	REF	3	LAST 113	0136		ENTRET	=	DOTINC		EXIT FROM ENTER
0219				0137	0137	DOTRET	ERASE			RETURN FROM DOT SUBROUTINE.
0220	REF	1		0137		DVNORMCT	EQUALS	DOTRET		DIVIDEND NORMALIZATION COUNT IN DDV.
0221	REF	2	LAST 113	0137		ESCAPE2	EQUALS	DOTRET		ALTERNATE ARCSIN/ARCCOS SWITCH.
0222	REF	3	LAST 113	0137		WDCNT	=	DOTRET		CHAR COUNTER FOR DSPWD
0223	REF	4	LAST 113	0137		INREL	=	DOTRET		INPUT BUFFER SELECTOR (X,Y,Z, REG)
0224				0140	0140	MATINC	ERASE			VECTOR INCREMENT IN MXV AND VXM.
0225	REF	1		0140		MAXDVSW	EQUALS	MATINC		+0 IF DP QUOTIENT IS NEAR ONE - ELSE -1.
0226	REF	2	LAST 113	0140		POLYCNT	EQUALS	MATINC		POLYNOMIAL LOOP COUNTER
0227	REF	3	LAST 113	0140		DSPMMTEM	=	MATINC		DSPCOUNT SAVE FOR DSPMM
0228	REF	4	LAST 113	0140		MIXBR	=	MATINC		INDICATOR FOR MIXED OR NORMAL NOUN
0229				0141	0141	TEM1	ERASE			EXEC TEMP
0230	REF	1		0141		POLYRET	=	TEM1		
0231	REF	2	LAST 113	0141		DSREL	=	TEM1		REL ADDRESS FOR DSPIN
0232				0142	0142	TEM2	ERASE			EXEC TEMP
0233	REF	1		0142		DSMAG	=	TEM2		MAGNITUDE STORE FOR DSPIN
0234	REF	2	LAST 113	0142		IDADDEM	=	TEM2		MIXNOUN INDIRECT ADDRESS STORAGE
0235				0143	0143	TEM3	ERASE			EXEC TEMP
0236	REF	1		0143		COUNT	=	TEM3		FOR DSPIN
0237				0144	0144	TEM4	ERASE			EXEC TEMP
0238	REF	1		0144		LSTPTR	=	TEM4		LIST POINTER FOR GRABUSY
0239	REF	2	LAST 113	0144		RELRET	=	TEM4		RETURN FOR RELDSP
0240	REF	3	LAST 113	0144		FREERET	=	TEM4		RETURN FOR FREEDSP
0241	REF	4	LAST 113	0144		DSPWDRET	=	TEM4		RETURN FOR DSPSIGN
0242	REF	5	LAST 113	0144		SEPSCRET	=	TEM4		RETURN FOR SEPSEC
0243	REF	6	LAST 113	0144		SEPMNRET	=	TEM4		RETURN FOR SEPMIN
0244				0145	0145	TEM5	ERASE			EXEC TEMP
0245	REF	1		0145		NOUNADD	=	TEM5		TEMP STORAGE FOR NOUN ADDRESS
0246				0146	0146	NNADTEM	ERASE			TEMP FOR NOUN ADDRESS TABLE ENTRY
0247				0147	0147	NNTYPTM	ERASE			TEMP FOR NOUN TYPE TABLE ENTRY
0248				0150	0150	IDAD1TEM	ERASE			TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN)
A0249										MUST = IDAD2TEM-1, = IDAD3TEM-2.
0250				0151	0151	IDAD2TEM	ERASE			TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN)

L ERASABLE ASSIGNMENTS

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A0251
0252 0152 0152 IDAD3TEM ERASE
A0253
0254 0153 0153 RUTMXTEM ERASE

MUST = IDAD1TEM+1, = IDAD3TEM-1.
TEMP FOR INDIR ADRESS TABLE ENTRY(MIXNN)
MUST = IDAD1TEM+2, = IDAD2TEM+1.
TEMP FOR SF ROUT TABLE ENTRY(MIXNN ONLY)

R0255 AX*SR*T STORAGE.

{6D}

0257	REF	3	LAST	113	0142	DEXDEX	EQUALS	TFM2	B(1)TMP
0258	RFF	2	LAST	113	0143	DEX1	EQUALS	TEM3	B(1)TMP
0259	REF	7	LAST	113	0144	DEX2	EQUALS	TEM4	B(1)TMP
0260	RFF	2	LAST	113	0145	RTNSAVER	EQUALS	TEM5	B(1)TMP
0261	REF	1			0157	TERM1TMP	EQUALS	MPAC +3	B(2)TMP
0262	RFF	1			0143	DEX1	=	DEX1	

R0263 THE FOLLOWING 10 REGISTERS ARE USED FOR TEMPORARY STOPAGE OF THE DERIVATIVE COEFFICIENT TABLE OF
R0265 SUBROUTINE ROOTPSRS. THEY MUST REMAIN WITHOUT INTERFERENCE WITH ITS SUBROUTINES WHICH ARE POWRSRS (POLY),
R0267 DMPNSUB, DMPNSUB, SHORTMP, DDV/BDDV, ABS, AND USPRCADR.

0268	REF	2	LAST	114	0142	DERCOF-8 =	MPAC	-12	ROOTPSRS DER COF N-4 HI ORDER
0269	REF	3	LAST	114	0143	DERCOF-7 =	MPAC	-11	ROOTPSRS DER COF N-4 LO ORDER
0270	RFF	4	LAST	114	0144	DERCOF-6 =	MPAC	-10	ROOTPSRS DER COF N-3 HI ORDER
0271	RFF	5	LAST	114	0145	DERCOF-5 =	MPAC	-7	ROOTPSRS DER COF N-3 LO ORDER
0272	REF	6	LAST	114	0146	DERCOF-4 =	MPAC	-6	ROOTPSRS DER COF N-2 HI ORDER
0273	REF	7	LAST	114	0147	DERCOF-3 =	MPAC	-5	ROOTPSRS DER COF N-2 LO ORDER
0274	RFF	8	LAST	114	0150	DERCOF-2 =	MPAC	-4	ROOTPSRS DER COF N-1 HI ORDER
0275	RFF	9	LAST	114	0151	DERCOF-1 =	MPAC	-3	ROOTPSRS DER COF N-1 LO ORDER
0276	REF	10	LAST	114	0152	DERCOFN =	MPAC	-2	POOTPSRS DER COF N HI ORDER
0277	RFF	11	LAST	114	0153	DERCOF+1 =	MPAC	-1	ROOTPSRS DER COF N LO ORDER
0278	REF	5	LAST	112	0117	PWRPTR =	POLISH		ROOTPSRS POWER TABLE POINTER
0279	REF	14	LAST	112	0124	DXCRIT =	VBUF	+2	ROOTPSRS CRITERION FOR ENDING ITERS HI
0280	REF	15	LAST	114	0125	DXCRIT+1 =	VBUF	+3	ROOTPSRS CRITERION FOR ENDING ITERS LO
0281	REF	16	LAST	114	0126	ROOTPS =	VBUF	+4	ROOTPSRS ROOT HI ORDER
0282	RFF	17	LAST	114	0127	ROOTPS+1 =	VBUF	+5	ROOTPSRS ROOT LO ORDER
0283	REF	4	LAST	113	0132	RETROOT =	BUF	+2	POOTPSRS RETUPN ADDRESS OF USER
0284	REF	5	LAST	113	0140	PWRCNT =	MATINC		ROOTPSRS DER TABLE LOOP COUNTER
0285	RFF	3	LAST	113	0141	DERPTR =	TEM1		ROOTPSRS DER TABLE POINTER

A0286

L ERASABLE ASSIGNMENTS

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P0287 DYNAMICALLY ALLOCATED CORE SETS FOR JOBS.

(84D)

0289	0154	0162	MPAC	ERASE	+6
0290	0163	0163	MODE	ERASE	
0291	0164	0164	LOC	ERASF	
0292	0165	0165	BANKSET	ERASE	
0293	0166	0166	PUSHLOC	ERASF	
0294	0167	0167	PRIORITY	ERASE	
0295	0170	0313		ERASE	+83D

A0296

MULTI-PURPOSE ACCUMULATOR.
+1 FOR TP, +0 FOR DP, OR -1 FOR VECTOR.
LOCATION ASSOCIATED WITH JOB.
USUALLY CONTAINS BBANK SETTING.
WORD OF PACKED INTERPRETIVE PARAMETERS.
PRIORITY OF PRESENT JOB AND WORK AREA.

EIGHT SETS OF 12 REGISTERS EACH

R0297 INCORP STORAGE: R22 (N29) (SHARES WITH FOLLOWING SECTION)

(4D)

0299	REF	1	0314	R22DISP	EQUALS	TIME2SAV
------	-----	---	------	---------	--------	----------

A0300

1(4) N49 DISPLAY OF DELTA R AND DELTA V

R0301 STANDBY VERB ERASABLES. REDOCTR BEFORE THETADS.

(14D)

0303	0314	0315	TIME2SAV	ERASE	+1
0304	0316	0317	SCALSAVE	ERASE	+1
0305	0320	0320	REDOCTR	ERASE	
0306	0321	0323	THETAD	ERASE	+2
0307	REF	1	0321	CPH1	= THETAD
0308	REF	2 LAST 115	0322	CTHETA	= THETAD +1
0309	REF	3 LAST 115	0323	CPSI	= THETAD +2
0310	0324	0331	DELV	ERASE	+5
0311	REF	1	0324	DELVX	= DELV
0312	REF	2 LAST 115	0326	DELVY	= DELV +2
0313	REF	3 LAST 115	0330	DELVZ	= DELV +4

A0314

CONTAINS NUMBER OF RESTARTS

0 DESIRED GIMBAL ANGLES
1 FOR
M MANEUVER.

R0315 DOWNLINK STORAGE.

(28D)

0317	REF	1	0332	DNLSTADR	EQUALS	DNLSTCOD
0318	0332	0332	DNLSTCOD	ERASE		
0319	0333	0333	DUMPCNT	ERASE		
0320	0334	0365	L0ATALST	ERASE	+25D	
0321	REF	1	0335	DNTMGOTO	EQUALS	L0ATALST +1
0322	REF	1	0336	TMINDEX	EQUALS	DNTMGOTO +1
0323	REF	1	0336	DUMPLOC	EQUALS	TMINDEX
A0324						
A0325						
0326	REF	2 LAST 115	0337	DNQ	EQUALS	TMINDEX +1
0327	REF	1	0340	DNTMBUFF	EQUALS	DNQ +1

B(1)PRM DOWNLINK LIST CODE

B(1)

(26D)

B(1)

B(1)

CONTAINS ECADR OF AGC DP WORD BEING DUMP
ED AND COUNT OF COMPLETE DUMPS ALREADY S
ENT.

B(1)

B(22)PRM DOWNLINK SNAPSHOT BUFFER

R0328 UNSWITCHED FOR DISPLAY INTERFACE ROUTINES.

(10D) FIVE MORE IN EBANK 2

L ERASABLE ASSIGNMENTS

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0330 0366 0366 RESTREG ERASE B(1)PRM FOR DISPLAY RESTARTS
 0331 0367 0367 NVWORD ERASE
 0332 0370 0370 MARKNV ERASE
 0333 0371 0371 NVSAVE ERASE
 R0334 (RETAIN THE ORDER OF CADRFLSH TO FAILPEG +2 FOR DOWNLINK PURPOSES)
 0336 0372 0372 CADRFLSH ERASE
 0337 0373 0373 CADRMARK ERASE
 0338 0374 0374 TEMPFLSH ERASE
 0339 0375 0377 FAILREG ERASE +2 B(3)PRM 3 ALARM CODE REGISTERS

R0340 VAC AREAS. -BE CAREFUL OF PLACEMENT- (220D)

0342 0400 0400 VAC1USE ERASE
 0343 0401 0453 VAC1 ERASE +42D
 0344 0454 0454 VAC2USE ERASE
 0345 0455 0527 VAC2 ERASE +42D
 0346 0530 0530 VAC3USE ERASE
 0347 0531 0603 VAC3 ERASE +42D
 0348 0604 0604 VAC4USE ERASE
 0349 0605 0657 VAC4 ERASE +42D
 0350 0660 0660 VAC5USE ERASE
 0351 0661 0733 VAC5 ERASE +42D

R0352 WAITLIST REPEAT FLAG. (1D)

0354 0734 0734 RUPTAGN ERASE
 0355 REF 1 0734 KEYTEMP2 = RUPTAGN TEMP FOR KEYRUPT, UPRUPT
 A0356

R0357 STARALIGN ERASABLES. (13D)

0359 0735 0735 STARCODE ERASE (1)
 0360 REF 1 0735 AOTCODE = STARCODE
 0361 0736 0751 STARALGN ERASE +11D
 0362 REF 1 0736 SINC DU = STARALGN
 0363 REF 2 LAST 116 0744 COSCDU = STARALGN +6
 0364 REF 1 0742 SINC DUX = SINC DU +4
 0365 REF 2 LAST 116 0736 SINC DUY = SINC DU
 0366 REF 3 LAST 116 0740 SINC DUZ = SINC DU +2
 0367 REF 1 0750 COSCDUX = COSCDU +4
 0368 REF 2 LAST 116 0744 COSCDUY = COSCDU
 0369 REF 3 LAST 116 0746 COSCDUZ = COSCDU +2

R0370 PHASE TABLE AND RESTART COUNTERS. (12D)

0372 0752 0752 -PHASE1 ERASE

L ERASABLE ASSIGNMENTS

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0373	0753	0753	PHASE1	ERASE
0374	0754	0754	-PHASE2	ERASE
0375	0755	0755	PHASE2	ERASE
0376	0756	0756	-PHASE3	ERASE
0377	0757	0757	PHASE3	ERASE
0378	0760	0760	-PHASE4	ERASE
0379	0761	0761	PHASE4	ERASE
0380	0762	0762	-PHASE5	ERASE
0381	0763	0763	PHASE5	ERASE
0382	0764	0764	-PHASE6	ERASE
0383	0765	0765	PHASE6	ERASE

R0384 A**SR*T STORAGE. (6D)

0386 0766 0773 CDUSPOT ERASE +5 B(6)

0387	REF	1	0766	CDUSPOTY =	CDUSPOT	
0388	REF	2	LAST 117	0770	CDUSPOTZ =	CDUSPOT +2
0389	REF	3	LAST 117	0772	CDUSPOTX =	CDUSPOT +4

R0390 VERB 37 STORAGE. (2D)

0392	0774	0774	MINDEX	ERASE	B(1) TMP INDEX FOR MAJOR MODE
0393	0775	0775	MMNUMBER	ERASE	B(1) TMP MAJOR MODE REQUESTED BY V37

R0394 PINBALL INTERRUPT ACTION. (1D)

0396 0776 0776 DSPCNT ERASE B(1)PRM COUNTER FOR DSPOUT.

R0397 PINBALL EXECUTIVE ACTION (44D)

0399	0777	0777	DSPCOUNT	ERASE	DISPLAY POSITION INDICATOR.	
0400	1000	1000	DECBRNCH	ERASE	+DEC, - DEC, OCT INDICATOR	
0401	1001	1001	VERBREG	ERASE	VERB CODE	
0402	1002	1002	NOUNREG	ERASE	NOUN CODE	
0403	1003	1003	XREG	ERASE	R1 INPUT BUFEER	
0404	1004	1004	YREG	ERASE	R2 INPUT BUFEER	
0405	1005	1005	ZREG	ERASE	R3 INPUT BUFEER	
0406	1006	1006	XREGLP	ERASE	LO PART OF XREG (FOR DEC CONV ONLY)	
0407	1007	1007	YREGLP	ERASE	LO PART OF YREG (FOR DEC CONV ONLY)	
0408	REF	1	1007	HITEMOUT =	YREGLP	TEMP FOR DISPLAY OF HRS, MIN, SEC
A0409						MUST = LITEMOUT-1.
0410			1010	ZREGLP	ERASE	LO PART OF ZREG (FOR DEC CONV ONLY)
0411	REF	1	1010	LITEMOUT =	ZREGLP	TEMP FOR DISPLAY OF HRS, MIN, SEC
A0412						MUST = HITEMOUT+1.
0413			1011	MODREG	ERASE	MODE CODE

L ERASABLE ASSIGNMENTS

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0414		1012	1012	DSPLCK	ERASE		KEYBOARD/SUBROUTINE CALL INTERLOCK
0415		1013	1013	REQRET	ERASE		RETURN REGISTER FOR LOAD
0416		1014	1014	LOADSTAT	ERASE		STATUS INDICATOR FOR LOADTST
0417		1015	1015	CLPASS	ERASE		PASS INDICATOR CLEAR
0418		1016	1016	NOUT	ERASE		ACTIVITY COUNTER FOR DSPTAB
0419		1017	1017	NOUNCADR	ERASE		MACHINE CADR FOR NOUN
0420		1020	1020	MONSAVE	ERASE		N/V CODE FOR MONITOR. (= MONSAVE1-1)
0421		1021	1021	MONSAVE1	ERASE		NOUNCADR FOR MONITOR(MATBS) =MONSAVE +1
0422		1022	1022	MONSAVE2	ERASE		NVMONOPT OPTIONS
0423		1023	1036	DSPTAB	FRASF	+11D	0-10D, DISPLAY PANEL BUFF. 11D, C/S LTS.
0424		1037	1037	NVQTEM	ERASE		NVSUB STORAGE FOR CALLING ADDRESS
A0425							MUST = NVBNKTEM-1
0426		1040	1040	NVBNKTEM	FRASF		NVSUB STORAGE FOR CALLING BANK
A0427							MUST = NVQTEM+1
0428		1041	1041	VERBSAVE	ERASE		NEEDED FOR RECYCLE
0429		1042	1042	CADRSTOR	ERASE		ENDIDLE STORAGE
0430		1043	1043	DSPLIST	ERASE		WAITING REG FOR DSP SYST INTERNAL USE
0431		1044	1044	EXTVBACT	ERASE		EXTENDED VERB ACTIVITY INTERLOCK
0432		1045	1047	DSPTM1	ERASE	+2	BUFFER STORAGE AREA 1 (MOSTLY FOR TIME)
0433		1050	1052	DSPTM2	ERASE	+2	BUFFER STORAGE AREA 2 (MOSTLY FOR DFG)

0434	REF	1	1051	DSPTMX	EQUALS DSPTM2	+1	B(2) S-S DISPLAY BUFFER FOR EXT. VERBS
0435	REF	1	1045	NORMTEM1	EQUALS DSPTM1		B(3)DSP NORMAL DISPLAY REGISTERS.
A0436							

R0437				DISPLAY FOR EXTENDED VERBS (V82, R04(V62), V41(N72))	(2D)
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0439	REF	1	1051	OPTIONX	EQUALS DSPTMX	(2) EXTENDED VERB OPTION CODE
A0440						

R0441				TBASES AND PHSPRDT S.	(12D)
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0443		1053	1053	TBASE1	ERASE
0444		1054	1054	PHSPRDT1	ERASE
0445		1055	1055	TBASE2	ERASF
0446		1056	1056	PHSPRDT2	ERASE
0447		1057	1057	TBASE3	ERASE
0448		1060	1060	PHSPRDT3	ERASE
0449		1061	1061	TBASE4	ERASE
0450		1062	1062	PHSPRDT4	ERASE
0451		1063	1063	TBASE5	ERASF
0452		1064	1064	PHSPRDT5	ERASE
0453		1065	1065	TBASE6	ERASE
0454		1066	1066	PHSPRDT6	ERASE

R0455				UNSWITCHED FOR DISPLAY INTERFACE ROUTINES.	(6D)
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B(1)PROBABLY FOR DISPLAY DURING SERVICER

(10)

R0467 SINGLE PRECISION SUBROUTINE TEMPORARIES.

(20)

(1)

(1)

(130)

HALF U IT VECTOR IN SM OR NB AXES.
DESIRE TRUNNION AND SHAFT ANGLES.

DODES LOBBERS TANG +2.

USED I DATA READING ROUTINES.

(6D)

I(6)S-S CSM POSITION VECTOR

L ERASABLE ASSIGNMENTS

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P0489 UNSWITCHED FOR ORBIT INTEGRATION.

(21D)

0491			1115	1141	TDEC	ERASE	+20D		I(2)
0492	REF	1	1117		COLREG	EQUALS	TDEC	+2	I(1)
0493	REF	1	1120		LAT	EQUALS	COLRFG	+1	I(2)
0494	REF	1	1122		LONG	EQUALS	LAT	+2	I(2)
0495	REF	1	1124		ALT	EQUALS	LONG	+2	I(2)
0496	REF	1	1126		YV	EQUALS	ALT	+2	I(6)
0497	REF	1	1134		ZV	EQUALS	YV	+6	I(6)

A0498

R0499 MISCELLANEOUS UNSWITCHED.

(20D)

0501			1142	1142	P40/RET	ERASE			(WILL BE PUT IN E6 WHEN THERE IS ROOM)
0502			1143	1143	GENRET	ERASE			B(1) R61 RETURN CADR.
0503			1144	1144	OPTION1	ERASE			B(1) NOUN 06 USES THIS
0504			1145	1145	OPTION2	ERASE			B(1) NOUN 06 USES THIS
0505			1146	1146	OPTION3	ERASE			B(1) NOUN 06 USES THIS
0506			1147	1150	LONGCADR	ERASE	+1		B(2) LONGCALL REGISTER
0507			1151	1152	LONGBASE	ERASE	+1		
0508			1153	1154	LONGTIME	ERASE	+1		B(2) LONGCALL REGISTER
0509			1155	1155	CDUTEMPX	ERASE			B(1)TMP
0510			1156	1156	CDUTEMPY	ERASE			B(1)TMP
0511			1157	1157	CDUTEMPZ	ERASE			B(1)TMP
0512			1160	1160	PIPATMPX	ERASE			B(1)TMP
0513			1161	1161	PIPATMPY	ERASE			B(1)TMP
0514			1162	1162	PIPATMPZ	ERASE			B(1)TMP
0515			1163	1163	DISPDEX	ERASE			B(1)
0516			1164	1164	TEMPR60	ERASE			B(1)
0517			1165	1165	PRIOTIME	ERASE			B(1)

R0518 P27 (UPDATE PROGRAM) STORAGE.

(26D)

0520			1166	1166	UPVERBSV	ERASE			B(1) UPDATE VERB ATTEMPTED.
0521			1167	1217	UPTMP	ERASE	+24D		B(1)TMP SCRATCH
0522	REF	1	1167		INTWAK1Q	EQUALS	UPTMP		(BORROWS UPTMP REGISTERS)
R0523	RETAIN THE ORDER OF COMPNUMB THRU UPBUFF +19D FOR DOWNLINK PURPOSES.								
0524	REF	2	LAST	120	1170	COMPNUMB	EQUALS	UPTMP +1	B(1)TMP NUMBER OF ITEMS TO BE UPLINKED
0525	REF	1			1171	UPOLDMOD	EQUALS	COMPNUMB +1	B(1)TMP INTERRUPTED PROGRAM MM
0526	REF	1			1172	UPVERB	EQUALS	UPOLDMOD +1	B(1)TMP VERB NUMBER
0527	REF	1			1173	UPCOUNT	EQUALS	UPVERB +1	B(1)TMP UPBUFF INDEX
0528	REF	1			1174	UPBUFF	EQUALS	UPCOUNT +1	B(20D)

A0529

R0530 SPECIAL DEFINITION FOR SYSTEM TEST ERASABLE PGMS.

(2D)

0532	REF	3	LAST	120	1167	EBUF2	EQUALS	UPTMP	B(2) FOR EXCLUSIVE USE OF SYSTEM TEST
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A0533

L ERASABLE ASSIGNMENTS

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R0534 PERM STATE VECTORS FOR BOOST AND DOWNLINK-WHOLE MISSION-

(14D)

0536		1220	1225	RN	ERASE	+5	B(6)PRM
0537		1226	1233	VN	ERASE	+5	B(6)PRM
0538		1234	1235	PIPTIME	ERASE	+1	B(2)PRM (MUST BE FOLLOWED BY GDT/2)

R0539 SERVICER -MUST FOLLOW PIPTIME-

(19D)

0541		1236	1261	GDT/2	ERASE	+19D	B(6)TMP (MUST FOLLOW PIPTIME)
0542	REF	1	1244	MASS	EQUALS	GDT/2 +6	B(2)
0543	REF	1	1244	WEIGHT/G	=	MASS	
0544	REF	2	1246	ABDELV	EQUALS	MASS +2	ALCMANU STORAGE)
0546	REF	1	1247	PGUIDE	EQUALS	ABDELV +1	(2)
0547	REF	1	1251	DVTHRUSH	EQUALS	PGUIDE +2	(1)
0548	REF	1	1252	AVEGEXIT	EQUALS	DVTHRUSH +1	(2)
0549	REF	1	1252	AVGEXIT	=	AVEGEXIT	
0550	REF	2	1254	TEMX	EQUALS	AVEGEXIT +2	(1)
0551	REF	1	1255	TEMY	EQUALS	TEMX +1	(1)
0552	REF	1	1256	TEMZ	EQUALS	TEMY +1	(1)
0553	REF	1	1257	PIPAGE	EQUALS	TEMZ +1	B(1)
0554	REF	1	1260	OUTROUTE	EQUALS	PIPAGE +1	B(1)

A0555

R0556 PERMANENT LEM-DAP STORAGE.

(12D)

0558		1262	1262	CH5MASK	ERASE		B(1)PRM
0559		1263	1263	CH6MASK	ERASE		B(1)PRM JET FAILURE MASK.
0560		1264	1271	DTHETASM	ERASE	+5	(6)
0561		1272	1272	SPNDX	ERASE		B(1)
0562		1273	1273	RCSFLAGS	ERASE		AUTOPILOT FLAG WORD

A0563 BIT ASSIGNMENTS:
 A0564 1) ALTERYZ SWITCH (ZER00R1)
 A0565 2) NEEDLER SWITCH
 A0566 3) NEEDLER SWITCH
 A0567 4) NEEDLER SWITCH
 A0568 5) NEEDLER SWITCH
 A0569 9) JUST-IN-DETENT SWITCH
 A0570 10) PBIT - MANUAL CONTROL SWITCH
 A0571 11) QRBIT - MANUAL CONTROL SWITCH
 A0572 12) PSKIP CONTROL (PJUMPADR)
 A0573 13) 1/ACCJOB CONTROL (ACCSET)
 0574 GENADR OF NEXT LM DAP T5RUPT. * 2CADR *
 A0575 BBCON OF NEXT LM DAP T5RUPT. 2CADR

R0576 RCS FAILURE MONITOR STORAGE.

(1)

L ERASABLE ASSIGNMENTS

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0578		1276	1276	PVALVEST	ERASE		B(1) PRM
R0579	KALCMANU/DAP INTERFACE.						(3D)
0581		1277	1277	DELPERROR	ERASE		B(1)PRM COMMAND LAGS.
0582		1300	1300	DELQERROR	ERASE		B(1)PRM
0583		1301	1301	DELRERROR	ERASE		B(1)PRM
R0584	MODE SWITCHING ERASABLE.						(9D)
R0586	RETAIN THE ORDER OF IMODES30 AND IMODES33 FOR DOWNLINK PURPOSES.						
0587		1302	1302	IMODES30	ERASE		B(1)
0588		1303	1303	IMODES33	ERASE		
0589		1304	1306	MODECADR	ERASE +2		B(3)PRM
0590	REF 1	1304		IMUCADR	EQUALS MODECADR		
0591	REF 2 LAST 122	1305		OPTCADR	EQUALS MODECADR +1		
0592	REF 3 LAST 122	1306		RADCADR	EQUALS MODECADR +2		
0593		1307	1311	ATTCADR	ERASE +2		B(3)PRM
0594	REF 1	1311		ATTPRIO	= ATTCADR +2		
0595		1312	1312	MARKSTAT	ERASE		
R0596	T4RUPT ERASABLE.						(2D)
0598		1313	1313	DSRUPTSW	ERASE		
0599		1314	1314	LGYRO	ERASE		(1)
R0600	RENDEZVOUS RADAR TASK STORAGE						(3D)
0602		1315	1317	RRRET	ERASE +2D		B(1)TMP P20'S, PERHAPS R29 & R12
0603	REF 1	1316		RDES	EQUALS RRPET +1		B(1)TMP
0604	REF 1	1317		RRINDEX	EQUALS RDES +1		B(1)TMP
A0605							
R0606	MEASINC						(4D)
0608		1320	1320	WIXA	ERASE		B(1)
0609		1321	1321	WIXB	ERASE		B(1)
0610		1322	1322	ZIXA	ERASE		B(1)
0611		1323	1323	ZIXB	ERASE		B(1)
R0612	ACS DUMMY ID WORD.						(1D)
0614		1324	1324	AGSWORD	ERASE		
R0615	SCME MISCELLANEOUS UNSWITCHED.						(6D)

L ERASABLE ASSIGNMENTS

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0617		1325	1325	RATEINDX	ERASE	
0618		1326	1330	DELAYLOC	ERASE	+2
0619		1331	1331	LEMMASS	ERASE	
0620		1332	1332	CSMMASS	ERASE	

(1) USED BY KALCMANU

KEEP CONTIGUOUS W. CSMMASS (1) EACH

R0621 LESS IS MORE.

R0622 RENDEZVOUS AND LANDING RADAR DOWNLINK STORAGE.

(7D)

R0624 { NORMALLY USED DURING P20, BUT MAY ALSO }

R0625 { BE REQUIRED FOR THE V62 SPURIOUS TEST. }

R0626 (PLEASE KEEP IN THIS ORDER)

0627		1333	1341	DNRRANGE	ERASE	+6	B(1) TMP
0628	REF	1	1334	DNRRDOT	EQUALS	DNRRANGE	+1 B(1)TMP
0629	REF	1	1335	DNINDEX	EQUALS	DNRRDOT	+1 B(1)TMP
0630	REE	1	1336	DNLRVELX	EQUALS	DNINDEX	+1 B(1)TMP
0631	REF	1	1337	DNLRVELY	EQUALS	DNLRVELX	+1 B(1)TMP
0632	REF	1	1340	DNLRVELZ	EQUALS	DNLRVELY	+1 B(1)TMP
0633	REF	1	1341	DNLRALT	EQUALS	DNLRVELZ	+1 B(1) TMP

R0634 INCORPORATION UNSWITCHED.

(2D)

0636	REF	2	LAST 121	1257	W.IND	EQUALS	PIPAGE	B(1)
0637	REF	1		1260	W.IND1	EQUALS	W.IND	+1 I(1)

R0638 SUBROUTINE BALLANGS OF R60.

(1D)

0640 1342 1342 BALLEEXIT ERASE B(1)SAVE LOCATION FOR BALLINGS SUBR EXIT

R0641 SCME LEM DAP STORAGE.

(4D)

0643		1343	1343	DAPDATR1	ERASE		B(1)DSP DAP CONFIG.
0644		1344	1345	TEVENT	ERASE	+1	B(2)DSP
0645		1346	1346	DB	ERASE		R(1)TMP DEAD BAND.

R0647 NOUN 87

(2D)

0649		1347	1350	AZ	FRASE	+1D	B(1) AZ AND EL MUST BE CONTIGUOUS
0650	REE	1	1350	EL	EQUALS	AZ +1D	B(1)

0652 1351 END-UE EQUALS NEXT UNUSED UE ADDRESS

R0653 SELE-CHECK ASSIGNMENTS.

(17D)

L ERASABLE ASSIGNMENTS

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R0655 (DO NOT MOVE, S-C IS ADDRESS SENSITIVE)

0656		1357	1377	SELFERAS	ERASE	1357 - 1377	*** MUST NOT BE MOVED ***
0657	REF	1	1357	SEAIL	EQUALS	SELEERAS	B(1)
0658	REE	1	1360	ERESTORE	EQUALS	SEAIL +1	B(1)
0659	REF	1	1361	SELFRET	EQUALS	ERESTORE +1	B(1) RETURN
0660	REE	1	1362	SMODE	EQUALS	SELFRET +1	B(1)
0661	REE	1	1363	ALMCADR	EQUALS	SMODE +1	B(2) ALARM-ABORT USER'S 2CADR
0662	REF	1	1365	ERCOUNT	EQUALS	ALMCADR +2	B(1)
0663	REE	1	1366	SCOUNT	EQUALS	ERCOUNT +1	B(3)
0664	REE	1	1371	SKEEP1	EQUALS	SCOUNT +3	B(1)
0665	REE	1	1372	SKEEP2	EQUALS	SKEEP1 +1	B(1)
0666	REE	1	1373	SKEEP3	EQUALS	SKEEP2 +1	B(1)
0667	REF	1	1374	SKEEP4	EQUALS	SKEEP3 +1	B(1)
0668	REE	1	1375	SKEEP5	EQUALS	SKEEP4 +1	B(1)
0669	REE	1	1376	SKEEP6	EQUALS	SKEEP5 +1	B(1)
0670	REF	1	1377	SKEEP7	EQUALS	SKEEP6 +1	B(1)

L ERASABLE ASSIGNMENTS

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P0671 EBANK-3 ASSIGNMENTS

0672 E3,1400 SETLOC 1400

R0673 WAITLIST TASK LISTS. (26D)

0675	E3,1400	E3,1407	LST1	ERASE	+7	B(18D)PRM DELTA T S.
0676	E3,1410	E3,1431	LST2	ERASE	+17D	B(18D)PRM TASK 2CADR ADDRESSES.

R0677 RESTART STORAGE. (2D)

0679 E3,1432 E3,1433 RSBBQ ERASE +1 B(2)PRM SAVE BB AND Q FOR RESTARTS.

R0680 MCRC LONGCALL STORAGE.(MUST BE IN LST1 S BANK. (2D)

0682 E3,1434 E3,1435 LONGEXIT ERASE +1 B(2)TMP MAY BE SELDOM OVERLAYED.

R0683 PHASE-CHANGE LISTS PART 11. (12D)

0685	E3,1436	E3,1436	PHSNAME1	ERASE	B(1)PRM
0686	E3,1437	E3,1437	PHSBB1	ERASE	B(1)PRM
0687	E3,1440	E3,1440	PHSNAME2	ERASE	B(1)PRM
0688	E3,1441	E3,1441	PHSBB2	ERASE	B(1)PRM
0689	E3,1442	E3,1442	PHSNAME3	ERASE	B(1)PRM
0690	E3,1443	E3,1443	PHSBB3	ERASE	B(1)PRM
0691	E3,1444	E3,1444	PHSNAME4	ERASE	B(1)PRM
0692	E3,1445	E3,1445	PHSBB4	ERASE	B(1)PRM
0693	E3,1446	E3,1446	PHSNAME5	ERASE	B(1)PRM
0694	E3,1447	E3,1447	PHSBB5	ERASE	B(1)PRM
0695	E3,1450	E3,1450	PHSNAME6	ERASE	B(1)PRM
0696	E3,1451	E3,1451	PHSBB6	ERASE	B(1)PRM

R0697 IMU COMPENSATION PARAMETERS. (22D)

0699		E3,1452	E3,1452	PBIASX	ERASE	B(1) PIPA BIAS, PIPA SCALE FACTR TERMS
0700	REF	1	E3,1452	PIPABIAS	= PBIASX	INTERMIXED.
0701		E3,1453	E3,1453	PIPASCFX	ERASE	
0702	REF	1	E3,1453	PIPASCF	= PIPASCFX	
0703		E3,1454	E3,1454	PBIASZ	ERASE	
0704		E3,1455	E3,1455	PIPASCFY	ERASE	
0705		E3,1456	E3,1456	PBIASZ	ERASE	
0706		E3,1457	E3,1457	PIPASCFZ	ERASE	

0707		E3,1460	E3,1460	NBDX	ERASE	GYRO BIAS DRIFTS
0708		E3,1461	E3,1461	NBDY	ERASE	
0709		E3,1462	E3,1462	NBDZ	ERASE	

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R0721 STATE VECTORS FOR ORBIT INTEGRATION. (44D)

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0729          E3,1500  E3,1553  DIFFCNT ERASE  +43D          B(1)
R0730          (UPSVFLAG...XKEP MUST BE KEPT IN ORDER)

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0731	REF	1	F3,1501	UPSVFLAG	EQUALS	DIFEQCNT	+1	B(1)
0732	REF	1	E3,1502	RRECT	EQUALS	UPSVFLAG	+1	B(6)
0733	REF	1	F3,1510	RRECT	EQUALS	RRECT	+6	B(6)
0734	REF	1	F3,1516	TET	EQUALS	VRECT	+6	B(2)
0735	REF	1	E3,1520	TDELTA V	EQUALS	TET	+2	B(6)
0736	REF	1	E3,1526	TNUV	EQUALS	TDELTA V	+6	B(6)
0737	REF	1	F3,1534	RCV	EQUALS	TNUV	+6	B(6)
0738	REF	1	E3,1542	VCV	EQUALS	RCV	+6	B(6)
0739	REF	1	E3,1550	TC	EQUALS	VCV	+6	B(2)
0740	REF	1	F3,1552	XKEP	EQUALS	TC	+2	B(2)

R0741----- PERMANENT STATE VECTORS AND TIMES. (990)

R0743 (DO NOT OVERLAY WITH ANYTHING AFTER BOOST)

R0744 (IRECTCSM ...XKEPCSM MUST BE KEPT IN THIS ORDER)

0745			E3,1554	E3,1561	RRECTCSM	ERASE	+5		B(6)PRM CSM VARIABLES.
0746	REF	1	E3,1554		RRECTOTH	=	RRECTCSM		
0747			E3,1562	E3,1567	RRECTCSM	ERASE	+5		B(6)PRM

L ERASABLE ASSIGNMENTS

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0748		E3,1570	E3,1571	TETCSM	ERASE	+1	B(2)PRM
0749	REE 1	F3,1570		TETOTHER	=	TETCSM	
0750		E3,1572	E3,1577	DEL TACSM	ERASE	+5	B(6)PRM
0751		E3,1600	E3,1605	NUVCSM	ERASE	+5	B(6)PRM
0752		E3,1606	E3,1613	RCVCSM	ERASE	+5	B(6)PRM
0753		E3,1614	E3,1621	VCVCSM	ERASE	+5	B(6)PRM
0754		E3,1622	E3,1623	TCCSM	ERASE	+1	B(2)PRM
0755		E3,1624	E3,1625	XKEPCSM	ERASE	+1	B(2)PRM

R0756 (RRECTLEM ...XKEPLEM MUST BE KEPT IN THIS ORDER)

0757		E3,1626	E3,1633	RRECTLEM	ERASE	+5	B(6)PRM LEM VARIABLES
0758	REF 1	E3,1626		RRECTHIS	=	RRECTLEM	
0759		E3,1634	E3,1641	VRECTLEM	ERASE	+5	B(6)PRM
0760		E3,1642	E3,1643	TETLEM	ERASE	+1	B(2)PRM
0761	REF 1	E3,1642		TETTHIS	=	TETLEM	
0762		E3,1644	E3,1651	DELTALEM	ERASE	+5	B(6)PRM
0763		E3,1652	E3,1657	NUVLEM	ERASE	+5	B(6)PRM
0764		E3,1660	E3,1665	RCVLEM	ERASE	+5	B(6)PRM
0765		E3,1666	E3,1673	VCVLEM	ERASE	+5	B(6)PRM
0766		E3,1674	E3,1675	TCLEM	ERASE	+1	B(2)PRM
0767		E3,1676	E3,1677	XKEPLEM	ERASE	+1	B(2)PRM
0768		E3,1700	E3,1705	X789	ERASE	+5	
0769		E3,1706	E3,1710	TEPHM	ERASE	+2	
0770		E3,1711	E3,1712	AZO	ERASF	+1	
0771		E3,1713	E3,1714	-AYO	ERASE	+1	
0772		E3,1715	E3,1716	AXO	ERASF	+1	
A0773							

R0774 STATE VECTORS FOR DOWNLINK.

(12D)

0776		E3,1717	E3,1724	R-OTHER	ERASE	+5	B(6)PRM POS VECT (OTHER VECH) FOR DNLINK
0777		E3,1725	E3,1732	V-OTHER	EPASE	+5	B(6)PRM VEL VECT (OTHER VECH) EOR DNLINK
0778	REF 2 LAST 127	E3,1570		T-OTHER	=	TETCSM	TIME (OTHER VECH) FOR DNLINK

R0779 REFSMMAT.

(18D)

0781 E3,1733 E3,1754 REFSMMAT ERASE +17D I(18D)PRM

R0782 ACTIVE VEHICLE CENTANG. MUST BE DISPLAYED ANYTIME (ALMOST.) (2D)

0784		E3,1755	E3,1756	ACTCENT	ERASE	+1	I(2) S-S CENTRAL ANGLE BETWEEN ACTIVE
A0785							VEHICLE AT TPI TIG AND TARGET VECTOR.

R0786 **** USED IN CONICSEX (PLAN INERT ORIENT) ****

L ERASABLE ASSIGNMENTS

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0787 A0788	REE 1	E3,1706	TIMSUBD	EQUALS	TEPHEM	CSEC B-42 (TRIPLE PRECISION)
R0789	LPS20.1 STORAGE -ALL ARE PRM -					(9D)
0791		E3,1757	E3,1757	LS21X	ERASE	I(1)
0792		E3,1760	E3,1765	LOSVEL	ERASE +5	I(6)
0793 A0794		E3,1766	E3,1767	MLOSV	ERASE +1	I(2) MAGNITUDE OF LOS, METERS B-29
R0795	***** P22 ***** (OVERLAYS LPS 20.1 STORAGE)					(6D)
0797 A0798	REF 1	E3,1760	VSUBC	EQUALS	LOSVEL	I(6)S-S CSM VELOCITY VECTOR
R0799	PADLOADED ERASABLES FOR P20/P22					(6D)
0801		E3,1770	E3,1771	RANGEVAP	ERASE +1	I(2) RR RANGE ERROR VARIANCE
0802		E3,1772	E3,1773	RATEVAR	ERASE +1	I(2) RR RANGE-RATE ERROR VARIANCE
0803		E3,1774	E3,1774	RVARMIN	ERASE	I(1) MINIMUM RANGE ERROR VARIANCE
0804 A0805		E3,1775	E3,1775	VVARMIN	ERASE	I(1) MINIMUM RANGE-RATE ERROR VARIANCE
0806		E3,1776	END-E3	EQUALS		NEXT UNUSED E3 ADDRESS

L ERASABLE ASSIGNMENTS

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P0807 EBANK-4 ASSIGNMENTS

0808 E4,1400 SETLOC 2000

R0809 E4 1S, FOR THE MOST PART RESERVED FOR PAD LOADED AND UNSHARABLE ERASE.

0810 E4,1400 AMEMORY EQUALS

R0811 P20 STORAGE. -PAD LOADED-

(6D)

0813	E4,1400	E4,1400	WRENDPOS	ERASE	B(1)PL	KM*2(-7)
0814	E4,1401	E4,1401	WRFNDVEL	ERASE	B(1)PL	KM(-1/2)*2(11)
0815	E4,1402	E4,1402	WSHAET	ERASE	B(1)PL	KM*2(-7)
0816	E4,1403	E4,1403	WTRUN	ERASE	B(1)PL	KM*2(-7)
0817	E4,1404	E4,1404	RMAX	ERASE	B(1)PL	METERS*2(-19)
0818	E4,1405	E4,1405	VMAX	ERASE	B(1)PL	M/CSEC*2(-7)

R0819 LUNAR SURFACE NAVIGATION

(2D)

0821	E4,1406	E4,1406	WSUREPOS	ERASE	B(1)PL
0822	E4,1407	E4,1407	WSUREVEL	ERASE	B(1)PL

A0823

R0824 P22 STORAGE. -PAD LOADED-

(2D)

0826	E4,1410	E4,1410	SHAFTVAR	FRASE	B(1)PL	RAD SQ*2(12)
0827	E4,1411	E4,1411	TRUNVAR	ERASE	B(1)PL	RAD SQ*2(10)

R0828 CCNISEX STORAGE. -PAD LOADED-

(6D)

0830	E4,1412	E4,1417	504LM	ERASE	+5	1(6)MOON LIBRATION VECTOR
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A0831

R0832 V47(R47) AGS INITIALIZATION STORAGE. -PAD LOADED-

(2D)

0834	E4,1420	E4,1421	AGSK	ERASE	+1
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R0835 LUNAR LANDING STORAGE. -PAD LOADED-

(6D)

0837	E4,1422	E4,1427	RLS	FRASE	+5	1(6) LANDING SITE VECTOR -MOON REF
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A0838

R0839 INTEGRATION STORAGE.

(102D)

0841	E4,1430	E4,1575	PBODY	ERASE	+101D	1(1)
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L ERASABLE ASSIGNMENTS

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0842	REF	1		E4,1431	ALPHAV	EQUALS	P8ODY	+1	I(6)	
0843	REF	1		E4,1437	BETAV	EQUALS	ALPHAV	+6	I(6)	
0844	REF	1		E4,1445	PHIV	EQUALS	BETAV	+6	I(6)	
0845	REF	1		E4,1453	PSIV	EQUALS	PHIV	+6	I(6)	
0846	REF	1		E4,1461	FV	EQUALS	PSIV	+6	I(6)	PERTURBING ACCELERATIONS
0847	REF	1		E4,1467	ALPHAM	EQUALS	FV	+6	I(2)	
0848	REF	1		E4,1471	BETAM	EQUALS	ALPHAM	+2	I(2)	
0849	REF	1		E4,1473	TAU.	EQUALS	BETAM	+2	I(2)	
0850	REF	1		E4,1475	DT/2	EQUALS	TAU.	+2	I(2)	
0851	REF	1		E4,1477	H	EQUALS	DT/2	+2	I(2)	
0852	REF	1		E4,1501	GMODE	EQUALS	H	+2	I(1)	
0853	REF	1		E4,1502	IRETURN	EQUALS	GMODE	+1	I(1)	
0854	REF	1		E4,1503	NORMGAM	EQUALS	IRETURN	+1	I(1)	
0855	REF	1		E4,1504	RPQV	EQUALS	NORMGAM	+1		
0856	REF	1		F4,1512	ORIGEX	EQUALS	RPQV	+6	I(1)	
0857	REF	1		E4,1512	KEPRTN	EQUALS	ORIGEX		I(1)	
0858	REF	2	LAST 130	E4,1513	RQVV	EQUALS	ORIGEX	+1	I(6)	
0859	REF	1		F4,1521	RPSV	EQUALS	RQVV	+6	I(6)	
0860	REF	1		F4,1527	XKEPNEW	EQUALS	RPSV	+6	I(2)	
0861	REF	1		F4,1531	VECTAB	EQUALS	XKEPNEW	+2	I(36D)	
0862	REF	1		E4,1574	VECTA8ND	EQUALS	VECTAB	+35D	END MARK	

A0863

R0864 THESE PROBABLY CAN SHARE MID-COURSE VARIABLES. (6D)

0866	REF	2	LAST 130	F4,1537	VACX	EQUALS	VECTA8	+6	I(2)
0867	REF	1		E4,1541	VACY	EQUALS	VACX	+2	I(2)
0868	REF	1		F4,1543	VACZ	EQUALS	VACY	+2	I(2)

R0869 SERVICFR STORAGE (USED BY ALL POWERED FLIGHT PROGS.) (18D)

0871	REF	3	LAST 130	F4,1545	XN8PIP	EQUALS	VECTAB	+12D	I(6)
0872	REF	1		E4,1553	YN8PIP	EQUALS	XN8PIP	+6	I(6)
0873	REF	1		F4,1561	ZN8PIP	EQUALS	YN8PIP	+6	I(6)

A0874

R0875 SCME VER8 82 STORAGE (4D)

0877	REF	2	LAST 130	F4,1517	HAPOX	EQUALS	RQVV	+4	I(2)
0878	REF	1		F4,1521	HPERX	EQUALS	HAPOX	+2	I(2)

A0879

R0880 V82 STORAGE (6D)

0882	REF	4	LAST 130	E4,1567	VONE	EQUALS	VECTAB	+30D	I(6)TMP	NORMAL VELOCITY VONE /SQRT. MU
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A0883

R0884 R31(V83) STORAGE. -SHARES WITH INTEGRATION STORAGE- (28D)

L ERASABLE ASSIGNMENTS

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0886 A0887	REF	2	LAST	130	E4,1504	BASETHV	EQUALS	RPQV		I(6)	BASE VEL VECTOR THIS VEH
0888	REF	3	LAST	130	E4,1513	BASETIME	EQUALS	RQVV		I(2)	TIME ASSOC WITH BASE VECs
0889	REF	4	LAST	131	E4,1515	ORIG	EQUALS	RQVV	+2	I(1)	=0 FOR EARTH =2 FOR MOON
0890	REF	5	LAST	131	E4,1516	STATEXIT	EQUALS	RQVV	+3	I(1)	STQ ADDRESS FOR STATEXTP
0891 A0892	REF	6	LAST	131	E4,1517	BASEOTV	EQUALS	RQVV	+4	I(6)	BASE VEL VECTOR OTHER VEH
0893 A0894	REF	5	LAST	130	E4,1537	BASEOTV	EQUALS	VECTAB	+6	I(6)	BASE POS VECTOR OTHER VEH
0895 A0896	REF	6	LAST	131	E4,1567	BASETHP	EQUALS	VECTAB	+30D	I(6)	BASE POS VECTOR THIS VEH

R0897 KEPLER STORAGE. (KEPLER IS CALLED BY PRECISION INTEGRATION AND (6D)
R0899 CONICS)

0900					E4,1576	E4,1603	XMODULO	ERASE		+5	I(2)
0901	REF	1			E4,1600		TMODULO	EQUALS	XMODULO	+2	I(2)
0902	REF	1			E4,1602		EPSILON	EQUALS	TMODULO	+2	I(2)

R0903 VFRB 83 STORAGE.

(18D)

0905					E4,1604	E4,1625	RANGE	ERASE		+17D	I(2)DSP NOUN 54 DISTANCE TO OPTICAL SUBJ
0906	REF	1			E4,1606		RRATE	EQUALS	RANGE	+2	I(2)DSP NOUN 54 RATE OF APPROACH.
0907	REF	1			E4,1610		RTHETA	EQUALS	RRATE	+2	I(2)DSP NOUN 54.
0908	REF	1			E4,1612		RONE	EQUALS	RTHETA	+2	I(6)TMP VECTOR STORAGE. (SCRATCH)
0909	REF	1			E4,1620		VONE	EQUALS	RONE	+6	I(6)TMP VECTOR STORAGE. (SCRATCH)

0910	REF	2	LAST	131	E4,1604	WWPOS	=	RANGE			NOUN 99 (V67)
0911	REF	2	LAST	131	E4,1606	WWVEL	=	RRATE			NOUN 99 (V67)
R0912					V82 STORAGE. (CANNOT OVERLAY RONE OR VONE)						(11D) TWO SEPARATE LOCATIONS

0914	REF	7	LAST	131	E4,1537	V82ELAGS	EQUALS	VECTAB	+6		(1) FOR V82 BITS.
0915	REF	1			E4,1540	TFF	EQUALS	V82FLACS	+1	I(2)	
0916 A0917	REF	1			E4,1542	-TPER	EQUALS	TFF	+2	I(2)	

0918	REF	3	LAST	131	E4,1604	HPERMIN	EQUALS	RANGE			I(2) SET TO 300KET OR 35KET FOR SR30.1
0919	REF	1			E4,1606	RPADTEM	EQUALS	HPERMIN	+2		I(2) PAD OR LANDING RADIUS FOR SR30.1
0920 A0921	REF	1			E4,1610	TSTARTB2	EQUALS	RPADTEM	+2		I(2) TEMP TIME STORAGE FOR V82.

R0922 VARIOUS DISPLAY REGISTERS

(6D) NOUN 84; P76

L ERASABLE ASSIGNMENTS

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0924 E4,1626 E4,1633 DELVOV ERASE +5D (6)
A0925

R0926 ALIGNMENT PLANETARY-INERTIAL TRANSFORMATION STORAGE. (18D)

R0928 UNSHARED WHILE LM ON LUNAR SURFACE.

0929 E4,1634 E4,1655 GSAV ERASE +17D I(6)
0930 REF 1 E4,1642 YNBSAV EQUALS GSAV +6 I(6)
0931 REF 1 E4,1650 ZNBSAV EQUALS YNBSAV +6 I(6)
A0932

R0933 KALCMANU STORAGE. CAN-OVERLAY GSAV. (18D)

0935 REF 2 LAST 132 E4,1634 MFS EQUALS GSAV I(18)
0936 REF 1 E4,1634 MFI EQUALS MFS I
0937 REF 2 LAST 132 E4,1634 KEL EQUALS MFS I(18)
0938 REF 3 LAST 132 E4,1634 E01 EQUALS MFS I(6)
0939 REF 1 E4,1642 E02 EQUALS E01 +6 I(6)

R0940 LR-VEL BEAM VECTORS. (26D)

A0942
R0943 CAN OVERLAY GSAV WITH CARE, USED DURING POWERED DESCENT ONLY.

0944 REF 3 LAST 132 E4,1634 VZBEAMNB EQUALS GSAV I(6) LR VELOCITY BEAMS IN NB COORDS.
0945 REF 1 E4,1642 VYBEAMNB EQUALS VZBEAMNB +6 I(6)
0946 REF 1 E4,1650 VXBEAMNB EQUALS VYBEAMNB +6 I(6) PRESERVE Z,Y,X ORDER.

0947 REF 1 E4,1656 LRVTIME = VXBEAMNB +6 B(2) LR
0948 REF 1 E4,1660 LRXCDCU = LRVTIME +2 B(1) LR
0949 REF 1 E4,1661 LRYCUDU = LRXCDCU +1 B(1) LR
0950 REF 1 E4,1662 LRZCUDU = LRYCUDU +1 B(1) LR
0951 REF 1 E4,1663 PIPTM = LRZCUDU +1 B(3) LR
A0952

R0953 P32-P35, P72-P75 STORAGE. (40D)

0955 E4,1656 E4,1657 T1TOT2 ERASE +1 (2) TIME FROM CSI TO CDH
0956 E4,1660 E4,1661 T2TOT3 ERASE +1 (2)
0957 E4,1662 E4,1663 ELEV ERASE +1 (2)
0958 E4,1664 E4,1671 UP1 FRASE +5 (6)
0959 E4,1672 E4,1677 DELVEET1 ERASE +5 I(6) DV CSI IN REF
0960 E4,1700 E4,1705 DELVEET2 ERASE +5 I(6) DV CSH IN REF
0961 E4,1706 E4,1713 RACT1 ERASF +5 (6) POS VEC OF ACTIVE AT CSI TIME
0962 E4,1714 E4,1721 RACT2 ERASE +5 (6) POS VEC OF ACTIVE AT CDH TIME

L ERASABLE ASSIGNMENTS

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0963		E4,1722	E4,1723	RTSR1/MU	ERASE	+1	(2)	SQ ROOT 1/MU STORAGE
0964		E4,1724	E4,1725	RTMU	ERASE	+1	(2)	MU STORAGE
R0965								

R0966 (THE FOLLOWING ERASABLES OVERLAY PORTIONS OF THE PREVIOUS SECTION)

0968	REF	1	E4,1656	+MGA	EQUALS T1TOT2	(2)	S-S + MID GIM ANGL TO DELVEET3
A0969							
0970	REF	1	E4,1664	UNRM	EQUALS UP1	I(6)	S-S
A0971							
0972	REF	1	E4,1706	DVLOS	EQUALS RACT1	I(6)	S-S DELTA VELOCITY, LOS COORD-DISPLA
0973	REF	1	E4,1714	ULOS	EQUALS RACT2	I(6)	S-S UNIT LINE OF SIGHT VECTOR
A0974							
0975	REF	1	E4,1722	NOMTPI	EQUALS RTSR1/MU	(2)	S-S NOMINAL TPI TIME FOR RECYCLE

R0976 SCME P30 STORAGE.

(4D)

0978	REF	2	LAST 133	E4,1722	HAPD	EQUALS RTSR1/MU	I(2)
0979	REF	1		E4,1724	HPER	EQUALS HAPD +2	I(2)
A0980							

R0981 SCME P38-P39,P78-79 STORAGE.

(6D)

0983	REF	1	F4,1706	DELTAR	EQUALS DVLOS	I(2)	
0984	REF	1	E4,1710	DELTIME	EQUALS DELTAP +2	I(2)	TIME REPRESENTATION OF DELTAR
0985	REF	1	F4,1712	TARGETIME	EQUALS DELTIMEF +2	I(2)	TINT MINUS DELTIME
A0986							
0987	REF	2	LAST 133	F4,1706	TINTSOI	EQUALS DELTAP	I(2)
A0988							TIME OF INTERCEPT FOR SOI PHASE

R0989 THE FOLLOWING ARE ERASABLE LOADS DURING A PERFORMANCE TEST.

0990	REF	1	F4,1400	TRANSM1	=	WPENDPOS	E4,1400
0991	REF	1	E4,1422	ALFDK	=	TRANSM1 +18D	

R0992 ***** THE FOLLOWING SECTIONS OVERLAY V83 AND DISPLAY STORAGE *****

R0993 V47(R47)AGS INITIALIZATION PROGRAM STORAGE. (OVERLAYS V83) (14D)

0995	REF	4	LAST 131	E4,1604	AGSBUFF	EQUALS RANGE	B(14D)
0996	REF	1		F4,1621	AGSBUFFE	EQUALS AGSBUFF +13D	ENDMARK

L ERASABLE ASSIGNMENTS

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R0997 R36 OUT-OF-PLANE RENDEZVOUS DISPLAY STORAGE. (OVERLAYS V83) (12D)

0999	REF	2	LAST	131	E4,1612	RPASS36	EQUALS	RONE		I(6)	S-S
1000	REF	1			E4,1620	UNP36	EQUALS	RPASS36	+6	I(6)	S-S

R1001 S-BAND ANTENNA GIMBAL ANGLES. DISPLAYED BY R05(V64).(OVERLAYS V83) (10D)
R1003 (OPERATES DURING P00 ONLY)

1004	REF	5	LAST	133	E4,1604	ALPHASB	EQUALS	RANGE		B(2)	DSP NOUN 51. PITCH ANGLE.
1005	RFF	1			E4,1606	BETASB	EQUALS	ALPHASB	+2	B(2)	DSP NOUN 51. YAW ANGLE.
1006	REF	1			E4,1610	RLM	EQUALS	BETASB	+2	I(6)	S S/C POSITION VECTOR.

R1007 **** USED IN S-BAND ANTENNA FOR LM ****

1008	REF	2	LAST	134	E4,1606	YAWANG	EQUALS	BETASB			
1009	REF	2	LAST	134	E4,1604	PITCHANG	EQUALS	ALPHASB			

R1010 NCUN 56 DATA - COMPUTED AND DISPLAYED BY VERB B5.

(4)

1012	REF	1			E4,1604	RR-AZ	EQUALS	PITCHANG		I(2)	ANGLE BETWEEN LOS AND X-Z PLANE.
1013	REF	1			E4,1606	RR-ELEV	EQUALS	RR-AZ	+2	I(2)	ANGLE BETWEEN LOS AND Y-Z PLANE.

R1014 R04(V62) RADAR TEST STORAGE.
R1016 R04 IS RESTRICTED TO P00.

(8D)

1017	REF	6	LAST	134	E4,1604	RSTACK	EQUALS	RANGE		B(8)	BUFFER FOR R04 NOUNS.
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A1018

R1019 INITVEL STORAGE. ALSO USED BY P31,P34,P35,P74,P75,P10,P11,MIDGIM,S40.1 AND S40.9. (18D)

R1021 (POSSIBLY RINIT & VINIT CAN OVERLAY DELVEET1 & 2 ABOVE)

1022					E4,1726	E4,1733	RINIT	ERASE	+5	I(6)	ACTIVE VEHICLE POSITION
1023					E4,1734	E4,1741	VINIT	ERASE	+5	I(6)	ACTIVE VEHICLE VELOCITY
1024					E4,1742	E4,1747	VIPRIME	ERASE	+5	I(6)	NEW VEL REQUIRED AT INITIAL RADIUS.

R1025 VARIOUS DISPLAY REGISTERS. BALLANGS

(3D)

1027					E4,1750	E4,1750	FDAIX	ERASE		I(1)	
1028					E4,1751	E4,1751	FDAIY	ERASE		I(1)	
1029					E4,1752	E4,1752	FDAIZ	ERASE		I(1)	

A1030

R1031 * P34-P35 STORAGE. DOWNLINKED.

R1032 *(2D)

L ERASABLE ASSIGNMENTS

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1033	*		E4,1753	E4,1754	DELVTPE	ERASE	+1	I(2) DELTA V FOR TPF
A1034	*							(6D)
R1035			SCME R04(V62)-R77 RADAR TEST STORAGE					
1037			E4,1755	F4,1755	RTSTDEX	ERASE		(1)
1038			E4,1756	E4,1756	RTSTMAX	ERASE		(1)
1039			E4,1757	F4,1757	RTSTBASE	ERASE		(1)
1040			E4,1760	E4,1760	RTSTLOC	ERASE		(1)
1041	REF	1	F4,1760		RSTKLOC	=	RTSTLOC	
1042			E4,1761	E4,1761	RSAMPDT	ERASE		(1)
1043			E4,1762	E4,1762	RFAILCNT	ERASE		(1)
R1044								
R1045	*		LPS20.1 STORAGE					
R1046			*(12D)					
1047	*REF	1	E4,1755		LMPOS	EQUALS	RTSTDEX	I(6) TEMP. STORAGE FOR LM POS. VECTOR.
1048	*REF	1	E4,1763		LMVEL	EQUALS	LMPOS	I(6) TEMP. STORAGE FOR LM VEL. VECTOR.
A1049	*							
1050			E4,1763		END-E4	EQUALS		FIRST UNUSED LOCATION IN E4
R1051			SECOND DPS GUIDANCE (LUNAR LANDING) (OVERLAY P32-35,INITVEL)					(26D)
1053	REF	1	E4,1666		VHORIZ	EQUALS	PIPTM	I(2) DISPLAY
1054	REF	1	E4,1670		ACG	EQUALS	VHORIZ	I(6) GUIDANCE
1055	REF	1	F4,1676		JLING	EQUALS	ACG	I(6) GUIDANCE
1056	REF	1	E4,1704		ANGTERM	EQUALS	JLING	I(6) GUIDANCE
1057	REF	1	E4,1712		HBEAMNB	EQUALS	ANGTERM	I(6) LANDING RADAR
1058	REF	1	E4,1740		LRXCDUDL	EQUALS	/LAND/	B(1) LANDING RADAR DOWNLINK
1059	REF	1	E4,1741		LRXCDUDL	EQUALS	LRXCDUDL	B(1) LANDING RADAR DOWNLINK
1060	RFF	1	E4,1742		LRZCDUDL	EQUALS	LRXCDUDL	B(1) LANDING RADAR DOWNLINK
1061	REE	1	E4,1743		LRVTIMDL	EQUALS	LRZCDUDL	B(2) LANDING RADAR DOWNLINK
A1062								
R1063			ASCENT GUIDANCE FOR LUNAR LANDING					(62D)
1065	REF	2	LAST	133	E4,1656	AT	EQUALS	TITOT2
1066	REF	1			E4,1660	VE	EQUALS	AT
1067	REF	1			E4,1662	TTO	EQUALS	VE
1068	REF	1			E4,1664	TBUP	EQUALS	TTO
1069	REF	1			E4,1666	RDOTD	EQUALS	TBUP
1070	REF	1			E4,1670	YDOTD	EQUALS	RDOTD
1071	REF	1			F4,1672	ZDOTD	EQUALS	YDOTD
1072	REF	1			E4,1674	/R/MAG	EQUALS	ZDOTD
1073	REF	1			E4,1676	LAXIS	EQUALS	/R/MAG

I(2)TMP ENGINE DATA -- THRUST ACC.*2(9)
 I(2)TMP EXHAUST VELOCITY * 2(7)M/CS.
 I(2)TMP TAILOFF TIME * 2(17)CS.
 I(2)TMP (M/MDOT) * 2(17)CS.
 I(2)TMP TARGET VELOCITY COMPONENTS
 I(2)TMP SCALING IS 2(7)M/CS.
 I(2)TMP

L ERASABLE ASSIGNMENTS

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1074	REF	1	E4,1704	ZAXIS1	EQUALS LAXIS	+6	I(6)TMP	SYSTEM (R,L,Z).
1075	REF	1	E4,1712	RDOT	EQUALS ZAXIS1	+6	I(2)TMP	RADIAL RATE * 2(-7).
1076	REF	1	E4,1714	YDOT	EQUALS RDOT	+2	I(2)TMP	VEL. NORMAL TO REF. PLANE*2(-7)
1077	REF	1	E4,1716	ZDOT	EQUALS YDOT	+2	I(2)TMP	DOWN RANGE VEL *2(-7).
1078	REF	1	E4,1720	GEFF	EQUALS ZDOT	+2	I(2)TMP	EFFECTIVE GRAVITY

R1079 THESE TWO GROUPS OF ASCENT GUIDANCE ARE SPLIT BY THE ASCENT-DESCENT SERVICER SECTION FOLLOWING THIS SECTION

1081	REF	2	LAST 135	E4,1740	Y	EQUALS /LAND/	+2	I(2)TMP	OUT-OF-PLANE DIST *2(24)M
1082	REF	1		E4,1742	DRDOT	EQUALS Y	+2	I(2)TMP	RDOTD - RDOT
1083	REF	1		E4,1744	DYDOT	EQUALS DRDOT	+2	I(2)TMP	YDOTD - YDOT
1084	REF	1		E4,1746	DZDOT	EQUALS DYDOT	+2	I(2)TMP	ZDOTD - ZDOT
1085	REF	1		E4,1750	PCONS	EQUALS DZDOT	+2	I(2)TMP	CONSTANT IN ATR EQUATION
1086	REF	1		E4,1752	YCONS	EQUALS PCONS	+2	I(2)TMP	CONSTANT IN ATY EQUATION
1087	REF	1		E4,1754	PRATE	EQUALS YCONS	+2	I(2)TMP	RATE COEFF. IN ATR EQUATION
1088	REF	1		E4,1756	YRATE	EQUALS PRATE	+2	I(2)TMP	RATE COEFF. IN ATY EQUATION
1089	REF	1		E4,1760	ATY	EQUALS YRATE	+2	I(2)TMP	OUT-OF-PLANE THRUST COMP.*2(9)
1090	REF	1		E4,1762	ATR	EQUALS ATY	+2	I(2)TMP	RADIAL THRUST COMP.*2(9)
1091	REF	1		E4,1764	ATP	EQUALS ATR	+2	I(2)TMP	DOWN-RANGE THRUST COMP
1092	REF	1		E4,1766	YAW	EQUALS ATP	+2	I(2)TMP	
1093	REF	1		E4,1770	PITCH	EQUALS YAW	+2	I(2)TMP	

A1094

R1095 SERVICER FOR LUNAR ASCENT AND DESCENT

(14D)

1097	REF	1	E4,1722	G(CSM)	EQUALS GEFF	+2	I(6)	FOR UPDATE OF COMMAND MODULE STATE
1098	REF	1	E3,1717	R(CSM)	EQUALS R-OTHER			VECTORS BY LEM; ANALOGS OF GDT/2,
1099	REF	1	E3,1725	V(CSM)	EQUALS V-OTHER			R, AND V, RESPECTIVELY OF THE CSM
1100	REF	1	E4,1730	WM	EQUALS G(CSM)	+6	I(6)	TMP - LUNAR ROTATION VECTOR (SM)
1101	REF	1	E4,1736	/LAND/	EQUALS WM	+6	B(2)	LUNAR RADIUS AT LANDING SITE

A1102

L ERASABLE ASSIGNMENTS

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P1103 EBANK-5 ASSIGNMENTS

1104 E5,1400 SETLOC 2400

R1105 W-MATRIX. ESSENTIALLY UNSHARABLE. (162D)

1107			E5,1400	E5,1641	W	ERASE	+161D
1108	REF	1	E5,1642		ENDW	EQUALS W	+162D

A1109

R1110 ***** OVERLAY NUMBER 1 IN EBANK 5 *****

R1111 LUNAR LANDING TARGET PARAMETERS - PADLOADED - (64D)

R1113 PLEASE RETAIN THE ORDER OF TLAND THRU JAPFG

1114	REF	2	LAST 137	E5,1400	TLAND	EQUALS W	I(2)	NOMINAL TIME OF LANDING
1115	REF	1		E5,1402	RBRFG	EQUALS TLAND	+2	I(6) BRAKING
1116	REF	1		E5,1410	VBRFG	EQUALS RBRFG	+6	I(6) PHASE
1117	REF	1		E5,1416	ABRFG	EQUALS VBRFG	+6	I(6) TARGET
1118	REF	1		E5,1424	VBRFG*	EQUALS ABRFG	+6	I(2) PARAMETERS:
1119	REF	1		E5,1426	ABRFG*	EQUALS VBRFG*	+2	I(2) HIGH
1120	REF	1		E5,1430	JBRFG*	EQUALS ABRFG*	+2	I(2) GATE
1121	REF	1		E5,1432	RAPFG	EQUALS JBRFG*	+2	I(6) APPROACH
1122	REF	1		E5,1440	VAPFG	EQUALS RAPFG	+6	I(6) PHASE
1123	REF	1		E5,1446	AAFG	EQUALS VAPFG	+6	I(6) TARGET
1124	REF	1		E5,1454	VAPEG*	EQUALS AAFG	+6	I(2) PARAMETERS:
1125	REF	1		E5,1456	AAFG*	EQUALS VAPEG*	+2	I(2) LOW
1126	REF	1		E5,1460	JAPFG*	EQUALS AAFG*	+2	I(2) GATE
1127	REF	1		E5,1462	VIGN	EQUALS JAPFG*	+2	I(2) DESIRED SPEED FOR IGNITION
1128	REF	1		E5,1464	RIGNX	EQUALS VIGN	+2	I(2) DESIRED 'ALTITUDE' FOR IGNITION
1129	REF	1		E5,1466	RIGNZ	EQUALS RIGNX	+2	I(2) DESIRED GROUND RANGE FOR IGNITION
1130	REF	1		E5,1470	KIGNX/B4	EQUALS RIGNZ	+2	I(2)
1131	REF	1		E5,1472	KIGNY/B8	EQUALS KIGNX/B4	+2	I(2)
1132	REF	1		E5,1474	KIGNV/B4	EQUALS KIGNY/B8	+2	I(2)
1133	REF	1		E5,1476	LOWCRIT	EQUALS KIGNV/B4	+2	B(1) (HIGHCRIT MUST FOLLOW LOWCRIT)
1134	REF	1		E5,1477	HIGHCRIT	EQUALS LOWCRIT	+1	B(1) %S OF NOMINAL MAXIMUM THRUST

1135	REF	5	LAST 114	0130	L*WCR*T =	BUF		TEMPORARY STORAGE IN UNSWITCHED
1136	REF	6	LAST 137	0131	H*GHCR*T =	BUF	+1	FOR USE IN EBANK SWITCHING LOWCRIT

1137	*REF	1		E5,1500	DELQFIX	EQUALS HIGHCRIT	+1	I(2) LR ALTITUDE DATA REASONABLE PARM.
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A1138

R1139 P70-P71 PADLOADED * ASCENT * (5D)

L ERASABLE ASSIGNMENTS

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1141	*REF	1	E5,1502	TBRKPNT	EQUALS	DELQFIX	+2	I(1) TFI BRANCH TIME:ABORT TARGET PCR133
1142	REF	1	E5,1503	ABTVINJ1	EQUALS	TBRKPNT	+1	I(2) ABORT VELOCITY;TFI LESSTHAN TBRKPNT
1143	REF	1	E5,1505	ABTVINJ2	EQUALS	ABTVINJ1	+2	I(2) ABORT VEL ;TFI GREATER THAN TBRKPNT

A1144

R1145 SOME VARIABLES FOR SECOND DPS GUIDANCE

(34D)

1147	REF	1	E5,1507	CG	EQUALS	ABTVINJ2	+2	I(18D) GUIDANCE
1148	REF	1	E5,1531	RANGEDSP	=	CG	+18D	B(2) DISPLAY
1149	REF	1	E5,1533	OUTOFPLN	=	RANGEDSP	+2	B(2) DISPLAY
1150	REF	1	E5,1535	R6OVSAVE	EQUALS	OUTOFPLN	+2	I(6)TMP SAVES VALUE OF POINTVSM THRU R51
1151	REF	1	E5,1543	RGU	EQUALS	R6OVSAVE	+6	I(6) UNSHARED FOR DOWNLINK

A1152

R1153 ALIGNMENT/SYSTEST/CALCSMSC COMMON STORAGE.

(36D)

1155	REF	1	E5,1642	XSM	EQUALS	ENDW		B(6)
1156	REF	1	E5,1650	YSM	EQUALS	XSM	+6	B(6)
1157	REF	1	E5,1656	ZSM	EQUALS	YSM	+6	B(6)
1158	REF	1	E5,1664	XDC	EQUALS	ZSM	+6	B(6)
1159	REF	1	E5,1672	YDC	EQUALS	XDC	+6	B(6)
1160	REF	1	E5,1700	ZDC	EQUALS	YDC	+6	B(6)
1161	REF	2	LAST 138	XNB	=	XDC		
1162	REF	2	LAST 138	YNB	=	YDC		
1163	REF	1	E5,1700	ZNB	=	ZDC		

R1164 OVERLAYS WITHIN ALIGNMENT/SYSTEST/CALCSMSC COMMON STORAGE.

(4D)

1166	REF	2	LAST 138	E5,1644	-COSB	EQUALS	XSM	+2	(2)TMP
1167	REF	1		E5,1646	SINB	EQUALS	-COSB	+2	(2)TMP

R1168 MORE OVERLAYS TO ALIGNMENT /SYSTEST (THESE ARE P52)

(6D)

1170	REF	1	E5,1706	LANDLAT	EQUALS	STARAD		(2) LATITUDE, LONGITUDE
1171	REF	1	E5,1710	LANDLONG	EQUALS	LANDLAT	+2	(2) AND ALTITUDE
1172	REF	1	E5,1712	LANDALT	EQUALS	LANDLONG	+2	(2) OF LANDING SITE

A1173

R1174 ALIGNMENT/SYSTEST COMMON STORAGE.

(31D)

1176	REF	2	LAST 138	E5,1706	STARAD	EQUALS	ZDC	+6	I(18D)TMP
1177	REF	2	LAST 138	E5,1730	STAR	EQUALS	STARAD	+18D	I(6)
1178	REF	1		E5,1736	GCTR	EQUALS	STAP	+6	B(1)
1179	REF	1		E5,1737	DGC	EQUALS	GCTR	+1	I(2)
1180	REF	1		E5,1741	IGC	EQUALS	DGC	+2	I(2)
1181	REF	1		E5,1743	MGC	EQUALS	IGC	+2	I(2)

L ERASABLE ASSIGNMENTS

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R1182 P57 ALIGNMENT (OVERLAY OF ALIGNMENT/SYSTEST COMMON STORAGE) (120)

1184	REF	3	LAST	138	E5,1706	GACC	=	STARAD	(6) SS
1185	REF	4	LAST	139	E5,1714	GOUT	=	STARAD +6	(6) SS

A1186

R1187 OVERLAYS WITHIN ALIGNMENT/SYSTEST COMMON STORAGE (240)

1189	REF	5	LAST	139	E5,1706	VEARTH	EQUALS	STARAD	(6) TMP
1190	REF	1			E5,1714	VSUN	EQUALS	VEARTH +6	(6) TMP
1191	REF	1			E5,1722	VMOON	EQUALS	VSUN +6	(6) TMP
1192	REF	1			E5,1730	SAX	EQUALS	VMOON +6	(6) TMP

R1193 P50'S,R50'S Q STORES. (20)

1195	REF	1			E5,1745	QMIN	EQUALS	MGC +2	B(1) TMP
1196	REF	1			E5,1746	QMAJ	EQUALS	QMIN +1	B(1) TMP

R1197

R1198 **** USED IN P50S **** (SCATTERED OVERLAYS)

1199	REF	6	LAST	139	E5,1706	XSCI	EQUALS	STAPAD	
1200	REF	1			E5,1714	YSCI	EQUALS	XSCI +6	
1201	REF	1			E5,1714	ZSCI	EQUALS	YSCI	
1202	REF	2	LAST	139	E5,1706	CULTRIX	EQUALS	VEARTH	VEARTH, VSUN, VMOON
1203	REF	7	LAST	139	E5,1722	VEC1	EQUALS	STARAD +120	
1204	REF	2	LAST	138	E5,1730	VEC2	EQUALS	STAR	

A1205

R1206 ALIGNMENT STORAGE. (230)

1208	REF	1			E5,1747	OGCT	EQUALS	QMAJ +1	I(6)
1209	REF	1			E5,1755	BESTI	EQUALS	OGCT +6	I(1)
1210	REF	1			E5,1756	BESTJ	EQUALS	BESTI +1	
1211	REF	1			E5,1757	STARIND	EQUALS	BFSTJ +1	

R1212 RETAIN THE ORDER OF STARS AV1 TO STARS AV2 +5 FOR DOWNLINK PURPOSES.

1213	REF	1			E5,1760	STARS AV1	EQUALS	STARIND +1	I(6)
1214	REF	1			E5,1766	STARS AV2	EQUALS	STARS AV1 +6	I(6)
1215	REF	1			E5,1774	TALIGN	EQUALS	STARS AV2 +6	B(2) TIME OF IMU ALIGNMENT (DOWNLINKED)

A1216 VEL/C EQUALS STARS AV2 +6 I(6) TMP (NOT USED IN LEM)

1217		0026	ZPRIME	=	220
1218		0026	PDA	=	220
1219		0020	COSTH	=	160
1220		0022	SINTH	=	180
1221		0024	THETA	=	200
1222		0040	STARM	=	320

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P1223 ***** OVERLAY NUMBER 2 IN EBANK 5 *****

R1224 CCNICS ROUTINE STORAGE.

(850)

1226	REF	2	LAST	138	E5,1642	DELX	EQUALS	ENDW		I(2)TMP
1227	REF	1			E5,1644	DELT	EQUALS	DELX	+2	I(2)TMP
1228	REF	1			E5,1646	URRECT	EQUALS	DELT	+2	I(6)TMP
1229					0042	RCNORM	EQUALS	340		I(2)TMP
1230	REF	1			E3,1552	XPREV	EQUALS	XKEP		I(2)TMP
1231	REF	1			E5,1654	R1VEC	EQUALS	URRECT	+6	I(6)TMP
1232	REF	1			E5,1662	R2VEC	EQUALS	R1VEC	+6	I(6)TMP
1233	REF	1			F5,1670	TDES IRED	EQUALS	R2VEC	+6	I(2)TMP
1234	REF	1			E5,1672	GEOMSGN	EQUALS	TDES IRED	+2	I(1)TMP
1235	REF	1			E5,1673	UN	EQUALS	GEOMSGN	+1	I(6)TMP
1236	REF	1			F5,1701	VTARGETAG	EQUALS	UN	+6	I(1)TMP
1237	REF	1			E5,1702	VTARGET	EQUALS	VTARGETAG	+1	I(6)TMP
1238	REF	1			F5,1710	RTNLAMB	EQUALS	VTARGET	+6	I(1)TMP
1239	REF	1			E5,1711	U2	EQUALS	RTNLAMB	+1	I(6)TMP
1240	REF	1			E5,1717	MAGVEC2	EQUALS	U2	+6	I(2)TMP
1241	REF	1			E5,1721	URL	EQUALS	MAGVEC2	+2	I(6)TMP
1242	REF	1			F5,1727	SNTH	EQUALS	URL	+6	I(2)TMP
1243	REF	1			E5,1731	CSTH	EQUALS	SNTH	+2	I(2)TMP
1244	REF	1			E5,1733	1-CSTH	EQUALS	CSTH	+2	I(2)TMP
1245	REF	1			E5,1735	CSTH-RHO	EQUALS	1-CSTH	+2	I(2)TMP
1246	REF	1			E5,1737	P	EQUALS	CSTH-RHO	+2	I(2)TMP
1247	REF	1			E5,1741	R1A	EQUALS	P	+2	I(2)TMP
1248	REF	2	LAST	140	E5,1654	RVEC	FQUALS	R1VEC		I(6)TMP
1249	REF	1			E5,1743	VVEC	FQUALS	R1A	+2	I(6)TMP
1250	REF	2	LAST	140	E5,1710	RTNTT	EQUALS	RTNLAMB		I(1)TMP
1251	REF	1			F5,1751	ECC	EQUALS	VVEC	+6	I(2)TMP
1252	REF	3	LAST	140	E5,1710	RTNTR	EQUALS	RTNLAMB		I(1)TMP
1253	REF	4	LAST	140	E5,1710	RTNAPSE	EQUALS	RTNLAMB		I(1)TMP
1254	REF	2	LAST	140	E5,1717	R2	EQUALS	MAGVEC2		I(2)TMP
1255	REF	1			E5,1753	RTNPRM	EQUALS	ECC	+2	I(1)TMP
1256	REF	1			F5,1754	SGNRDOT	EQUALS	RTNPRM	+1	I(1)TMP
1257	REF	1			E5,1755	RDES IRED	EQUALS	SGNRDOT	+1	I(2)TMP
1258	REF	1			E5,1757	DELDEP	EQUALS	RDES IRED	+2	I(2)TMP
1259	REF	1			F5,1761	DEPREV	EQUALS	DELDEP	+2	I(2)TMP
1260	REF	2	LAST	140	E5,1757	TERRLAMB	EQUALS	DELDEP		I(2)TMP
1261	REF	1			E5,1761	TPREV	EQUALS	DEPREV		I(2)TMP
1262	REF	2	LAST	140	E5,1763	EPSILONL	EQUALS	DEPREV	+2	I(2)TMP
1263	REF	1			E5,1765	COGA	EQUALS	EPSILONL	+2	I(2)TMP
1264	REF	1			E5,1765	INDEP	EQUALS	COGA		I(2)TMP

COGTA OF INITIAL FLIGHT PATH ANGLE.
USED BY SUBROUTINE 'ITERATOR'.

L ERASABLE ASSIGNMENTS

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P1265 ***** OVERLAY NUMBER 3 IN EBANK 5 *****

R1266 INCORP STORAGE. (18D)

1268 REF 3 LAST 140 E5,1642 ZI EQUALS ENDW I(18)TMP

R1269 INCORP/L SR22.3 STORAGE. (21D)

1271 REF 1 E5,1664 DELTAX EQUALS ZI +18D I(18)

1272 REF 1 E5,1706 VARIANCE EQUALS DELTAX +18D I(3)

R1273 MEASUREMENT INCORPORATION -R22- STORAGE. (49D)

1275 REF 1 E5,1711 GRP2SVQ EQUALS VARIANCE +3 I(1)TMP QSAVE FOR RESTARTS

1276 REF 1 E5,1712 OMEGAM1 EQUALS GRP2SVQ +1 I(6)

1277 REF 1 E5,1720 OMEGAM2 EQUALS OMEGAM1 +6 I(6)

1278 REF 1 E5,1726 OMEGAM3 EQUALS OMEGAM2 +6 I(6)

1279 REF 1 E5,1734 HOLDW EQUALS OMEGAM3 +6 I(18)

1280 REF 1 E5,1756 TDPOS EQUALS HOLDW +18D I(6)

1281 REF 1 E5,1764 TDVEL EQUALS TDPOS +6 I(6)

A1282

1283 REF 2 LAST 141 E5,1664 TRIPA EQUALS DELTAX I(3)TMP

1284 REF 1 E5,1667 TEMPVAR EQUALS TRIPA +3 I(3)TMP

A1285

R1286 INCORPORATION/INTEGRATION Q STORAGE. (1D)

1288 REF 1 E5,1772 EGRESS EQUALS TDVEL +6 I(1)

A1289

R1290 P30/P31 STORAGE. (1D) AND ONE OVERLAY

1292 REF 1 E5,1773 P30EXIT EQUALS EGRESS +1 B(1)TMP

A1293

1294 REF 1 E5,1773 ORIGIN EQUALS P30EXIT I(1)TMP INDEX DURING INITVEL

A1295

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P1296 SYSTEM TFST ERASABLES. CAN OVERLAY W MATRIX.

(1270)

R1298 ***** OVERLAY NUMBER 0 IN EBANK 5 *****

1299	REF	3	LAST	137	E5,1400	AZIMUTH	EQUALS	W	2
1300	REF	1			E5,1402	LATITUDE	EQUALS	AZIMUTH +2	2
1301	REF	1			E5,1404	ERVECTOR	EQUALS	LATITUDE +2	6
1302	REF	1			E5,1412	LENGTHOT	EQUALS	ERVECTOR +6	1
1303	REF	1			E5,1413	LOSVEC	EQUALS	LENGTHOT +1	6
1304	REF	1			E5,1414	NDXCTR	EQUALS	LOSVEC +1	1
1305	REF	1			E5,1415	PIPINDEX	EQUALS	NDXCTR +1	1
1306	REF	1			E5,1416	POSITON	EQUALS	PIPINDEX +1	1
1307	REF	1			E5,1417	QPLACE	EQUALS	POSITON +1	1
1308	REF	1			E5,1420	QPLACES	EQUALS	QPLACE +1	1
1309	REF	1			E5,1421	SOUTHDR	EQUALS	QPLACES +1	7
1310	REF	1			F5,1430	TEMPTIME	EQUALS	SOUTHDR +7	2
1311	REF	1			F5,1432	TMARK	EQUALS	TEMPTIME +2	2
1312	REF	1			E5,1434	GENPL	EQUALS	TMARK +2	
1313	RFF	1			E5,1434	CDUTIMEI	=	GENPL	
1314	REF	2	LAST	142	E5,1436	CDUTIMEF	=	GENPL +2	
1315	REF	3	LAST	142	E5,1440	CDUDANG	=	GENPL +4	
1316	REF	4	LAST	142	E5,1441	CDUREADE	=	GENPL +5	
1317	REE	5	LAST	142	E5,1442	CDUREADI	=	GENPL +6	
1318	REF	6	LAST	142	E5,1443	CDULIMIT	=	GENPL +7	
1319	REF	7	LAST	142	E5,1440	TEMPADD	=	GENPL +4	
1320	REF	8	LAST	142	E5,1441	TEMP	=	GENPL +5	
1321	REF	9	LAST	142	E5,1442	NOBITS	=	GENPL +6	
1322	REF	10	LAST	142	E5,1443	CHAN	=	GENPL +7	
1323	REF	11	LAST	142	E5,1444	LOS1	=	GENPL +8D	
1324	REF	12	LAST	142	F5,1452	LOS2	=	GENPL +14D	
1325	REF	13	LAST	142	E5,1460	CALCDIR	EQUALS	GENPL +20D	
1326	REF	14	LAST	142	E5,1461	CDUFLAG	EQUALS	GENPL +21D	
1327	REF	15	LAST	142	E5,1462	GYTOBETQ	EQUALS	GENPL +22D	
1328	REF	16	LAST	142	E5,1463	OPTNREG	EQUALS	GFNPL +23D	
1329	REF	17	LAST	142	E5,1464	SAVE	EQUALS	GENPL +24D	THREE ONSEC LOC
1330	REF	18	LAST	142	E5,1467	SFCONST1	EQUALS	GENPL +27D	
1331	REF	19	LAST	142	E5,1470	TIMER	EQUALS	GENPL +28D	
1332	REF	20	LAST	142	E5,1472	DATAPL	EQUALS	GFNPL +30D	
1333	RFF	21	LAST	142	F5,1434	RDSP	EQUALS	GFNPL	FIX LA ER POSSIBLY KEEP1
1334	REE	22	LAST	142	E5,1534	MASKREG	EQUALS	GENPL +64D	
1335	REF	23	LAST	142	F5,1536	CDUNDX	EQUALS	GENPL +66D	
1336	RFF	24	LAST	142	F5,1537	RESULTCT	EQUALS	GENPL +67D	
1337	REF	25	LAST	142	E5,1542	COUNTPL	EQUALS	GENPL +70D	
1338	REF	26	LAST	142	F5,1543	CDUANG	EQUALS	GENPL +71D	

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1339	REF	27	LAST	142	E5,1434	AINLA	=	GENPL	110 DE OR 156 OCT LOCATIONS
1340	REF	1			E5,1434	WANGO	EQUALS	AINLA	VERT E ATE
1341	REF	2	LAST	143	E5,1436	WANGT	EQUALS	AINLA +2D	HORIZO TAL FRATE
1342	REF	3	LAST	143	E5,1440	WANGT	EQUALS	AINLA +4D	T
1343	REF	1			E5,1440	IORQNDX	=	WANGT	
1344	REF	4	LAST	143	E5,1442	DRIFTT	EQUALS	AINLA +6D	
1345	REF	5	LAST	143	E5,1444	ALXIS	EQUALS	AINLA +8D	
1346	REF	6	LAST	143	E5,1445	CMPX1	EQUALS	AINLA +9D	IND
1347	REF	7	LAST	143	F5,1446	ALK	EQUALS	AINLA +10D	GAINS
1348	REF	8	LAST	143	E5,1462	VLAUNS	EQUALS	AINLA +22D	
1349	REF	9	LAST	143	E5,1464	WPLATO	EQUALS	AINLA +24D	
1350	REF	10	LAST	143	E5,1470	INTY	EQUALS	AINLA +28D	SOUTH IP INTE
1351	REF	11	LAST	143	E5,1472	ANGZ	EQUALS	AINLA +30D	EAST A IS
1352	REF	12	LAST	143	F5,1474	INTZ	EQUALS	AINLA +32D	EAST P P I
1353	REF	13	LAST	143	E5,1476	ANGY	EQUALS	AINLA +34D	SOUTH
1354	REF	14	LAST	143	E5,1500	ANGX	EQUALS	AINLA +36D	VF
1355	REF	15	LAST	143	E5,1502	DRIFTO	EQUALS	AINLA +38D	VERT
1356	REF	16	LAST	143	E5,1504	DRIFTI	EQUALS	AINLA +40D	SOU
1357	REF	17	LAST	143	E5,1510	VLAUN	EQUALS	AINLA +44D	
1358	REF	18	LAST	143	E5,1512	ACCWD	EQUALS	AINLA +46D	
1359	REF	19	LAST	143	F5,1520	POSNV	EQUALS	AINLA +52D	
1360	REF	20	LAST	143	E5,1522	DPIPAY	EQUALS	AINLA +54D	SOUTH
1361	REF	21	LAST	143	E5,1526	DPIPAZ	EQUALS	AINLA +58D	NORTH IP INCREMENT
1362	REF	22	LAST	143	E5,1530	ALTIM	EQUALS	AINLA +60D	
1363	REF	23	LAST	143	E5,1531	ALTIMS	EQUALS	AINLA +61D	INDEX
1364	REF	24	LAST	143	F5,1532	ALDK	EQUALS	AINLA +62D	TIME ONSTAN
1365	REF	25	LAST	143	E5,1550	DELM	EQUALS	AINLA +76D	
1366	REF	26	LAST	143	E5,1560	WPLATI	EQUALS	AINLA +84D	
1367	REF	27	LAST	143	E5,1562	GEOCOMPS	EQUALS	AINLA +86D	
1368	REF	28	LAST	143	F5,1563	ERCOMP	EQUALS	AINLA +87D	
1369	REF	29	LAST	143	F5,1571	ZERONDX	EQUALS	AINLA +93D	
1370	REF	1			E5,1452	THETAN	=	ALK +4	
1371	REF	1			E5,1460	FILDELV	EQUALS	THEIAN +6	AGS ALIGNMENT STORAGE
1372	REF	1			F5,1462	INTVEC	EQUALS	FILDELV +2	
1373	REF	30	LAST	143	E5,1572	ISECXT	=	AINLA +94D	
1374	REF	31	LAST	143	E5,1573	ASECXT	=	AINLA +95D	
1375	REF	32	LAST	143	E5,1574	PERFDLAY	EQUALS	AINLA +96D	B(2) DELAY TIME BEF. START DRIFT MEASURE
1376	REF	33	LAST	143	E5,1576	OVFLOWCK	EQUALS	AINLA +98D	(1) SET MEANS OVERFLOW IN IMU PERF TEST
AND CAUSES TERMINATION									
1379	REF	2	LAST	139	F5,1774	END-E5	EQUALS	STARSAV2 +6	*** FIRST FREE LOCATION IN E5***

A1377
A1378

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P1380 EBANK-6 ASSIGNMENTS.

1381 E6,1400 SETLOC 3000

R1382 DAP PAD-LOADED DATA.

(100)

R1384 ALL OF THE FOLLOWING EXCEPT PITTIME AND ROLLTIME ARE INITIALIZED IN FRESH START TO PERMIT IMMEDIATE USE OF DAP

1386	E6,1400	E6,1400	HIASCENT	ERASE	(1) MASS AFTER STAGING, SCALE AT B16 KG.
1387	E6,1401	E6,1401	ROLLTIME	ERASE	(1) TIME TO TRIM Z GIMBAL IN R03, CSEC.
1388	E6,1402	E6,1402	PITTIME	ERASE	(1) TIME TO TRIM Y GIMBAL IN R03, CSEC.
1389	E6,1403	E6,1403	DKTRAP	ERASE	(1) DAP STATE (POSSIBLE 77001
1390	E6,1404	E6,1404	DKOMEGAN	ERASE	(1) ESTIMATOR PARA- (VALUES 00012
1391	E6,1405	E6,1405	DKKADSN	ERASE	(1) METERS FOR THE 00074
1392	E6,1406	E6,1406	LMTRAP	ERASE	(1) DOCKED AND 77001
1393	E6,1407	E6,1407	LMDMEGAN	ERASE	(1) LEM-ALDNE CASES 00000
1394	E6,1410	E6,1410	LMKAOSN	ERASE	(1) RESPECTIVELY 00074
1395	E6,1411	E6,1411	DKDB	ERASE	(1) WIDTH OF DEADBAND FOR DOCKED RCS
A1396					AUTOPILOT (DB=1.4DEG IN FRESH START)
A1397					DEADBAND = PI/DKDB RAD.

R1398 AXIS TRANSFORMATION MATRIX - GIMBAL TO PILDIT AXES:

(50)

1400	E6,1412	E6,1412	M11	ERASE	SCALED AT 1
1401	E6,1413	E6,1413	M21	ERASE	SCALED AT 1
1402	E6,1414	E6,1414	M31	ERASE	
1403	E6,1415	E6,1415	M22	ERASE	SCALED AT 1.
1404	E6,1416	E6,1416	M32	ERASE	SCALED AT 1.

R1405 ANGLE MEASUREMENTS.

(310)

1407		E6,1417	F6,1423	DMEGAP	ERASE +4	BODY-AXIS ROT. RATES SCALED AT PI/4 AND
1408	REF 1	E6,1420		DMEGAQ	EQUALS DMEGAP +1	BODY-AXIS ACCELERATIONS SCALED AT PI/8
1409	REF 2 LAST 144	F6,1421		DMEGAR	EQUALS DMEGAP +2	
R1410	RETAIN THE ORDER OF ALPHAQ AND ALPHAR FOR DOWNLINK PURPOSES.					
1411	REF 3 LAST 144	E6,1422		ALPHAQ	EQUALS DMEGAP +3	
1412	REF 4 LAST 144	E6,1423		ALPHAR	EQUALS DMEGAP +4	
1413		E6,1424	E6,1425	OMEGAU	ERASE +1	
1414	REF 1	F6,1425		OMEGAV	= OMEGAU +1	
1415		E6,1426	E6,1433	TRAPEDP	ERASE +5	
1416	REF 1	E6,1427		TRAPEDQ	= TRAPEDP +1	
1417	REF 2 LAST 144	E6,1430		TRAPEDR	= TRAPEDP +2	
1418	REF 3 LAST 144	F6,1431		NPTRAPS	= TRAPEDP +3	
1419	REF 4 LAST 144	E6,1432		NQTRAPS	= TRAPEDP +4	
1420	REF 5 LAST 144	E6,1433		NRTRAPS	= TRAPEDP +5	
1421	REF 1	E6,1425		EDDTP	= EDDT	
1422		E6,1434	E6,1435	EDDTQ	ERASE +1	
1423	REF 1	F6,1435		EDDTR	= EDDTQ +1	MANY SHARING NAMES
1424	REF 2 LAST 144	E6,1434		QRATEDIF	EQUALS EDDTQ	ALTERNATIVE NAMES:

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1425	REF	1		F6,1435	RRATEDIF	EQUALS	EDOTR	DELETE WHEN NO. OF REFERENCES = 0
1426	REF	2	LAST	144	E6,1424	URATEDIF	EQUALS	OMEGAU
1427	REF	1			F6,1425	VRATEDIF	EQUALS	OMEGAV
1428					F6,1436	OLDXFORP	ERASE	+2
1429	REF	1			E6,1437	OLDYFORP	EQUALS	OLDXFORP +1
1430	REF	2	LAST	145	E6,1440	OLDZFORQ	EQUALS	OLDXFORP +2
R1431	RATE-COMMAND AND MINIMUM IMPULSE MODES							
1432					E6,1441	E6,1441	CH31TEMP	ERASE
1433					E6,1442	E6,1442	STIKSENS	ERASE
1434					E6,1443	E6,1443	TCP	ERASE
1435					E6,1444	E6,1451	DXERROR	ERASE +5
1436	REF	1			F6,1446		DYERROR	EQUALS DXERROR +2
1437	REF	2	LAST	145	F6,1450		DZERROR	EQUALS DXERROR +4
1438					E6,1452	F6,1452	PLAST	ERASE
1439					E6,1453	E6,1453	QLAST	ERASE
1440					E6,1454	E6,1454	RLAST	ERASE
1441					F6,1455	F6,1455	TCQR	ERASE
R1442	OTHER VARIABLES.							
1444					E6,1456	E6,1456	OLDPMIN	ERASE
1445					E6,1457	E6,1457	OLDQRMIN	ERASE
1446	REF	1			E6,1735		TEMP31	EQUALS DAPTEMP1
1447					E6,1460	E6,1461	SAVEHAND	ERASE +1
1448					F6,1462	E6,1462	PERROR	ERASE
1449	REF	1			E6,1446		QERROR	EQUALS DYERROR
1450	REF	1			E6,1450		RERROR	EQUALS DZERROR
R1451	JET STATE CHANGE VARIABLES- TIME (TOFJTCHG), JET BITS WRITTEN NOW							
R1453	{JTSCNNOW}, AND JET BITS WRITTEN AT T6 RUPT {JTSATCHG}.							
1454					E6,1463	E6,1463	NXT6ADR	ERASE
1455					E6,1464	E6,1465	T6NEXT	ERASE +1
1456					E6,1466	E6,1467	T6FURTHA	ERASE +1
1457					E6,1470	E6,1472	NEXTP	ERASE +2
1458	REF	1			F6,1471		NEXTU	= NEXTP +1
1459	REF	2	LAST	145	E6,1472		NEXTV	= NEXTP +2
1460					E6,1473	E6,1474	-2JETLIM	ERASE +1
1461	REF	1			F6,1474		-RATEDB	EQUALS -2JETLIM +1
1462	REF	1			E6,1474		TARGETDB	EQUALS -RATEDB
R1463	*** Q,R AXIS ERASABLES ***							
1465	REF	13	LAST	103	4742		PBIT	EQUALS BIT10
1466	REF	13	LAST	103	4741		QRBIT	EQUALS BIT11
1467	REF	1			E6,1747		UERROR	EQUALS DAPTREG5
1468	REF	1			E6,1750		VERROR	= UERROR +1
1469					E6,1475	E6,1475	RFTJADR	ERASE

STORED CDU READINGS FOR STATE DERIVATIONS: SCALED AT PI RADIANS (2'S)

(5D)

THESE THREE USED IN MIN IMPULSE MODE.

(10D)

RATE COMMAND 4-JET RATE DIFFERENCE LIMIT AND RATE DEADBAND FOR ASCENT OR DESCENT

MAN. CONTROL TARGET DB COMPLEMENT.

(3)

U,V-AXES ATT ERROR FOR RCS CONTROL LAWS

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1470	REF	1		E6,1740	TEMPNUM	EQUALS	DAPTEMP4	
1471	REF	1		E6,1741	NUMBERT	EQUALS	DAPTEMP5	
1472	REF	1		E6,1742	ROTINDEX	EQUALS	DAPTEMP6	
1473	REF	2	LAST 145	E6,1735	ROTEMP1	EQUALS	DAPTEMP1	
1474	REF	1		E6,1736	ROTEMP2	EQUALS	DAPTEMP2	
1475				E6,1476	AXISCTR	ERASE		
1476	REF	1		E6,1737	POLYTEMP	EQUALS	DAPTEMP3	
1477				E6,1477	SENSETYP	ERASE		
1478	REF	3	LAST 146	E6,1735	ABSTJ	EQUALS	DAPTEMP1	ABS VALUE OF JET-FIRING TIME
1479	REF	4	LAST 146	E6,1735	ABSEDOTP	EQUALS	DAPTEMP1	
1480	REF	1		E6,1746	DPSBURN	EQUALS	DAPTEMP4	USED WITH SNUFFBIT. VERY TEMPORARY.

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P1481 TRIM GIMBAL CONTROL LAW ERASABLES:

(11D)

1483	REF	5	LAST	146	F6,1735		GTSTEMPS	EQUALS	DAPTFMP1	GTS IS PART OF THE JASK.
1484	RFF	1			E6,1737		SHFTFLAG	EQUALS	GTSTEMPS +2	COUNT HIGH ORDER ZERO BITS FOR SHIFTING.
1485	REF	2	LAST	147	E6,1740		ININDEX	EQUALS	GTSTEMPS +3	INDEX FOR SHIFT LOOP.
1486	REF	1			E6,1476		SAVESR	EQUALS	AXISCTR	CANNOT BE A DAPTFMP - GTS USES THEM ALL.
1487	REF	3	LAST	147	F6,1742		SCRATCH	EQUALS	GTSTEMPS +5	ERASABLE FOR ROOTCYCL
1488	REF	4	LAST	147	E6,1743		HALFARG	EQUALS	GTSTEMPS +6	
1489	RFF	5	LAST	147	F6,1735		K2THETA	EQUALS	GTSTEMPS	D.P. K(2)THETA AND NEGUSUM
1490	REF	6	LAST	147	E6,1737		A2CNTRAL	EQUALS	GTSTEMPS +2	D.P. ALPHA(2), AT PI(2)/164 RAD/SEC(2)
1491	RFF	7	LAST	147	E6,1741		KCENTRAL	EQUALS	GTSTEMPS +4	S.P. K FROM KQ OR KR, AT PI/2(18)
1492	REF	1			E6,1741		OMEGA.K	EQUALS	KCENTRAL	D.P. OMEGA*K OVERLAYS K AND K(2)
1493	REF	8	LAST	147	F6,1742		K2CNTRAL	EQUALS	GTSTEMPS +5	S.P. K(2) FROM Q OR R, AT PI(2)/2(16)
1494	REF	9	LAST	147	E6,1743		WCENTRAL	EQUALS	GTSTEMPS +6	S.P. OMEGA, AT PI/4 RAD/SEC
1495	REF	10	LAST	147	E6,1744		ACENTRAL	EQUALS	GTSTEMPS +7	S.P. ALPHA, AT PI/8 RAD/SEC(2)
1496	RFF	11	LAST	147	F6,1745		DEL	EQUALS	GTSTEMPS +8D	S.P. SGN FUNCTION VALUE
1497	RFF	12	LAST	147	E6,1746		QRCNTR	EQUALS	GTSTEMPS +9D	INDEX FOR GTS LOOP THROUGH Q,R AXES.
1498	REF	13	LAST	147	F6,1747		FUNCTION	EQUALS	GTSTEMPS +10D	D.P. WORD FOR DRIVE FUNCTION
1499					E6,1500	E6,1502	NEGUQ	ERASE	+2	NEGATIVE OF Q-AXIS GIMBAL DRIVE
A1500									NEGUQ +1	DEFINED AND USED ELSEWHERE
1501	REF	1			E6,1502		NEGUR	EQUALS	NEGUQ +2	NEGATIVE OF R-AXIS GIMBAL DRIVE
1502					E6,1503	E6,1506	KQ	ERASE	+3	.3ACCDOTQ SCALED AT PI/2(18)
1503	REF	1			F6,1504		KQ2	EQUALS	KQ +1	KQ2 = KQ*KQ
1504	RFF	2	LAST	147	E6,1505		KRDAP	EQUALS	KQ +2	.3 ACCDOTR SCALED AT PI/2(18)
1505	RFF	3	LAST	147	E6,1506		KR2	EQUALS	KQ +3	KR2 = KR*KR
1506					F6,1507	E6,1512	ACCDOTQ	ERASE	+3	Q-JERK SCALED AT PI/2(17) UNSIGNED
1507	REF	1			E6,1510		QACCDOT	EQUALS	ACCDOTQ +1	Q-JERK SCALED AT PI/2(17) SIGNED
1508	REF	2	LAST	147	F6,1511		ACCDOTR	EQUALS	ACCDOTQ +2	R-JERK SCALED AT PI/2(17) UNSIGNED
1509	REF	3	LAST	147	F6,1512		RACCDOT	EQUALS	ACCDOTQ +3	R-JERK SCALED AT PI/2(17) SIGNED
1510	RFF	1			E6,1446		QDIFE	EQUALS	QERROR	ATTITUDE ERRORS:
1511	REF	1			E6,1450		RDIFF	EQUALS	RERROR	SCALED AT PI RADIANS

A1512

R1513 TORQUE VECTOR RECONSTRUCTION VARIABLES:

(18D)

1515	REF	1			E6,1743		JETRATE	EQUALS	DAPTFMP1	
1516	RFF	1			E6,1744		JETRATEQ	EQUALS	JETRATE +1	THE LAST CONTROL SAMPLE PERIOD OF 100 MS
1517	REF	2	LAST	147	E6,1745		JETRATER	EQUALS	JETRATE +2	SCALED AT PI/4 RADIANS/SECOND

L ERASABLE ASSIGNMENTS

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1518				E6,1513	E6,1520	DOWNTORK	ERASE	+5	
1519	REF	1		E6,1513		POSTORKP	EQUALS	DOWNTORK	
1520	REF	2	LAST	148	E6,1514	NEGTOCKP	EQUALS	DOWNTORK	+1
1521	REF	3	LAST	148	E6,1515	POSTORKU	EQUALS	DOWNTORK	+2
1522	REF	4	LAST	148	E6,1516	NEGTOCKU	EQUALS	DOWNTORK	+3
1523	REF	5	LAST	148	E6,1517	POSTORKV	EQUALS	DOWNTORK	+4
1524	REF	6	LAST	148	E6,1520	NEGTOCKV	EQUALS	DOWNTORK	+5

ACCUMULATED JET TORQUE COMMANDED ABOUT
+,-P, +,-U, +,-V RESPECTIVELY.
EMPLOYED EXCLUSIVELY FOR DOWNLIST.
NOT INITIALIZED; PERMITTED TO OVERFLOW
SCALED AT 32 JET-SEC, OR ABOUT 2.0 JET-
MSEC PER BIT.

1525				F6,1521	E6,1523	NO.PJETS	ERASE	+2	
1526	REF	1		F6,1522		NO.UJETS	=	NO.PJETS	+1
1527	REF	1		E6,1523		NO.VJETS	=	NO.UJETS	+1
1528				E6,1524	E6,1526	TJP	ERASE	+2	
1529	REF	1		F6,1525		TJU	=	TJP	+1
1530	REF	2	LAST	148	E6,1526	TJV	=	TJP	+2

1531				E6,1527	E6,1527	L,PVT-CG	ERASE		
1532				E6,1530	E6,1534	1JACC	ERASE	+4	
1533	REF	1		E6,1531		1JACCQ	EQUALS	1JACC	+1
1534	REF	2	LAST	148	E6,1532	1JACCR	EQUALS	1JACC	+2
1535	REF	3	LAST	148	E6,1533	1JACCU	EQUALS	1JACC	+3
1536	REF	4	LAST	148	E6,1534	1JACCV	EQUALS	1JACC	+4

ACCELERATIONS DUE TO 1 JET TORQUING
SCALED AT $\pi/4$ RADIANS/SECOND

FOR U,V-AXES THE SCALE FACTOR IS DIFF:
SCALED AT $\pi/2$ RADIANS/SECOND (FOR ASC)

R1537 ASCENT VARIABLES:

(10D)

A1539				E6,1535	E6,1536	SKIPU	ERASE	+1	
1540				E6,1536		SKIPV	=	SKIPU	+1
1541	REF	1		E6,1536		SKIPV	=	SKIPU	+1

R1542 THE FOLLOWING LM CAP ERASABLES ARE ZEROED IN THE STARTDAP SECTION OF THE DAPIDLER PROGRAM AND THE COASTASC
R1544 SECTION OF THE AOSTASK. THE ORDER MUST BE PRESERVED FOR THE INDEXING METHODS WHICH ARE EMPLOYED IN THOSE
R1546 SECTIONS AND ELSEWHERE.

1547				F6,1537	E6,1544	AOSQ	ERASE	+5	
1548	REF	1		E6,1541		AOSR	EQUALS	AOSQ	+2
1549	REF	2	LAST	148	E6,1543	AOSU	EQUALS	AOSQ	+4
1550	REF	3	LAST	148	E6,1544	AOSV	EQUALS	AOSQ	+5

OFFSET ACC. ESTIMATES, UPDATED IN D.P.,
AND SCALED AT $\pi/2$.
UV-AXES OFFSET ACC. FROMED BY VECTOR
ADDITION OF Q,R. AT $\pi/2$ RAD/SEC(2).

1551				E6,1545	E6,1546	AOSQTERM	ERASE	+1	
1552	REF	1		E6,1546		AOSRTERM	EQUALS	AOSQTERM	+1

(.1-.05K)AOS
SCALED AT $\pi/4$ RADIANS/SECOND.

R1553 FOR TJET LAW SUBROUTINE:

(TEMPS ONLY)

A1555						NUMBERT	EQUALS	DAPTEMP5	
1556	REF	6	LAST	147	E6,1735	EDOTSQ	EQUALS	DAPTEMP1	
1557	REF	2	LAST	146	E6,1736	ROTSENSE	EQUALS	DAPTEMP2	
1558	REF	2	LAST	146	F6,1737	F1REFCT	EQUALS	DAPTEMP3	
1559	REF	2	LAST	146	F6,1740	TTOAXIS	EQUALS	DAPTEMP4	
1560	REF	2	LAST	146	E6,1742	ADRSDF2	EQUALS	DAPTEMP6	
1561	REF	2	LAST	147	E6,1743	HOLDQ	EQUALS	DAPTEMP1	
1562	REF	1		F6,1744		ADRSDF1	EQUALS	DAPTEMP2	
1563	REF	1		F6,1745		HH	EQUALS	DAPTEMP3	

DEFINED IN QPAXIS.

LOOKED AT BY PAXIS.

DOUBLE PRECISION

L ERASABLE ASSIGNMENTS

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A1564
 1565 REF 1 E6,1750 HH +1 EQUALS DAPTRREG4
 1566 REF 2 LAST 145 E6,1425 E EQUALS DAPTRREG6
 EDOT EQUALS OMEGAV

TIME SHARE WITH VERROR

R1567 INPUT TO TJET LAW (PERMANENT ERASABLES).

(48D)

1569 REF 1 E6,1525 TJETU = TJU
 1570 E6,1547 E6,1626 BLOCKTOP ERASE +47D
 1571 REF 1 E6,1567 1/ANET1 = BLOCKTOP +16D
 1572 REE 1 E6,1570 1/ANET2 = 1/ANET1 +1
 1573 REE 2 LAST 149 E6,1573 1/ACOAST = 1/ANET1 +4
 1574 REF 3 LAST 149 E6,1575 ACCECTZ1 = 1/ANET1 +6
 1575 REE 4 LAST 149 E6,1576 ACCECTZ5 = 1/ANET1 +7
 1576 REE 5 LAST 149 F6,1601 FIRFDB = 1/ANET1 +10D
 1577 REE 6 LAST 149 E6,1603 COASTDB = 1/ANET1 +12D
 1578 REF 7 LAST 149 E6,1605 AXISDIST = 1/ANET1 +14D

EQUATE NAMES. INDEXED BY -1, 0, +1.

THESE 8 PARAMETERS ARE SET UP BY 1/ACCS
 FOR MINIMUM JETS ABOUT THE U-AXIS WHEN
 EDOT IS POSITIVE. TJETLAW INDEXES BY
 ADRSDIFF FROM THESE REGISTERS TO PICK UP
 PARAMETERS FOR THE PROPER AXIS, NUMBER
 OF JETS AND SIGN OF EDOT. THERE ARE 48
 REGISTERS IN ALL IN THIS BLOCK.

EOR NOT REFERENCED (P-AXIS) ARE FILLED

IN BY THE FOLLOWING:

SET BY 1/ACCS TO SHOW WHETHER MAXIMUM
 JETS ARE REQUIRED BECAUSE OF AOS.
 WIDTH OF MINIMUM IMPULSE ZONE.
 HEIGHT OF MINIMUM IMPULSE ZONE(AT 4 SEC)

A1579
 1580 REF 2 LAST 149 F6,1547 ACCSWU = BLOCKTOP
 1581 REF 1 E6,1550 ACCSWV = ACCSWU +1
 1582 REE 3 LAST 149 E6,1555 ELAT = BLOCKTOP +6
 1583 REF 4 LAST 149 E6,1556 ZONE3LIM = BLOCKTOP +7

A1584

R1585 VARIABLES FOR GTS-QRAXIS CONTROL EXCHANGE.

(4)

1587 REE 2 LAST 147 E6,1501 ALLOWGTS EQUALS NEGUQ +1
 1588 E6,1627 E6,1627 COTROLER ERASE
 1589 E6,1630 E6,1632 QGIMTIMR ERASE +2
 1590 REF 1 E6,1631 INGTS EQUALS QGIMTIMR +1
 1591 REE 2 LAST 149 E6,1632 RGIMTIMR EQUALS QGIMTIMP +2

INSERT INTO UNUSED LOCATION
 INDICATES WHICH CONTROL SYSTEM TO USE.
 Q-GIMBAL DRIVE TIMER, DECISECONDS.
 INDICATOR OF CURRENT GTS CONTROL.
 R-GIMBAL DRIVE TIMER, DECISECONDS.

R1592 PLEASE RETAIN THE ORDER OF CDUXD THRU CDUZD FOR DOWNLINK PURPOSES.

R1593 KALCMANU:DAP INTERFACE.

(9D)

1595 E6,1633 E6,1635 CDUXD ERASE +2
 1596 REF 1 F6,1634 CDUYD EQUALS CDUXD +1
 1597 REF 2 LAST 149 E6,1635 CDUZD EQUALS CDUXD +2

CDU DESIRED REGISTERS:
 SCALED AT PI RADIANS (180 DEGREES)
 (STORE IN 2S COMPLEMENT)

1598 E6,1636 E6,1640 DELCDUX ERASE +2
 1599 REF 1 F6,1637 DELCDUY EQUALS DELCDUX +1
 1600 REF 2 LAST 149 F6,1640 DELCDUZ EQUALS DELCDUX +2

NEGATIVE OF DESIRED 100MS CDU INCREMENT:
 SCALED AT PI RADIANS (180 DEGREES)
 (STORE IN 2S COMPLEMENT)

R1601 RETAIN THE ORDER OF OMEGAPD TO OMEGARD FOR DOWNLINK PURPOSES.

1602 E6,1641 E6,1643 OMEGAPD ERASE +2
 1603 REF 1 F6,1642 OMEGAQD EQUALS OMEGAPD +1
 1604 REF 2 LAST 149 E6,1643 OMEGARD EQUALS OMEGAPD +2

ATTITUDE MANEUVER DESIRED RATES:
 (NOT EXPLICITLY REFERENCED IN GTS CNTRL)
 SCALED AT PI/4 RADIANS/SECOND

R1605 KALCMANU STORAGE.

(24D)

L ERASABLE ASSIGNMENTS

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1607				E6,1644	E6,1673	MIS	ERASE	+23D	I(18D)
1608	REF	1		E6,1666		COF	EQUALS MIS	+18D	I(6)
R1609 KALCMANU STORAGE. (33D)									
1611				E6,1674	E6,1732	BCDU	ERASE	+30D	B(3)
1612	REF	1		E6,1677		KSPNDX	EQUALS BCDU	+3	B(1)
1613	REF	1		E6,1700		KDPNDX	EQUALS KSPNDX	+1	B(1)
1614	REF	1		E6,1701		TMIS	EQUALS KDPNDX	+1	I(18) MUST BE IN SAME BANK AS RCS DAP
1615	REF	1		E6,1723		COFSKEW	EQUALS TMIS	+18D	I(6) MUST BE IN SAME BANK AS RCS DAP
1616	REF	1		E6,1731		CAM	EQUALS COFSKEW	+6	I(2) MUST BE IN SAME BANK AS RCS DAP
1617				E6,1733	E6,1734	AM	ERASE	+1	I(2) THIS WAS ONCE IN E5 OVERLAYING DGC
A1618									
R1619 FIRST-ORDER OVERLAYS IN KALCMANU (25D)									
1621	REF	2	LAST	150	E6,1701	KV1	EQUALS TMIS		I(6)
1622	REF	3	LAST	150	E6,1701	MFISYM	EQUALS TMIS		I
1623	REF	4	LAST	150	E6,1701	TMFI	EQUALS TMIS		I
1624	REF	5	LAST	150	E6,1701	NCDU	EQUALS TMIS		B
1625	REF	6	LAST	150	E6,1704	NEXTIME	EQUALS TMIS	+3	B
1626	REF	7	LAST	150	E6,1705	TTEMP	EQUALS TMIS	+4	B
1627	REF	8	LAST	150	E6,1707	KV2	EQUALS TMIS	+6	I(6)
1628	REF	9	LAST	150	E6,1707	BIASTEMP	EQUALS TMIS	+6	B
1629	REF	10	LAST	150	E6,1715	KV3	EQUALS TMIS	+12D	I(6)
1630	REF	11	LAST	150	E6,1715	DGF	EQUALS TMIS	+12D	I
1631	REF	2	LAST	150	E6,1723	BRATE	EQUALS COFSKEW		B
1632	REF	3	LAST	150	E6,1723	IG	EQUALS COFSKEW		I
1633	REF	1			E6,1731	TM	EQUALS CAM		B
R1634 SECOND-ORDER OVERLAYS IN KALCMANU (24D)									
1636	REF	1			E6,1701	K1	=	KV1	
1637	REF	1			E6,1707	K2	=	KV2	
1638	REF	1			E6,1715	K3	=	KV3	
1639	REF	2	LAST	150	E6,1701	P21	EQUALS	KV1	I(2)
1640	REF	3	LAST	150	E6,1703	D21	EQUALS	KV1	+2 I(2)
1641	REF	4	LAST	150	E6,1705	G21	EQUALS	KV1	+4 I(2)
1642	REF	2	LAST	150	E6,1707	C2SQP	EQUALS	KV2	I(2)
1643	REF	3	LAST	150	E6,1711	C2SQM	EQUALS	KV2	+2 I(2)
1644	REF	4	LAST	150	E6,1713	C2PP	EQUALS	KV2	+4 I(2)
1645	REF	2	LAST	150	E6,1715	C2MP	EQUALS	KV3	I(2)
1646	REF	3	LAST	150	E6,1717	C1PP	EQUALS	KV3	+2 I(2)
1647	REF	4	LAST	150	E6,1721	C1MP	EQUALS	KV3	+4 I(2)

L ERASABLE ASSIGNMENTS

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1648	REE	4	LAST	150	E6,1723	VECQTEMP =	COFSKEW
1649	REE	3	LAST	149	E6,1633	DCDU =	CDUXD
1650	REF	3	LAST	149	E6,1636	DELDCDU =	DELCDUX
1651	REE	1			E6,1637	DELDCDU1 =	DELCDUY
1652	REF	1			E6,1640	DELDCDU2 =	DELCDUZ

R1653 * * * * *

R1654 STORAGE FOR EINDCDUW

R1655 OVERLAYING KALCMANU STORAGE: (26D)

1657	REF	2	LAST	150	E6,1644	ECDUW	EQUALS	MIS	
1658	REF	1			E6,1644	ECDUWUSR	EQUALS	ECDUW	B(1)TMP
1659	REE	1			E6,1645	QCDUWUSR	EQUALS	ECDUWUSR +1	I(1)TMP
1660	REF	1			E6,1646	NDXCDUW	EQUALS	QCDUWUSR +1	B(1)TMP
1661	REF	1			E6,1647	FLAGOODW	EQUALS	NDXCDUW +1	B(1)TMP
1662	REE	1			E6,1650	FLPAUTNO	EQUALS	FLAGOODW +1	B(1)TMP
1663	REE	1			E6,1651	UNFC/2	EQUALS	FLPAUTNO +1	I(6)IN
1664	REE	1			E6,1657	UNWC/2	EQUALS	UNFC/2 +6	I(6)IN
1665	REE	1			E6,1665	UNFV/2	EQUALS	UNWC/2 +6	I(6)S-S
1666	REE	1			E6,1665	UNEVX/2	=	UNFV/2	
1667	REF	2	LAST	151	E6,1667	UNEVY/2	=	UNFV/2 +2	
1668	REE	3	LAST	151	E6,1671	UNFVZ/2	=	UNEV/2 +4	
1669	REE	4	LAST	151	E6,1673	-DELGMB	EQUALS	UNFV/2 +6	B(3)TMP

R1670
R1671 DEFINED IN THE WORK AREA: (18D)

1673		0000	UNX/2	=	0
1674		0006	UNY/2	=	6
1675		0014	UNZ/2	=	14

R1676
R1677 END OF FINDCDUW ERASABLES

R1678 * * * * *

R1679 THE ECLLOWING ARE THE DAP REPLACEMENTS FOR THE ITEMS AND RUPTRGS, NEEDED BECAUSE DAP IS NOW A TOB, JASK, JAB, TOSK
R1681 ...ANYWAY, THE DAP CAN NOW BE INTERRUPTED. (18D)

1683				E6,1735	E6,1756	DAPTEMP1	ERASE	+17D
1684	REF	7	LAST	148	E6,1736	DAPTEMP2	EQUALS	DAPTEMP1 +1
1685	REE	8	LAST	151	F6,1737	DAPTEMP3	EQUALS	DAPTEMP1 +2
1686	REF	9	LAST	151	E6,1740	DAPTEMP4	EQUALS	DAPTEMP1 +3
1687	REE	10	LAST	151	E6,1741	DAPTEMP5	EQUALS	DAPTEMP1 +4
1688	REF	11	LAST	151	F6,1742	DAPTEMP6	EQUALS	DAPTEMP1 +5
1689	REE	12	LAST	151	E6,1743	DAPTREG1	EQUALS	DAPTEMP1 +6
1690	REF	13	LAST	151	F6,1744	DAPTRFG2	EQUALS	DAPTEMP1 +7
1691	REE	14	LAST	151	E6,1745	DAPTREG3	EQUALS	DAPTEMP1 +8D

L ERASABLE ASSIGNMENTS

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1692	REF	15	LAST	151	F6,1746	DAPTREG4	EQUALS	DAPTEMP1	+9D
1693	REF	16	LAST	152	E6,1747	DAPTREG5	EQUALS	DAPTEMP1	+10D
1694	REF	17	LAST	152	E6,1750	DAPTREG6	EQUALS	DAPTEMP1	+11D
1695	REF	18	LAST	152	E6,1751	DAPARUPT	EQUALS	DAPTEMP1	+12D
1696	REF	1			E6,1752	DAPLRUPT	EQUALS	DAPARUPT	+1
1697	REF	2	LAST	152	E6,1753	DAPBQRPT	EQUALS	DAPARUPT	+2
1698	REF	3	LAST	152	E6,1755	DAPZRUPT	EQUALS	DAPARUPT	+4

A1699 (DAPZRUPT IS ALSO JASK-IN-PROGRESS FLAG)
A1700

R1701 NEEDLER(ATTITUDE ERROR EIGHT BALL DISPLAY) STORAGE. (6D)

1703	REF	3	LAST	111	0061	T5TEMP	EQUALS	ITEMP1	
1704	REF	4	LAST	111	0063	DINDX	EQUALS	ITEMP3	
1705					E6,1757	E6,1761	AK	ERASE	+2
1706	REF	1			F6,1760		AK1	EQUALS	AK +1
1707	REF	2	LAST	152	E6,1761		AK2	EQUALS	AK +2
1708					E6,1762	E6,1764	EDRIVEX	ERASE	+2
1709	REF	1			E6,1763		EDRIVEY	EQUALS	EDRIVEX +1
1710	REF	2	LAST	152	E6,1764		EDRIVEZ	EQUALS	EDRIVEX +2

NEEDLER ATTITUDE INPUTS, SCALED AT 180 DEGREES. P,Q,R AXES IN AK,AK1,AK2.

NEEDLER DISPLAY REGS AT 1800 DEGREES. SO THAT 384 BITS REPRESENT 42 3/16 DEG.

R1711 INITVEL STORAGE. ALSO USED BY P31,P34,P35,P74,P75,S40.1 AND DOWNLINKED. (6D)

1713 E6,1765 E6,1772 DELVEET3 ERASE +5 I(6) DELTA V IN INERTIAL

R1714 P32-P33 STORAGE. (2)

1716 E6,1773 E6,1774 TCDH ERASE +1 I(2) T2 CDH TIME IN C.S. ALSO DOWNLINKED
A1717

R1718 P32 - 35 (2D)

1720 F6,1775 E6,1775 RTX1 ERASE I(1) X1 -2 FOR EARTH, -10 FOR MOON
1721 E6,1776 E6,1776 RTX2 ERASE I(1) X2 FOR SHIFT-EARTH 0, MOON 2
A1722

1723 REF 1 E6,1776 END-E6 EQUALS RTX2 LAST LOCATION USED IN E6.

L ERASABLE ASSIGNMENTS

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P1724 EBANK-7 ASSIGNMENTS

1725 E7,1400 SETLOC 3400

R1726 P35 CONSTANTS. -PAD LOADED- (4D)

1728	E7,1400	E7,1401	ATIGINC	ERASE	+1	B(2)PL	*MUST BE AT 1400 EOR SYSTEMSTEST
1729	E7,1402	E7,1403	PTIGINC	ERASE	+1	B(2)PL	

R1730 ACTMARK STORAGE. -PAD LOADED- (6D)

1732	E7,1404	E7,1406	AOTAZ	ERASE	+2	B(3)PL
1733	E7,1407	E7,1411	AOTEL	ERASE	+2	B(3)PL

R1734 LANDING RADAR. -PAD LOADED- (10D)

1736		E7,1412	E7,1415	LRALPHA	ERASE	+3	B(1)	POS1 X ROTATION	* MUST *	
1737	REE	1		LRBETA1	EQUALS	LRALPHA	+1	B(1)	POS1 Y ROTATION	* BE *
1738	REE	1		LRALPHA2	EQUALS	LRBETA1	+1	B(1)	POS2 X ROTATION	* IN *
1739	REF	1		LRBETA2	EQUALS	LRALPHA2	+1	B(1)	POS2 Y ROTATION	* ORDER *
1740		E7,1416	E7,1416	LRHMAX	ERASE			B(1)		
1741		E7,1417	E7,1417	LRVMAX	ERASE			B(1)		
1742		E7,1420	E7,1420	LRWH	ERASE			B(1)		
1743		E7,1421	E7,1421	LRWVZ	ERASE			B(1)	* MUST *	
1744		E7,1422	E7,1422	LRWVY	ERASE			B(1)	* BE IN *	
1745		E7,1423	E7,1423	LRWVX	ERASE			B(1)	* ORDER *	

R1747 THROTTLE STORAGE. -PAD LOADED- (1D)

1749	E7,1424	E7,1424	ZOOMTIME	ERASE		B(1)PL	TIME OF DPS THROTTLE-UP COMMAND
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R1750 P63 AND P64 CONSTANTS. -PAD LOADED- (2D)

1752	E7,1425	E7,1425	TENDBRAK	ERASE		B(1)	LANDING PHASE SWITCHING CRITERION
1753	E7,1426	E7,1426	TENDAPPR	ERASE		B(1)	LANDING PHASE SWITCHING CRITERION

R1755 LANDING RADAR -PAD LOADED- (2D)

1757	E7,1427	E7,1427	RPCRTIME	ERASE		B(1)	REPOSITIONING CRITERION (TIME)
1758	E7,1430	E7,1430	RPCRTQSW	ERASE		B(1)	REPOSITIONING CRITERION (ANGLE)

R1760 *** RETAIN THE ORDER OF DELVSLV, TIG, RTARG, DELLT4 EOR UPDATE. ***

L		ERASABLE ASSIGNMENTS				USER'S PAGE NO. 49		EO S4
R1761		P32-35 P72-75 STORAGE.				(6D)		
1763		E7,1431	E7,1436	DELVLVC	ERASE	+5	I(6) DELTA VELOCITY - LOCAL VERTICAL COO	
1764	REF 1	E7,1431		DELVSLV	=	DELVLVC	(TEMP STORAGE OF SAME VECTOR) -RDINATE	
A1765								
R1766		P30-P40 INTERFACE UNSHARED.				(2D)		
1768		E7,1437	E7,1440	TIG	ERASE	+1	B(2)	
A1769								
R1770		INITVEL STORAGE. ALSO USED BY P34,35,74,75,10,11 OTHERS				(8D)		
1772		E7,1441	E7,1446	RTARG	ERASE	+5	I(6) TARGET VECTOR	
1773		E7,1447	E7,1450	DELLT4	ERASE	+1	I(2) TIME DIEERENCE	
A1774								
R1775		P30-P40 INTERFACE UNSHARED.				(3D)		
1777		E7,1451	E7,1452	TTOGO	FRASE	+1	B(2)	
1778	REF 1	E7,1451		TFI	EQUALS	TTOGO		
1779		E7,1453	E7,1453	WHICH	ERASE		B(1)	
A1780								
R1781		*** R21 ***				(1D)		
1783		E7,1454	E7,1454	LOSCOUNT	ERASE		B(1)	
A1784								
P1785		LSR22.3 (RENDEZVCUS NAVIGATION) STORAGE.				(4D)		
R1787		RETAIN THE ORDER OF AIG TO TRKMKCNT FOR DOWNLINK PURPOSES.						
1788		E7,1455	E7,1455	AIG	ERASE		B(1)OUT GIMGAL ANGLES	
1789		E7,1456	E7,1456	AMG	ERASE		B(1)OUT (MUST BE	
1790		E7,1457	E7,1457	AOG	ERASE		B(1)OUT CONSECUTIVE)	
1791		E7,1460	E7,1460	TRKMKCNT	ERASE		B(1)TMP TEMPORARY MARK STORAGE.	
1792	REF 1	E7,1460		MARKCTR	=	TRKMKCNT		
R1793		P32-P35, P72-P75 STORAGE. -PERMANENT-				(6)		
1795		E7,1461	E7,1461	NORMEX	ERASE		B(1) PRM SAVE EOR Q	
1796		E7,1462	E7,1462	QSAVED	ERASE		B(1) PRM SAVE EOR Q	
1797		E7,1463	E7,1463	RTRN	ERASE		B(1) PRM SAVE EOR Q	
1798		E7,1464	E7,1465	NN	ERASE	+1	B(2)	
1799		E7,1466	E7,1466	SUBEXIT	ERASE		B(1) PRM SAVE Q	

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L ERASABLE ASSIGNMENTS

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1800

E7,1467

E7OVERLA EQUALS

START OF E7 OVERLAYS

1801 REF 1

E7,1467

WHOCARES EQUALS E7OVFRLA

A DUMMY FOR E-BANK INSENSITIVE 2CADRS.

L ERASABLE ASSIGNMENTS

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P1802 ***** OVERLAY NUMBER 0 IN EBANK 7 *****
A1803

R1804 RENDEZVOUS GUIDANCE STORAGE -P32....P35-

(39D)

1806	REF	1		E7,1607	TSTRT	EQUALS	DELDV	MIDCOURSE START TIME	
1807	RFF	1		E7,1571	TDEC2	EQUALS	DELVCSI	TEMP STORAGE FOR INTEGRATION TIME INPUT	
1808	REF	1		E7,1573	KT	EQUALS	DELVTPI	TEMP STORAGE FOR MIDCOURSE DELTA TIME	
1809				E7,1467	E7,1474	VACT1	ERASE	+5D	VELOCITY VECTOR OF ACTIVE AT CSI TIME
1810				E7,1475	E7,1502	RPASS1	ERASE	+5D	POSITION VECTOR OF PASSIVE AT CSI TIME
1811				E7,1503	E7,1510	VPASS1	ERASE	+5D	VELOCITY VECTOR OF PASSIVE AT CSI TIME
1812				E7,1511	E7,1516	VACT2	ERASE	+5D	VELOCITY VECTOR OF ACTIVE AT CDH TIME
1813				E7,1517	E7,1524	RPASS2	ERASE	+5D	POSITION VECTOR OF PASSIVE AT CDH TIME
1814				E7,1525	E7,1532	VPASS2	ERASE	+5D	VELOCITY VECTOR OF PASSIVE AT CDH TIME
1815				E7,1533	E7,1540	RACT3	ERASE	+5D	POSITION VECTOR OF ACTIVE AT TPI TIME
1816				E7,1541	E7,1546	VACT3	ERASE	+5D	VELOCITY VECTOR OF ACTIVE AT TPI TIME
1817				E7,1547	E7,1554	RPASS3	ERASE	+5D	POSITION VECTOR OF PASSIVE AT TPI TIME
1818				E7,1555	E7,1562	VPASS3	ERASE	+5D	VELOCITY VECTOR OF PASSIVE AT TPI TIME
1819				E7,1563	E7,1570	VACT4	ERASE	+5D	VELOCITY VECTOR OF ACTIVE AT INTERCEPT
1820	REF	1		E7,1541		UNVEC	EQUALS	VACT3	CDHMVR UNIT VECTOR TEMP STORAGE.
1821				E7,1571	E7,1572	DELVCSI	ERASE	+1D	THRUST VALUE AT CSI
1822				E7,1573	E7,1574	DELVTPI	ERASE	+1D	THRUST VALUE AT TPI OR MID
1823	REF	2	LAST 156	E7,1573		DELVMID	EQUALS	DELVTPI	
1824				E7,1575	E7,1576	DIFALT	ERASE	+1D	ALT DIFEERENCE AT CDH
1825				E7,1577	E7,1600	POSTCSI	ERASE	+1	PERIGEE ALTITUDE AFTER CSI MANEUVER
1826				E7,1601	E7,1602	POSTCDH	ERASE	+1	PERIGEE ALTITUDE AFTER CDH MANEUVER
1827				E7,1603	E7,1604	POSTTPI	ERASE	+1	PERIGEE ALTITUDE AFTER TPI MANEUVER
1828	REF	1		E7,1603		LOOPCT	EQUALS	POSTTPI	CSI NEWTON ITERATION COUNTER
1829	REF	1		E7,1601		HAFFA1	EQUALS	POSTCDH	HALE PERIOD
1830				E7,1605	E7,1606	GAMPREV	ERASE	+1	PREVIOUS GAMMA
1831	REF	3	LAST 156	E7,1573		DVPREV	EQUALS	DELVTPI	PREVIOUS DELVCSI
1832				E7,1607	E7,1610	DELDV	ERASE	+1D	
1833				E7,1611	E7,1612	CSIALRM	ERASE	+1	FIRST SOLUTION ALARM
1834				E7,1613	E7,1613	VERBNOUN	ERASE		
1835	REF	1		E7,1611		TITER	EQUALS	CSIALRM	ITERATION COUNTER
1836				E7,1614	E7,1615	RDDTV	ERASE	+1	
1837	REF	1		E7,1503		VAPREC	EQUALS	VPASS1	I(6) S-S PREC VEC FOR NOM TPI TIME(ACT V
1838	REF	1		E7,1475		RAPREC	EQUALS	RPASS1	I(6) S-S PREC VEC FOR NOM TPI TIME(ACT V
1839	REF	1		E7,1525		VPPREC	EQUALS	VPASS2	I(6) S-S PREC VEC FOR NOM TPI TIME(PASS
1840	RFF	1		E7,1517		RPPREC	EQUALS	RPASS2	I(6) S-S PREC VEC FOR NOM TPI TIME(PASS
1841	RFF	4	LAST 156	E7,1573		DELEL	EQUALS	DELVTPI	I(2) S-S
1842	REF	2	LAST 156	E7,1607		DELTEE	EQUALS	DELDV	I(2)S-S
1843	REF	2	LAST 156	E7,1571		SECMA	EQUALS	DELVCSI	I(2) S-S MAX STOP SIZE FOR ROUTINE
1844	RFF	2	LAST 156	E7,1603		DELTEEO	EQUALS	POSTTPI	I(2) S-S BACK VALUES OF DELTA TIME
1845				E7,1616	E7,1617	CENTANG	ERASE	+1	I(2) S-S CENTRAL ANGLE COVERED(TPI-TPF)

A1846

L ERASABLE ASSIGNMENTS

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R1847 SCME P47 STORAGE

(6D)

1849 E7,1620 E7,1625 DELVIMU ERASE +5
A1850

I(6)DSP NOUN 83 EOR P47 DELTA V (IMU)

R1851 P30-P40 COMMON STORAGE.

(3D)

1853 E7,1626 E7,1627 TPASS4 ERASE +1
1854 E7,1630 E7,1630 QTEMP ERASE

INTERCEPT TIME
I(1)TMP COMMON RETURN SAVE REGISTER.

A1855
R1856 P32,33,34 STORAGE.

(6D)

1858 E7,1631 E7,1632 TCSI ERASE +1
1859 E7,1633 E7,1634 TTPI ERASE +1
1860 E7,1635 E7,1636 TTPIO ERASE +1

B(2) TMP CSI TIME IN CENTISECONDS
B(2) TMP TPI TIME IN CENTISECONDS
B(2) TMP TTPI STORAGE EOR RECYCLE

R1861 P30,P40 INTEREACE.

(21D)

1863 E7,1637 E7,1662 RTIG ERASE +19D
1864 REE 1 E7,1645 VTIG EQUALS RTIG +6
1865 REF 1 E7,1653 DELVSIN EQUALS VTIG +6
1866 REE 1 E7,1661 DELVSAB EQUALS DELVSIN +6
1867 REF 1 E7,1661 VGOISP = DELVSAB

I(6)TMP
I(6)TMP
I(6)TMP
I(2)TMP

1868 E7,1663 E7,1663 QTEMP1 ERASE
1869 REF 1 E7,1663 RGEXIT EQUALS QTEMP1
1870 REF 2 LAST 157 E7,1663 SAVQR52 EQUALS QTEMP1

I(1)TMP HOLDS RETURN.
SAVE_Q

R1871 INITVEL STORAGE. (IN OVERLAY 0 AND OVERLAY 1.
R1873 (CALLS LAMBERT, CONIC SUBROUTINES)

(2D)

1874 REF 1 E7,1563 VTPRIME EQUALS VACT4
1875 REE 1 E7,1614 ITCTR EQUALS RDOTV
1876 E7,1664 E7,1665 COZY4 ERASE +1
1877 REF 3 LAST 156 E7,1607 XIINPUT EQUALS DFLOV
1878 REE 1 E7,1605 INTIME EQUALS GAMPREV
A1879

TOTAL VELOCITY AT DESIRED RADIUS
ITERATION COUNTER
COS DE ANGLE WHEN ROTATION STARTS
X1 TEMP STORAGE
TIME OF RINIT

R1880 PERIAPO STORAGE. (2D)

(2D)

1882 E7,1666 E7,1667 XXXALT ERASE +1
1883 REE 1 E7,1670 END-IN/M EQUALS XXXALT +2

RADIUS TO LAUNCH PAD OR LANDING SIGHT
NEXT AVAIL ERASABLE AFTER INITVEL/MIDGIM

L ERASABLE ASSIGNMENTS

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R1884	S40.1 STORAGE.					(19D)		
1886			E7,1670	E7,1712	BDT	ERASE	+18D	I(6) IN
1887	REF	1	E7,1676		UT	EQUALS BDT	+6	I(6)OUT THRUST DIRECTION
1888	REF	1	E7,1704		VGTIG	EQUALS UT	+6	I(6)OUT
1889	REF	1	E7,1704		VGPREV	= VGTIG		
R1890	S40.9 STORAGE.					(16D)		
1892			E7,1713	E7,1732	VG	ERASE	+15D	I(6)TMP
1893	REF	1	E7,1721		VRPREV	EQUALS VG	+6	I(6)TMP
1894	REF	1	E7,1727		TNIT	EQUALS VRPREV	+6	I(2)TMP TIME SINCE LAST CALL TO S40.9
1895	REF	1	E7,1731		TNITPREV	EQUALS TNIT	+2	I(2)TMP PREVIOUS TNIT.
R1896	P40 STORAGE.					(6D)		
R1898	F,MDOT,AND TDECAY MUST BE CONTIGUOUS FOR VLOAD.							
1899			E7,1733	E7,1740	F	ERASE	+5	I(2)TMP S40.1 GENERATES THIS FOR S40.3
1900	REF	1	E7,1735		MDOT	EQUALS F	+2	I(2)TMP MASS CHNG RATE, KG/CS AT 2**3.
1901	REF	1	E7,1737		TDECAY	EQUALS MDOT	+2	I(2)IN DELTA-T TAILOFF, (2**28)CS.
1902			E7,1741	E7,1742	VEX	ERASE	+1	I(2) EXHAUST VELOCITY FOR TGO COMPUTAT'N
A1903								
R1904	MIDTOAV1(2) STORAGE. (CALLED BY P40,P41,P42)					(1D)		
1906			E7,1743	E7,1743	IRETURN1	ERASE		B(1) RETURN FROM MIDTOAV1 AND 2
A1907								

L ERASABLE ASSIGNMENTS

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P1908 ***** OVERLAY NUMBER 1 IN EBANK 7 *****
 A1909

R1910				INITVEL (CALLED BY P34,35,38,39,10,11,S40.9,S40.1)	(6D)
1912 A1913	REF	1		E7,1467 RTARG1 EQUALS VACT1	I(6)S TEMP STORAGE OF RTARG
R1914				P35-P40 INTERFACE.	(6D)
1916	REF	2	LAST 156	E7,1503 VPASS4 EQUALS VPASS1	I(6)TMP VELOCITY OF PASSIVE AT INTERCEPT
R1917				INITVEL OVERLAYS RENDESVOUS GUIDANCE (LISTED IN OVERLAY 0)	
R1918				SCME P38-39,P78-79 STORAGE.	(2D)
1920 A1921	REF	1		E7,1626 TINT EQUALS TPASS4	I(2) TIME OF INTERCEPT
R1922				LAT - LONG TEMPORARIES. CAN OVERLAY WITH S40.1	(3D)
1924	REF	2	LAST 158	E7,1670 ERADM EQUALS BDT	I(2)
1925	REF	1		E7,1672 INCORPEX EQUALS ERADM +2	I(1)
R1926				LRS24.1 STORAGE. (CAN SHARE WITH P30'S)	(40D)
1928	REF	1		E7,1673 RLMSRCH EQUALS INCORPEX +1	I(6) TMP LM POSITION VECTOR
1929	REF	1		F7,1701 VXRCM EQUALS RLMSRCH +6	I(6) CM V X R VECTOR
1930	REF	1		E7,1707 LOSDESRO EQUALS VXRCM +6	I(6) DESIRED LOS VECTOR
1931	REF	1		E7,1715 UXVECT EQUALS LOSDESRO +6	I(6) X-AXIS SRCH PATTERN COORDS
1932	REF	1		F7,1723 UYVECT EQUALS UXVECT +6	I(6) Y-AXIS SRCH PATTERN COORDS
1933	REF	1		E7,1731 DATAGOOD EQUALS UYVECT +6	B(1)DSP FOR R1 - ALL 1-S WHEN LOCKON
1934	REF	1		E7,1732 OMEGDISP EQUALS DATAGOOD +1	B(2) ANGLE OMEGA DISPLAYED IN R2
1935	REF	1		E7,1732 OMEGAD = OMEGDISP	PINBALL DEFINITION.
1936	REF	2	LAST 159	E7,1734 NSRCHPNT EQUALS OMEGDISP +2	B(1)TMP SEARCH PATTERN POINT COUNTER.
1937	REF	1		E7,1735 SAVLEMV EQUALS NSRCHPNT +1	I(6) S-S SAVES LOSVEL

A1938

L ERASABLE ASSIGNMENTS

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P1939 ***** OVERLAY NUMBER 2 IN EBANK 7 *****
 A1940

R1941 INCORP STORAGE IN E7. (47D)

1943	REF	2	LAST 155	E7,1467	TX789	EQUALS E7OVERLA	I(6)
1944	REF	1		E7,1475	GAMMA	EQUALS TX789 +6	I(3)
1945	REF	1		E7,1500	OMEGA	EQUALS GAMMA +3	I(18)
1946	REF	1		E7,1522	BVECTOR	EQUALS OMEGA +18D	I(18)
1947	REF	1		E7,1544	DELTAQ	EQUALS BVECTOR +18D	I(2)
R1948			ACTMARK STORAGE				(3D)

1950	REF	1		E7,1546	MARKCNTR	EQUALS DELTAQ +2	I(1)
1951	REF	1		E7,1547	XYMARK	EQUALS MARKCNTR +1	B(1)
1952	REF	1		E7,1550	MKDEX	EQUALS XYMARK +1	B(1)TMP INDEX FOR ACTMARK
A1953							

R1954 PLANET STORAGE. (8D)

1956	REF	1		E7,1551	PLANVEC	EQUALS MKDEX +1	(6) REFER VECTOR OF PLANET
1957	REF	1		E7,1557	TSIGHT	EQUALS PLANVEC +6	(2) TIME OF MARK OR EST TIME OF MARK
A1958							

R1959 LRS22.3 STORAGE. (CAN SHARE WITH P30'S AND OVERLAY LRS24.1 (30D).

1961	REF	2	LAST 159	E7,1673	LGRET	EQUALS RLMSRCH	I(1) TMP
1962	REF	1		E7,1673	RDRET	EQUALS LGRET	B(1) TEMP RETURN.
1963	REF	2	LAST 160	E7,1673	IGRET	EQUALS LGRET	B(1) TEMP RETURN.
1964	REF	1		E7,1674	MX	EQUALS RDRET +1	I(6)
1965	REF	1		E7,1702	MY	EQUALS MX +6	I(6)
1966	REF	1		E7,1710	MZ	EQUALS MY +6	I(6)
1967	REF	2	LAST 160	E7,1674	E0	EQUALS MX	I(2)
1968	REF	3	LAST 160	E7,1676	E1	EQUALS MX +2	I(2)
1969	REF	4	LAST 160	E7,1700	E2	EQUALS MX +4	I(2)
1970	REF	1		E7,1702	E3	EQUALS E2 +2	I(2)
1971	REF	1		E7,1716	SCALSHFT	EQUALS MZ +6	B(1) SCALE SHIFT FOR EARTH/MOON
1972	REF	1		E7,1717	RXZ	EQUALS SCALSHFT +1	I(2)
1973	REF	1		E7,1721	ULC	EQUALS RXZ +2	I(6)
1974	REF	1		E7,1727	SINTheta	EQUALS ULC +6	I(2)

R1975 ***** IN OVERLAY ONE *****

1976	REF	1		E7,1744	N49FLAG	EQUALS RDOTMSAV	B(1)S FLAG INDICATING V0649 RESPONSE
A1977							

R1978 LRS22.1 STORAGE. (MUST NOT SHARE WITH P30'S) (13D)

R1980 (OUTPUTS ARE TO LRS22.3)

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A1986

A 1994

A2000

A2001

2004	REF	1	E7,1756	P21TIME	EQUALS	RM	+2	I(2)TMP
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A2005

2008	REF	1	—	E7,1760	SCAXIS	EQUALS	P21TIME	+2	I(6)
2009	REF	1		E7,1766	POINTVSM	EQUALS	SCAXIS	+6	I(6)

A2010

L ERASABLE ASSIGNMENTS

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P2011 ***** OVERLAY NUMBER 3 IN EBANK 7 *****
A2012

R2013 SERVICER STORAGE (6D)

2015	REF	3	LAST 160	E7,1467	ABVEL	EQUALS	E7OVERLA	B(2)	DISPLAY
2016	REF	1		E7,1471	HDDTDISP	EQUALS	ARVEI +2	B(2)	DISPLAY
2017	REF	1		E7,1473	TTFDISP	EQUALS	HDDTDISP +2	B(2)	DISPLAY

A2018

R2019 BURN-PROG STORAGE. (2D)

2021	REF	1		E7,1475	SAVET-30	EQUALS	TTFDISP +2	B(2)	TMP TIG-30 RESTART
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A2022

R2023 SERVICER STORAGE. (69D)

2025	REF	1		E7,1477	VGBODY	EQUALS	SAVET-30 +2	B(6)	OUT SET.BY S41.1 VG LEM, SC.COORDS
2026	REF	1		E7,1477	DELVCTL	=	VGBODY		
2027	REF	2	LAST 162	E7,1505	DVTOTAL	EQUALS	VGBODY +6	B(2)	DISPLAY NOUN
2028	REF	1		E7,1507	GOBLTIME	EQUALS	DVTOTAL +2	B(2)	NOMINAL TIG FOR CALC. OF GOBLATE.
2029	REF	1		E7,1511	ABDVCONV	EQUALS	GOBLTIME +2	I(2)	
2030	REF	1		E7,1513	DVCNTR	EQUALS	ABDVCONV +2	B(1)	
2031	REF	1		E7,1514	TGO	EQUALS	DVCNTR +1	B(2)	
2032	REF	1		E7,1516	R	EQUALS	TGO +2	I(6)	
2033	REF	1		E7,1516	UNITGOBL	EQUALS	R	I(6)	
2034	REF	2	LAST 162	E7,1524	V	EQUALS	R +6		
2035	REF	1		E7,1524	DELVREF	EQUALS	V	I(6)	
2036	REF	1		E7,1532	HCALC	EQUALS	DELVREF +6	B(2)	LR
2037	REF	1		E7,1534	UNIT/R/	EQUALS	HCALC +2	I(6)	

R2038 (THE FOLLOWING SERVICER ERASABLES CAN BE SHARED WITH SECOND DPS GUIDANCE STORAGE)

2040	REF	1		E7,1542	RN1	EQUALS	UNIT/R/ +6	B(6)	
2041	REF	1		E7,1550	VN1	EQUALS	RN1 +6	I(6)	(IN ORDER)
2042	REF	1		E7,1556	PIPTIME1	EQUALS	VN1 +6	B(2)	(FOR)
2043	REF	1		E7,1560	GDT1/2	EQUALS	PIPTIME1 +2	I(6)	(COPY)
2044	REF	1		E7,1566	MASS1	EQUALS	GDT1/2 +6	I(2)	(CYCLE)
2045	REF	1		E7,1570	R1S	EQUALS	MASS1 +2	I(6)	
2046	REF	1		E7,1576	V1S	EQUALS	R1S +6	I(6)	

P2047 ALIGNMENT/S40.2.3 COMMON STORAGE. (18D)

2049	REF	1		E7,1604	XSMD	EQUALS	V1S +6	I(6)	
2050	REF	1		E7,1612	YSMD	EQUALS	XSMD +6	I(6)	
2051	REF	1		E7,1620	ZSMD	EQUALS	YSMD +6	I(6)	

2052	REF	2	LAST 162	E7,1604	XSCREF	=	XSMD		
2053	REF	2	LAST 162	E7,1612	YSCREF	=	YSMD		

L ERASABLE ASSIGNMENTS

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2054 REF 1 E7,1620 ZSCREF = ZSMD
 2055 REF 2 LAST 163 E7,1626 END-ALIG EQUALS ZSMD +6 NEXT AVAIL ERASABLE AFTER ALIGN/S40.2,3

R2056 ***** p22 *****

(24D)

2058	REF	1	E7,1626	RSUBL	EQUALS	END-ALIG	I(6)S-S	LM POSITION VECTOR
2059	REF	1	F7,1634	UCSM	EQUALS	RSUBL +6	I(6)S-S	VECTOR U
2060	REF	1	E7,1642	NEWVEL	EQUALS	UCSM +6	I(6)S-S	TERMINAL VELOCITY VECTOR
2061	REF	1	E7,1650	NEWPOS	EQUALS	NEWVEL +6	I(6)S-S	TERMINAL POSITION VECTOR
2062	REF	1	E7,1656	LNCHTM	EQUALS	NEWPOS +6	I(2)S-S	EST. LAUNCH TIME FOR LEM
2063	REF	1	E7,1660	TRANSTM	EQUALS	LNCHTM +2	I(2)S-S	TRANSFER TIME
2064	REF	1	E7,1662	NCSMVEL	EQUALS	TRANSTM +2	I(6)S-S	NEW CSM VELOCITY

A2065

L ERASABLE ASSIGNMENTS

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P2066 ***** OVERLAY NUMBER 4 IN EBANK 7 *****
A2067

R2068 AUTO-OPTICS STORAGE. -R52-

(1)

2070	REF	1		E7,1467	XN81	=	WHOCARES	THESE WHOCARES THINGS ARE REFERENCED, BUT NOT USED IN SUNOANCE
2071	REF	2	LAST 164	E7,1467	YN81	=	WHOCARES	
2072	RFF	3	LAST 164	E7,1467	ZN81	=	WHOCARES	
A2073								

R2074 VARIABLES FOR SECOND OPS GUIDANCE (THE LUNAR LANDING)

(840)

R2076 THESE ERASABLES MAY BE SHARED WITH CARE

2077	REF	2	LAST 162	E7,1542	OURTEMPS	=	RN1	OVERLAY LAST PART OF SERVICER
2078	REF	1		E7,1542	LANDTEMP	=	OURTEMPS	B(6) GUIDANCE
2079	REF	1		E7,1550	TTF/8TMP	=	LANDTEMP +6	B(2) GUIDANCE
2080	REF	1		E7,1552	ELINCR	=	TTF/8TMP +2	B(2) GUIDANCE
2081	REF	1		E7,1554	AZINCR	=	ELINCR +2	B(2) GUIDANCE
2082	REF	1		E7,1556	KFEP-2	=	AZINCR +2	B(2) TO PREVENT PIPTIME1 OVERLAY
2083	REF	1		E7,1560	TABLTF	=	KEEP-2 +2	B(2) GUIDANCE
2084	REF	1		E7,1571	TPIPOLO	=	TABLTF +9D	B(2) GUIDANCE
2085	REF	1		E7,1573	/AFC/	=	TPIPOLO +2	B(2) GUIDANCE AND THROTTLE
R2086								

R2087 (ERASABLES WHICH OVERLAP WITH THE ABOVE BLOCK)

2088	REF	2	LAST 164	E7,1560	FCOOD	=	TABLTF	B(2) THROTTLE
2089	RFF	1		E7,1562	FP	=	FCOOD +2	B(2) THROTTLE
2090	REF	1		E7,1617	E2OPS	=	EQUALS OURPERMS	
R2091								

R2092 THESE ERASABLES MUST NOT OVERLAY GOBLTIME OR SERVICER

2093	REF	3	LAST 162	E7,1604	PIFSET	=	XSMO	B(1) THROTTLE
2094	REF	1		F7,1605	RTNHOLD	=	PIFSET +1	B(1) THROTTLE
2095	REF	1		E7,1606	FWEIGHT	=	RTNHOLD +1	B(2) THROTTLE
2096	RFF	1		F7,1610	PIF	=	FWEIGHT +2	B(2) THROTTLE
2097	REF	1		F7,1612	PSEU0055	=	PIF +2	B(1) THROTTLE DOWNLINK
2098	REF	1		E7,1613	FC	=	PSEU0055 +1	B(2) THROTTLE
2099	REF	1		E7,1615	TTHROT	=	FC +2	B(1) THROTTLE
2100	REF	1		E7,1616	FCOLD	=	TTHROT +1	B(1) THROTTLE
A2101								

R2102 THESE ERASABLES SHOULD NOT BE SHARED DURING P63, P64, P65, P66, P67

2103	RFF	1		E7,1617	OURPERMS	=	FCOLD +1	MUSTN'T OVERLAY OURTEMPS OR SERVICER
2104	REF	2	LAST 164	E7,1617	WCHPHOLD	=	OURPERMS	B(1) GUIDANCE

L ERASABLE ASSIGNMENTS

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2105	REF	1		F7,1620	WCHPHASE =	WCHPHOLD +1	B(1)	GUIDANCE	
2106	REF	1		E7,1621	FLPASSO =	WCHPHASE +1	B(1)	GUIDANCE	
2107	REF	1		E7,1622	TPIP =	FLPASSO +1	B(2)		
2108	RFE	1		E7,1624	VGU =	TPIP +2	B(6)	GUIDANCE	
2109	RFF	1		E7,1632	LAND =	VGU +6	B(6)	GUIDANCE	CONTIGUOUS
2110	RFF	1		F7,1640	TTF/8 =	LAND +6	B(2)	GUIDANCE	CONTIGUOUS
2111	RFF	1		F7,1642	ELINCR1 =	TTF/8 +2	B(1)	GUIDANCE	
2112	REF	1		E7,1643	AZINCR1 =	ELINCR1 +1	B(1)	GUIDANCE	
2113	REF	1		F7,1644	ZERLINA =	AZINCR1 +1	B(1)	GUIDANCE	
2114	RFF	1		E7,1645	FLVIRA =	ZERLINA +1	B(1)	GUIDANCE	
2115	REF	1		F7,1646	LRADRF =	FLVIRA +1	B(1)	LR	
2116	RFF	1		F7,1647	VSELECT =	LRADRET +1	B(1)	LR	
2117	RFF	1		E7,1650	VMFAS =	VSELECT +1	B(2)	LR	
2118	REF	1		F7,1652	HMEAS =	VMEAS +2	B(2)	LR	
2119	REF	1		F7,1654	VN2 =	HMEAS +2	B(6)	LR	
2120	RFF	1		F7,1654	GNUR =	VN2	B(6)	LR	
2121	RFF	2	LAST 165	F7,1654	GNUV =	VN2	B(6)	LR	
2122	REF	3	LAST 165	E7,1654	LRADRET1 =	VN2	B(1)	LR	
2123	RFF	4	LAST 165	F7,1662	DELTAH =	VN2 +6	B(2)	DISPLAY	
2124	REF	1		F7,1664	FUNNYDSP =	DELTAH +2	B(2)	DISPLAY	
2125	RFF	1		E7,1666	EQUUPERM EQUALS	FUNNYDSP +2		NEXT AVAILABLE ERASABLE AFTER EQUUPERMS	

R2126

R2127 (ERASABLES WHICH OVERLAY THE ABOVE BLOCK)

2128	REF	2	LAST 165	E7,1642	VDGVERT =	ELINCR1	B(2)	P65,66	
2129	REF	2	LAST 165	F7,1644	NIGNLOOP =	ZERLINA	B(1)	IGNALG	
2130	REF	2	LAST 165	F7,1645	NGUIDSUB =	ELVIRA	B(1)	IGNALG	
2131	REF	3	LAST 165	F7,1644	RODCOUNT =	ZERLINA	B(1)	P66	
2132	REF	3	LAST 165	E7,1645	WCHVERT =	ELVIRA	B(1)	P65,66,67	
2133	REF	2	LAST 165	F7,1664	FUELNEED =	FUNNYDSP	B(1)	DISPLAY	
2134	RFF	3	LAST 165	F7,1664	TREDES =	FUNNYDSP	B(1)	DISPLAY	
2135	REF	4	LAST 165	E7,1665	LOOKANGL =	FUNNYDSP +1	B(1)	DISPLAY	

A2136

R2137 ERASABLES CONVENIENTLY DEFINABLE IN THE WORK AREA

2138				0022	PROJ =	18D	I(2)	GUIDANCE	
2139				0024	UNLRB/2 =	20D	I(6)	GUIDANCE (DURING P64 ONLY)	
2140				0024	UNLR/2 =	20D	I(6)	GUIDANCE	

R2141

R2142 THE END OF THE LUNAR LANDING ERASABLES

A2143

R2144 R12 (FOR LUNAR LANDING)

(6D)

2146	REF	1		E7,1666	LRLCTR EQUALS	EQUUPERM	B(1)	LR DATA TEST	
2147	REF	1		E7,1667	LRRCTR EQUALS	LRLCTR +1	B(1)		

L ERASABLE ASSIGNMENTS

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2148	REF	1	E7,1670	LRMCTR	EQUALS	LRRCTR	+1	B(1)
2149	REF	1	E7,1671	LRSCTR	EQUALS	LPMCTR	+1	B(1)
2150	REF	1	E7,1672	STILBADH	EQUALS	LRSCTR	+1	B(1)
2151	REF	1	E7,1673	STILBADV	EQUALS	STILBADH	+1	B(1)

A2152

R2153 LANDING ANALOGS DISPLAY STORAGE.

(40D)

2155	REF	1	E7,1674	LATVMETR	EQUALS	STILBADV	+1	B(1)PRM LATVEL MONITOR METER (AN ORDER)
2156	REF	1	E7,1675	FORVMETR	EQUALS	LATVMETR	+1	B(1)PRM FORVEL MONITOR METER (-ED PAIR)
2157	REF	1	E7,1676	LATVEL	EQUALS	FORVMETR	+1	B(1)PRM LATERAL VELOCITY (AN ORDER)
2158	REF	1	E7,1677	FORVEL	EQUALS	LATVEL	+1	B(1)PRM FORWARD VELOCITY (-ED PAIR)
2159	REF	1	E7,1700	TRAKLATV	EQUALS	FORVEL	+1	B(1)PRM MONITOR FLG 4 LATVEL (AN ORDER)
2160	REF	1	E7,1701	TRAKFWDV	EQUALS	TRAKLATV	+1	B(1)PRM MONIT. FLAG FOR FORVEL (ED PAIR)
2161	REF	1	E7,1702	VHY	EQUALS	TRAKFWDV	+1	B(1)PRM VHY=VMP.UHYP (AN ORDER)
2162	REF	1	E7,1703	VHZ	EQUALS	VHY	+1	B(1)PRM VHZ=VMP.UHYP (-ED PAIR)
2163	REF	1	E7,1704	VVECT	EQUALS	VHZ	+1	B(3)PRM UPDATED S.P. VELOCITY VECTOR
2164	REF	1	E7,1707	ALTRATE	EQUALS	VVECT	+3	B(1)PRM ALTITUDE RATE IN BIT UNITS
2165	REF	1	E7,1710	ALTSAVE	EQUALS	ALTRATE	+1	B(2)PRM ALTITUDE IN BIT UNITS
2166	REF	1	E7,1712	LADQSAVE	EQUALS	ALTSAVE	+2	B(1)PRM SAVE Q IN LANDISP
2167	REF	1	E7,1713	DT	EQUALS	LADQSAVE	+1	B(1)PRM TIME 1 MINUS (PIPTIME +1)
2168	REF	1	E7,1714	DALTRATE	EQUALS	DT	+1	B(1)PRM ALTITUDE RATE ERROR CORRECTION
2169	REF	1	E7,1715	UHYP	EQUALS	DALTRATE	+1	B(5)PRM SM UNIT VECTOR
2170	REF	1	E7,1715	QAXIS	=	UHYP		
2171	REF	2	E7,1723	UHYP	EQUALS	UHYP	+6	B(6)PRM SM UNIT VECTOR
2172	REF	1	E7,1731	DELVS	EQUALS	UHYP	+6	B(6)PRM DELVS = WMXR
2173	REF	1	E7,1737	ALTBITS	EQUALS	DELVS	+6	B(2)PRM ALTITUDE IN BIT UNITS, 2.34FT/BT
2174	REF	1	E7,1741	RUNIT	EQUALS	ALTPITS	+2	B(3)PRM SM HALF-UNIT R VECTOR
2175	REF	1	E7,1743	LASTLADW	EQUALS	RUNIT	+2	ONLY A TAG TO SIGNIFY LAST L.A.D. WORD

A2176

L ERASABLE ASSIGNMENTS

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P2177 ***** OVERLAY NUMBER 5 IN EBANK 7 *****
 A2178

R2179 ASCENT GUIDANCE ERASABLES.

(230)

2181	REF	2	LAST 163	E7,1626	RCO	EQUALS	END-ALIG		I(2)TMP	TARGET RADIUS AND OUT-OF-PLANE
2182	REF	1		E7,1630	YCO	EQUALS	RCO	+2	I(2)TMP	DISTANCE, SCALED AT 2(24).
2183	REF	1		E7,1632	1/DV1	EQUALS	YCO	+2	B(2)TMP	ATMAG
2184	REF	1		E7,1634	1/DV2	EQUALS	1/DV1	+2	B(2)TMP	ATMAG
2185	REF	1		E7,1636	1/DV3	EQUALS	1/DV2	+2	B(2)TMP	ATMAG
2186	REF	1		F7,1640	XRANGE	EQUALS	1/DV3	+2	B(2)TMP	
2187	REF	1		E7,1642	APD	EQUALS	XRANGE	+2	B(2)TMP	APOLUNE ALTITUDE DESIRED - M.
A2188										SCALED AT 2(29).

2189	REF	1		E7,1644	ENG OFFDT	EQUALS	APD	+2	B(1)TMP	PROTECTION OF ENG OFF1 CALL
2190	REF	1		F7,1645	VGVECT	EQUALS	ENG OFFDT	+1	I(6)OUT	VELOCITY-TO-BE-GAINED
2191	REF	1		E7,1653	TXD	EQUALS	VGVECT	+6	I(2)TMP	TIME AT WHICH X-AXIS OVERRIDE
A2192										IS ALLOWED.

R2193 END OF THE ASCENT GUIDANCE ERASABLES.

R2194 THE FOLLOWING CARDS KEEP THE ASSEMBLER HAPPY UNTIL THE SYMBOLS ARE DELETED FROM THE PINBALL NOUN TABLES.

2196	REF	1		E7,1744	END-E7.0	EQUALS	IRETURN1	+1		FIRST UNUSED LOCATION IN E7 OVERLAY 0
2197	REF	1		E7,1745	END-E7.1	EQUALS	N49FLAG	+1		FIRST UNUSED LOCATION IN E7 OVERLAY 1
2198	REF	1		E7,1774	END-E7.2	EQUALS	POINTVSM	+6		FIRST UNUSED LOCATION IN E7 OVERLAY 2
2199	REF	3	LAST 167	E7,1626	END-E7.3	EQUALS	END-ALIG			FIRST UNUSED LOCATION IN E7 OVERLAY 3
2200	REF	1		E7,1744	END-E7.4	EQUALS	LASTLADW	+1		FIRST UNUSED LOCATION IN E7 OVERLAY 4
2201	REF	1		E7,1655	END-E7.5	EQUALS	TXD	+2		FIRST UNUSED LOCATION IN E7 OVERLAY 5
2202				E7,1777	END-E7	EQUALS	3777			**LAST LOCATION USED IN E7 **
A2203										

*** END OF LUMERASE.102 ***

L INTERRUPT LEAD INS

USER'S PAGE NO. 1 E0 S4

0001				4000	SETLOC 4000	
00015	REF	1			COUNT* \$\$/RUPTS	FIX-FIX LEAD INS
0002				4000 0 0004 0	INHINT	GO
0003	REF	1		4001 3 4054 1	CAF GOBB	
0004	REF	1		4002 56 006 1	XCH BBANK	
0005	REF	1		4003 1 2667 0	TCF GOPROG	
0006	REF	1		4004 52 011 0	DXCH ARUPT	T6RUPT
0007				4005 0 0006 1	EXTEND	
0008	REF	1		4006 3 4056 0	DCA T6ADR	
0009				4007 52 006 0	DTCB	
0010	REF	2	LAST 168	4010 52 011 0	DXCH ARUPT	T5RUPT - AUTOPILOT
0011				4011 0 0006 1	EXTEND	
0012	REF	1		4012 3 1275 0	DCA T5ADR	
0013				4013 52 006 0	DTCB	
0014	REF	3	LAST 168	4014 52 011 0	DXCH ARUPT	T3RUPT
0015	REF	1		4015 3 4057 1	CAF T3RPTBB	
0016	REF	2	LAST 168	4016 56 006 1	XCH BBANK	
0017	REF	1		4017 1 3404 0	TCF T3RUPT	
0018	REF	4	LAST 168	4020 52 011 0	DXCH ARUPT	T4RUPT
0019	REF	1		4021 3 4064 1	CAF T4RPTBB	
00195	REF	3	LAST 168	4022 56 006 1	XCH BBANK	
0020	REF	1		4023 1 2000 1	TCF T4RUPT	
0023	REF	5	LAST 168	4024 52 011 0	DXCH ARUPT	KEYRUPT1
0024	REF	1		4025 3 4060 0	CAF KEYRPTBB	
0025	REF	4	LAST 168	4026 56 006 1	XCH BBANK	
0026	REF	1		4027 1 3215 0	TCF KEYRUPT1	
0027	REF	6	LAST 168	4030 52 011 0	DXCH ARUPT	KEYRUPT2
0028	REF	1		4031 3 4061 1	CAF MKRUPTBB	
0029	REF	5	LAST 168	4032 56 006 1	XCH BBANK	
0030	REF	1		4033 1 2332 0	TCF MARKRUPT	
0031	REF	7	LAST 168	4034 52 011 0	DXCH ARUPT	UPRUPT
0032	REF	1		4035 3 4060 0	CAF UPRPTBB	
0033	REF	6	LAST 168	4036 56 006 1	XCH BBANK	
0034	REF	1		4037 1 3240 0	TCF UPRUPT	
0035	REF	8	LAST 168	4040 52 011 0	DXCH ARUPT	DOWNRUPT
0036	REF	1		4041 3 4062 1	CAF DWNRPBB	
0037	REF	7	LAST 168	4042 56 006 1	XCH BBANK	
0038	REF	1		4043 1 3430 1	TCF DODOWNTM	
0039	REF	9	LAST 168	4044 52 011 0	DXCH ARUPT	RADAR RUPT
0040	REF	1		4045 3 4063 0	CAF RDRPTBB	

L INTERRUPT LEAD INS

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0041	REF	8	LAST	168	4046	56 006 1	XCH	BBANK
0042	REF	1			4047	1 3150 1	TCF	RADAREAD
0043	REF	10	LAST	168	4050	52 011 0	DXCH	ARUPT
0044	REF	1			4051	3 4065 0	CA	RUPT10BB
0045	REF	9	LAST	169	4052	56 006 1	XCH	BBANK
0046	REF	1			4053	1 2006 1	TCF	PITFALL

RUPT10 IS USED ONLY BY LANDING GUIDANCE

0047	REF	1			F3,1400		EBANK=	LST1
0048	REF	2	LAST	168	4054	12103 0 GOBB	BBCON	GOPROC
0049	REF	1			E6,1462		EBANK=	PERROR
0050	REF	1			4055	02036 0 T6ADP	2CADP	DOT6RUPT
0050	REF	1			4056	36106 0		

RESTART USES E0, E3

0051	REF	2	LAST	169	E3,1400		EBANK=	LST1
0052	REF	2	LAST	168	4057	02103 1 T3RPTBB	BBCON	T3RUPT

0053	REF	1			0073		EBANK=	KEYTEMP1
0054	REF	2	LAST	168	4060	10100 1 KEYRPTBB	BBCON	KEYRUPT1

0055	REF	1			E7,1404		EBANK=	ADTAZ
0056	REF	2	LAST	168	4061	16107 0 MKRUPTBB	BBCON	MARKRUPT

0057	REF	2	LAST	168	4060		UPRPTBB	= KEYRPTBB
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0058	REF	1			0340		EBANK=	DNTMBUFF
0059	REF	2	LAST	168	4062	12100 0 DWNRPPTBB	BBCON	DODOWNTM

0060	REF	1			0110		EBANK=	RADMODES
0061	REF	2	LAST	169	4063	52100 1 RDRPTBB	BBCON	RADAREAD

0062	REF	1			E6,1412		EBANK=	M11
0063	REF	2	LAST	168	4064	14106 0 T4RPTBB	BBCON	T4RUPT

00631	REF	4	LAST	165	E7,1645		EBANK=	ELVIRA
00632	REF	2	LAST	169	4065	42107 1 RUPT10BB	BBCON	PITFALL

L T4RUPT PROGRAM

USER'S PAGE NO. 1 EO S4

0001				12,2000		BANK 12	
000101	REF	1		06,2000		SETLOC T4RUP	
000102				06,2000		BANK	
0002	REF	2	LAST 169	E6,1412		EBANK= M11	
00025	REF	1				COUNT* \$\$/T4RPT	
0003	REF	1		06,2000	54 016 1	T4RUPT TS BANK RUPT	
0004				06,2001	0 0006 1	EXTEND	
0005	REF	1		06,2002	22 012 1	QXCH QRUPT	
0007	REF	1		06,2003	11'313 0	CCS DSRUPTSW	GOES 7(-1)0 AROUND AND AROUND
0008	REF	1		06,2004	1 2010 0	TCF NORMT4 +1	
0009	REF	2	LAST 170	06,2005	1 2007 0	TCF NORMT4	
0010	REF	1		06,2006	1 2134 1	TCF QUIKDSP	
0015	REF	1		06,2007	3 4757 0	NORMT4 CAF SEVEN	
0016	REF	1		06,2010	54 070 1	TS RUPTREG1	
0017	REF	2	LAST 170	06,2011	55'313 0	TS DSRUPTSW	
0019				4066		BLOCK 02	
001901	REF	1		4000		SETLOC FFTAG10	
001902				4066		BANK	
001904	REF	1				COUNT* \$\$/T4RPT	
0020	REF	1		7726		100MRUPT = OCT37766	(DEC 16374)
R0023	RELTAB IS A PACKED TABLE. RELAYWORD CODE IN UPPER 4 BITS, RELAY CODE						
R0024	IN LOWER 5 BITS.						

0025	4066	04025 1	RELTAB	OCT	04025
0026	4067	10003 0		OCT	10003
0027	4070	14031 0		OCT	14031
0028	4071	20033 0		OCT	20033
0029	4072	24017 1		OCT	24017
0030	4073	30036 1		OCT	30036
0031	4074	34034 1		OCT	34034
0032	4075	40023 1		OCT	40023
0033	4076	44035 1		OCT	44035
0034	4077	50037 0		OCT	50037
0035	4100	54000 0		OCT	54000
0036	4101	60000 1	RELTAB11	OCT	60000

L T4RUPT PROGRAM

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P0037 SWITCHED-BANK PORTION.

0038					12,2000			BANK	12
003801	REF	2	LAST	170	06,2000			SETLOC	T4RUP
003802					06,2012			BANK	
0039	REF	2	LAST	170 TO	170:	10	10*	COUNT*	\$/T4RPT
0042	REF	1			06,2012	11'036	1	CCS	DSPTAB +11D
0043	REF	1			06,2013	0 2063	0	TC	DSPOUT
0044	REF	2	LAST	171	06,2014	0 2063	0	TC	DSPOUT
0045	REF	2	LAST	171	06,2015	57'036	0	XCH	DSPTAB +11D
0046	REF	1			06,2016	7 4356	1	MASK	LOW11
0047	REF	3	LAST	171	06,2017	55'036	1	TS	DSPTAB +11D
0048	REF	1			06,2020	6 4101	0	AD	RELTAB11
0049					06,2021	0 0006	1	EXTEND	
00491	REF	1			06,2022	01 010	1	WRITE	OUT0
00492	REF	1			06,2023	0 2071	0	TC	HANG20

L T4RUPT PROGRAM

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P0050 DSPCUT PROGRAM. PUTS OUT DISPLAYS.

0055	REF	1		06,2024	55'016 0	DSPGUTSB	TS	NCUT	
0056	REF	1		06,2025	4 4755 0		CS	ZERO	
0057	REF	1		06,2026	54 073 1		TS	DSRUPTM	SET TO -0 FOR 1ST PASS THRU DSPTAB
0058	REF	1		06,2027	56 776 1		XCH	DSPCNT	
0059	REF	1		06,2030	6 4754 0		AD	NEGO	TO PREVENT +0
0060	REF	2	LAST 172	06,2031	54 776 0		TS	DSPCNT	
0061	REF	3	LAST 172	06,2032	50 776 1	DSPSCAN	INDEX	DSPCNT	
0062	REF	4	LAST 171	06,2033	11'023 0		CCS	DSPTAB	
0063	REF	4	LAST 172	06,2034	10 776 0		CCS	DSPCNT	IF DSPTAB ENTRY +, SKIP
0064	REF	1		06,2035	1 2030 1		TCF	DSPSCAN -2	IF DSPCNT +, TRY AGAIN
0065	REF	1		06,2036	1 2047 1		TCF	DISPLAY	IF DSPTAB ENTRY -, DISPLAY
0066				06,2037	00012 1	TABLNTN	OCT	12	DEC 10 LENGTH OF DSPTAB
0067	REF	2	LAST 172	06,2040	10 073 1		CCS	DSRUPTM	IF DSRUPTM=+0,2ND PASS THRU DSPTAB
0068				06,2041	37764 0	120MRUPT	DEC	16372	(DSPCNT = 0). +0 INTO NOUT.
0069	REF	2	LAST 172	06,2042	55'016 0		TS	NOUT	
0070	REF	2	LAST 109	06,2043	0 0002 0		TC	Q	
0071	REF	3	LAST 172	06,2044	54 073 1		TS	DSRUPTM	IF DSRUPTM=-0,1ST PASS THRU DSPTAB
0072	RFF	1		06,2045	3 2037 1		CAF	TABLNTN	(DSPCNT=0). +0 INTO DSRUPTM. PASS AGAIN
0073	REF	2	LAST 172	06,2046	1 2031 0		TCF	DSPSCAN -1	
0074	REF	1		06,2047	6 4753 1	DISPLAY	AD	ONE	
0075	REF	5	LAST 172	06,2050	50 776 1		INDEX	DSPCNT	
0076	REF	5	LAST 172	06,2051	55'023 0		TS	DSPTAB	REPLACE POSITIVELY
0077	REF	2	LAST 171	06,2052	7 4356 1		MASK	LOW11	REMOVE BITS 12 TO 15
0078	REF	4	LAST 172	06,2053	54 073 1		TS	DSRUPTM	
0079	RFF	1		06,2054	3 4350 0		CAF	H15	
0080	REF	6	LAST 172	06,2055	50 776 1		INDEX	DSPCNT	
0081	REF	1		06,2056	7 4066 1		MASK	RELTAB	PICK UP BITS 12 TO 15 OF RELTAB ENTRY
0082	REF	5	LAST 172	06,2057	6 0073 0		AD	DSRUPTM	
0083				06,2060	0 0006 1		EXTEND		
0084	REF	2	LAST 171	06,2061	01 010 1		WRITE	CUTO	
00841	RFF	1		06,2062	1 6736 1		TCF	Q+1	
00842	REF	1		06,2063	10 101 0	DSPOUT	CCS	FLAGWRD5	IS DSKY FLAG ON
00843	RFF	2	LAST 172	06,2064	3 4755 1		CAF	ZERO	NO
00844	REF	1		06,2065	1 2130 0		TCF	NODSPOUT	NO
00845	REF	3	LAST 172	06,2066	11'016 0		CCS	NOUT	YES
00846	REF	1		06,2067	0 2024 0		TC	DSPGUTSB	
00847	REF	2	LAST 172	06,2070	1 2130 0		TCF	NODSPOUT	NO DISPLAY REQUESTS
0085	REF	1		06,2071	4 2171 0	HANG20	CS	14,11,9	
0086	RFF	3	LAST 170	06,2072	27'313 0		ADS	DSRUPTSW	
0087	REF	1		06,2073	3 7730 1		CAF	20MRUPT	
0088	REF	1		06,2074	54 027 0	SETTIME4	TS	TIME4	

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P00881 THE STATUS OF THE PROCEED PUSHBUTTON IS MONITORED EVERY 120 MILLISECONDS VIA THE CHANNEL 32 BIT 14 INBIT.
 R008812 THE STATE OF THIS INBIT IS COMPARED WITH ITS STATE DURING THE PREVIOUS T4RUPT AND IS PROCESSED AS FOLLOWS.

R008814 IF PREV ON AND NOW ON - BYPASS
 R008815 IF PREV ON AND NOW OFF - UPDATE IMODES33
 R008816 IF PREV OFF AND NOW ON - UPDATE IMODES33 AND PROCESS VIA PINBALL
 R008817 IF PREV OFF AND NOW OFF - BYPASS

R008818 THE LCGIC EMPLOYED REQUIRES ONLY 9 MCT (APPROX. 108 MICROSECONDS) OF COMPUTER TIME WHEN NO CHANGES OCCUR.

00882 REF 1	06,2075	3 1303 0	PROCEEDE CA	IMODES33	MONITOR FOR PROCEED BUTTON
008821	06,2076	0 0006 1	EXTEND		
008822 REF 1	06,2077	06 032 0	RXOR	CHAN32	
008823 REF 12 LAST 103	06,2100	7 4736 0	MASK	BIT14	
008824	06,2101	0 0006 1	EXTEND		
008825 REF 1	06,2102	1 2116 1	BZF	T4JUMP	NO CHANGE
008826 REF 2 LAST 173	06,2103	23 1303 0	LXCH	IMODES33	
008827	06,2104	0 0006 1	EXTEND		
008828 REF 1	06,2105	06 001 0	RXOR	LCHAN	
008829 REF 3 LAST 173	06,2106	55 1303 1	TS	IMODES33	UPDATE IMODES33
00883 REF 13 LAST 173	06,2107	7 4736 0	MASK	BIT14	
008831 REF 1	06,2110	10 000 0	CCS	A	
008832 REF 2 LAST 173	06,2111	1 2116 1	TCF	T4JUMP	WAS ON - NOW OFF
008833 REF 1	06,2112	3 4355 0	CAF	CHRPRIO	WAS OFF - NOW ON
008834 REF 1	06,2113	0 5072 1	TC	NOVAC	
008835 REF 1	0777		EBANK=	DSPCOUNT	
008836 REF 1	06,2114	03450 0	ZCADR	PROCKEY	
008836 REF 1	06,2115	60101 1			

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P0089 JUMP TO APPROPRIATE ONCE-PER SECOND (.96 SEC ACTUALLY) ACTIVITY

0090	REF	2	LAST	170	06,2116	50 070 0	T4JUMP	INDEX	RUPTREG1
0091					06,2117	1 2120 1		TCF	+1

0092	REF	1			06,2120	0 3156 0		TC	RCSMONIT
0093	REF	1			06,2121	1 3006 0		TCF	RPAUTCHK
0094	REF	1			06,2122	1 2172 0		TCF	IMUMCN
0095	REF	1			06,2123	1 3132 0		TCF	DAPT4S
0096	REF	2	LAST	174	06,2124	0 3156 0		TC	RCSMONIT
0097	REF	2	LAST	174	06,2125	1 3006 0		TCF	RPAUTCHK
0098	REF	2	LAST	174	06,2126	1 2172 0		TCF	IMUMON
0099	REF	2	LAST	174	06,2127	1 3132 0		TCF	DAPT4S

0102	REF	1			7730		20MRUPT =	OCT37776	(DEC 16382)
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PO150 ADDITIONAL ROUTINES FOR 20MS. KEYBOARD ACTIVITY

0151					06,2130	0 0006 1	NODSPOUT	EXTEND		
0152	REF	3	LAST	172	06,2131	01 010 1		WRITE	OUTO	
0153	REF	1			06,2132	3 2041 0		CAF	120MRUPT	SET FOR NEXT CDRIVE
0154	REF	1			06,2133	1 2074 1		TCF	SETTIME4	
0155	REF	14	LAST	173	06,2134	3 4736 1	QUIKDSP	CAF	BIT14	
01551	REF	4	LAST	172	06,2135	7 1313 0		MASK	DSRUPTSW	
01552					06,2136	0 0006 1		EXTEND		
01553	REF	1			06,2137	1 2165 0		BZF	QUIKOFF	WROTE LAST TIME, NOW TURN OFF RELAYS.
01555	REF	4	LAST	172	06,2140	11'016 0		CCS	NOUT	
0156	REF	2	LAST	172	06,2141	0 2024 0		TC	DSPCUTSB	
0157	REF	1			06,2142	1 2152 1		TCF	NODSPY	NOUT=0 OR BAD RETURN FROM DSPOUTSB
01575	REF	15	LAST	175	06,2143	4 4736 0		CS	BIT14	GOOD RETURN (WE DISPLAYED SOMETHING)
01577	REF	5	LAST	175	06,2144	27'313 0	QUIKRUP	ADS	DSRUPTSW	
0158	REF	2	LAST	172	06,2145	3 7730 1		CAF	20MRUPT	
0159	REF	2	LAST	172	06,2146	54 027 0		TS	TIME4	
0160	REF	14	LAST	103	06,2147	3 4743 0		CAF	BIT9	
0161	REF	6	LAST	175	06,2150	27'313 0		ADS	DSRUPTSW	
0162	REF	1			06,2151	0 5270 1		TC	RESUME	
0163					06,2152	0 0006 1	NODSPY	EXTEND		
0164	REF	4	LAST	175	06,2153	01 010 1		WRITE	OUTO	
0165	REF	3	LAST	175	06,2154	3 7730 1	SYNCT4	CAF	20MPUPT	
0166	REF	3	LAST	175	06,2155	26 027 0		ADS	TIME4	
0167	REF	15	LAST	175	06,2156	3 4743 0		CAF	BIT9	
0168	REF	7	LAST	175	06,2157	27'313 0		ADS	DSRUPTSW	
0169	REF	8	LAST	175	06,2160	11'313 0		CCS	DSRUPTSW	
0170	REF	2	LAST	175	06,2161	0 5270 1		TC	RESUME	
0171					06,2162	37737 0	OCT37737	OCT	37737	
0172	REF	1			06,2163	0 2154 0		TC	SYNCT4	
0173	REF	3	LAST	175	06,2164	0 5270 1		TC	RESUME	
0174					06,2165	0 0006 1	QUIKOFF	EXTEND		
0175	REF	5	LAST	175	06,2166	01 010 1		WRITE	OUTO	
0176	REF	16	LAST	175	06,2167	3 4736 1		CAF	BIT14	RESET DSRUPTSW TO SEND DISPLAY NEXT PASS
0177	REF	1			06,2170	1 2144 0		TCF	QUIKRUP	
0179					06,2171	22400 0	14,11,9	OCT	22400	

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P0300 PROGRAM NAME: IMUMON

R0301 FUNCTIONAL DESCRIPTION: THIS PROGRAM IS ENTERED EVERY 480 MS. IT DETECTS CHANGES OF THE IMU STATUS BITS IN
 R0303 CHANNEL 30 AND CALLS THE APPROPRIATE SUBROUTINES. THE BITS PROCESSED AND THEIR RELEVANT SUBROUTINES ARE:

R0305	FUNCTION	BIT	SUBROUTINE CALLED
R0306	-----	---	-----
R0307	TEMP IN LIMITS	15	TLIM
R0308	ISS TURN-ON REQUEST	14	ITURNON
R0309	IMU FAIL	13	IMUFAIL (SETISSW)
R0310	IMU CDU FAIL	12	ICDUFAIL (SETISSW)
R0311	IMU CAGE	11	IMUCAGE
R0312	IMU OPERATE	9	IMUOP

R0313 THE LAST SAMPLED STATE OF THESE BITS IS LEFT IN IMODES30. ALSO, EACH SUBROUTINE CALLED FINDS THE NEW
 R0315 VALUE OF THE BIT IN A, WITH Q SET TO THE PROPER RETURN LOCATION, NXTIFAIL.

R0317 CALLING SEQUENCE: T4RUPT EVERY 480 MILLISECONDS.

R0318 JCBS CR TASKS INITIATED: NONE.

R0319 SUBROUTINES CALLED: TLIM, ITURNON, SETISSW, IMUCAGE, IMUOP.

R0320 ERASABLE INITIALIZATION:

R0321 FRESH START OR RESTART WITH NO GROUPS ACTIVE: C(IMODES30) = OCT 37411.

R0323 RESTART WITH ACTIVE GROUPS: C(IMODES30) = (B(IMODES30)AND(OCT 00035)) PLUS OCT 37400.

R0325 THIS LEAVES IMU FAIL BITS INTACT.

R0326 ALARMS: NCNE.

R0327 EXIT: TNONTEST.

R0328 OUTPUT: UPDATED IMODES30 WITH CHANGES PROCESSED BY APPROPRIATE SUBROUTINE.

0330	REF	1	06,2172	3 1302	1	IMUMON	CA	IMODES30	SEE IF THERE HAS BEEN A CHANGE IN THE
0331			06,2173	0 0006	1		EXTEND		RELEVANT BITS OF CHAN 30.
0332	REF	1	06,2174	06 030	1		RXOR	CHAN30	
0333	REF	1	06,2175	7 2761	1		MASK	3ORDMSK	
0334			06,2176	0 0006	1		EXTEND		
0335	REF	1	06,2177	1 2227	0		BZF	TNONTEST	NO CHANGE IN STATUS.
0336	REF	3	LAST 174	06,2200	54 070	1	TS	RUPTRREG1	SAVE BITS WHICH HAVE CHANGED.
0337	REF	2	LAST 176	06,2201	23'302	1	LXCH	IMODES30	UPDATE IMODES30.
0338				06,2202	0 0006	1	EXTEND		
0339	REF	2	LAST 173	06,2203	06 001	0	RXOR	LCHAN	
0340	REF	3	LAST 176	06,2204	55'302	0	TS	IMODES30	
0341	REF	2	LAST 172	06,2205	4 4753	0	CS	ONE	
0342	REF	4	LAST 176	06,2206	56 070	0	XCH	RUPTRREG1	
0343				06,2207	0 0006	1	EXTEND		

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0344	REF	1		06,2210	6 2514 0		BZMF	TLIM	CHANGE IN IMU TEMP.
0345	REF	1		06,2211	1 2213 1		TCF	NXTIFBIT	BEGIN BIT SCAN.
0346	REF	3	LAST 176	06,2212	6 4753 1	-1	AD	ONE	(RE-ENTERS HERE FROM NXTIEAIL.)
0347	REF	5	LAST 176	06,2213	24 070 0	NXTIFBIT	INCR	RUPTREG1	ADVANCE BIT POSITION NUMBER.
0348				06,2214	6 0000 1	+1	DOUBLE		
0349	REF	2	LAST 173	06,2215	54 000 0		TS	A	SKIP IF OVERFLOW.
0350	REF	2	LAST 177	06,2216	1 2213 1		TCF	NXTIFBIT	LOOK FOR BIT.
0351	REF	1		06,2217	56 071 1		XCH	RUPTREG2	SAVE OVERFLOW-CORRECTED DATA.
0352	REF	6	LAST 177	06,2220	50 070 0		INDEX	RUPTREG1	SELECT NEW VALUE OF THIS BIT.
0353	REF	17	LAST 175	06,2221	3 4736 1		CAE	BIT14	
0354	REF	4	LAST 176	06,2222	7 1302 0		MASK	IMODES30	
0355	REF	7	LAST 177	06,2223	50 070 0		INDEX	RUPTREG1	
0356	REF	1		06,2224	0 2755 1		TC	IEAILJMP	
0357	REF	2	LAST 177	06,2225	10 071 0	NXTIFAIL	CCS	RUPTREG2	PROCESS ANY ADDITIONAL CHANGES.
0358	REF	3	LAST 177	06,2226	1 2212 0		TCF	NXTIEBIT -1	

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P0359 PROGRAM NAME: TNCNTEST.

R0360 FUNCTIONAL DESCRIPTION: THIS PROGRAM HDNORS REQUESTS FOR ISS INITIALIZATION. ISS TURN-ON (CHANNEL 30 BIT 14)
R0362 AND ISS OPERATE (CHANNEL 30 BIT 9) REQUESTS ARE TREATED AS A PAIR AND PROCESSING TAKES PLACE .480 SECONDS
R0364 AFTER EITHER ONE APPEARS. THIS INITIALIZATION TAKES DN ONE OF THE FOLLDWING THREE FORMS:

R0366 1) ISS TURN-ON: IN THIS SITUATION THE COMPUTER IS OPERATING WHEN THE ISS IS TURNED ON. NOMINALLY,
R0368 BCTH ISS TURN-ON AND ISS OPERATE APPEAR. THE PLATFORM IS CAGED FOR 90 SECONDS AND THE ICDU'S ZEROED
R0370 SO THAT AT THE END OF THE PROCESS THE GIMBAL LOCK MDNITOR WILL FUNCTION PROPERLY.

R0372 2) ICDU INITIALIZATION: IN THIS CASE THE CDMPUTER WAS PROBABLY TURNED ON WITH THE ISS IN OPERATE OR
R0374 A FRESH START WAS DDNE WITH THE ISS IN OPERATE. IN THIS CASE ONLY ISS OPERATE IS ON. THE ICDU'S ARE
R0376 ZEROED SD THE GIMBAL LOCK MONITOR WILL FUNCTION. AN EXCEPTION IS IF THE ISS IS IN GIMBAL LOCK AFTER
R0378 A RESTART, THE ICDU'S WILL NOT BE ZEROED.

R0379 3) RESTART WITH RESTARTABLE PRDGRAM USING THE IMU: IN THIS CASE, NO INITIALIZATION TAKES PLACE SINCE
R0381 IT IS ASSUMED THAT THE USING PROGRAM DID THE INITIALIZATION AND THEREFORE T4RUPT SHOULD NOT INTERFERE.

R0383 IMODES30 BIT 7 IS SET = 1 BY THE FIRST BIT (CHANNEL 30 BIT 14 OR 9) WHICH ARRIVES. FOLLOWING THIS, TNCNTEST IS
R0385 ENTERED, FINDS BIT 7 = 1 BUT BIT 8 = 0, SO IT SETS BIT 8 = 1 AND EXITS. THE NEXT TIME IT FINDS BIT 8 = 1 AND
R0387 PROCEEDS, SETTING BITS 8 AND 7 = 0. AT PROCTNON, IF ISS TURN-ON REQUEST IS PRESENT, THE ISS IS CAGED (ZFRO +
R0389 CDARSE). IF ISS OPERATE IS NDT PRESENT PRDGRAM ALARM 00213 IS ISSUED. AT THE END OF A 90 SECOND CAGE, BIT 2
R0391 OF IMODES30 IS TESTED. IF IT IS = 1, ISS TURN-ON WAS NOT PRESENT FOR THE ENTIRE 90 SECONDS. IN THAT CASE, IF
R0393 THE ISS TURN-ON REQUEST IS PRESENT THE 90 SECOND WAIT IS REPEATED, OTHERWISE NO ACTION OCCURS UNLESS A PROGRAM
R0395 WAS WAITING FOR THE INITIALIZATION IN WHICH CASE THE PRDGRAM IS GIVEN AN IMUSTALL ERROR RETURN. IF THE DELAY
R0397 WENT PROPERLY, THE ISS DELAY OUTBIT IS SENT AND THE ICDU'S ZEROED. A TASK IS INITIATED TO REMOVE THE PIPA FAIL
R0399 INHIBIT BIT IN 10.24 SECDNDS. IF A MISSION PROGRAM WAS WAITING IT IS INFORMED VIA ENDIMU.

R0401 AT PRCTNON, IF ONLY ISS OPERATE IS PRESENT (DONLY), THE CDU'S ARE ZEROED UNLESS THE PLATFORM IS IN COARSE
R0403 ALIGN (= GIMBAL LDCK HERE) OR A MISSION PROGRAM IS USING THE IMU (IMUSEFLG = 1).

R0405 CALLING SEQUENCE: T4RUPT EVERY 480 MILLISECDNDS AFTER IMUMDN.

R0406 JOBS CR TASKS INITIATED: 1) ENDTNND, 90 SECONDS AFTER CAGING STARTED. 2) ISSUP, 4 SECONDS AFTER CAGING DONE.
R0408 3) PFAILDK, 10.24 SECONDS AFTER INITIALIZATION COMPLETED. 4) UNZ2, 320 MILLISFCONDOS AFTER ZEROING
R0410 STARTED.

R0411 SUBROUTINES CALLED: CAGESUB, CAGESUB2, ZERDICDU, ENDIMU, IMUBAD, NOATTOFF, SETISSW, VARDELAY.

R0413 ERASABLE INITIALIZATION: SEE IMUMDN.

R0414 ALARMS: PROGRAM ALARM 00213 IF ISS TURN-ON REQUESTED WITHOUT ISS OPERATE.

R0416 EXIT: ENDTNND EXITS TO C33TEST. TASKS HAVING TO DD WITH INITIALIZATION EXIT AS FOLLOWS: MISSION PROGRAM
R0418 WAITING AND INITIALIZATION CDMplete, EXIT TO ENDIMU, MISSION PROGRAM WAITING AND INITIALIZATION FAILED, EXIT TO
R0420 IMUBAC, IMU NDT IN USE, EXIT TO TASKOVER.

R0421 OUTPUT: ISS INITIALIZED.

0422 REF 5 LAST 177 06,2227 4 1302 0 TNCNTEST CS IMODES30 AFTER PROCESSING ALL CHANGES, SEE IF IT

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0423	REF	15	LAST	104	06,2230	7 4745 1		MASK	BIT7	IS TIME TO ACT ON A TURN-ON SEQUENCE.
0424	REF	3	LAST	177	06,2231	10 000 0		CCS	A	
0425	REF	1			06,2232	1 2374 1		TCF	C33TEST	NO - EXAMINE CHANNEL 33.
0426	REF	14	LAST	104	06,2233	3 4744 1		CAF	BIT8	SEE IF FIRST SAMPLE OR SECOND.
0427	REF	6	LAST	178	06,2234	7 1302 0		MASK	IMODES30	
0428	REF	4	LAST	179	06,2235	10 000 0		CCS	A	
0429	REF	1			06,2236	1 2242 0		TCF	PROCTNON	REACT AFTER SFCOND SAMPLE.
0430	REF	15	LAST	179	06,2237	3 4744 1		CAF	BIT8	IF FIRST SAMPLE, SET BIT TO REACT NEXT
0431	REF	7	LAST	179	06,2240	27 302 0		ADS	IMODES30	TIME.
0432	REF	2	LAST	179	06,2241	1 2374 1		TCF	C33TEST	
R0433										PROCESS IMU TURN-ON REQUESTS AFTER WAITING 1 SAMPLE FOR ALL SIGNALS TO ARRIVE.
0435	REF	1			06,2242	4 2777 0	PROCTNON	CS	BITS7&8	
0436	REF	8	LAST	179	06,2243	7 1302 0		MASK	IMODES30	
0437	REF	9	LAST	179	06,2244	55 302 0		TS	IMODES30	
0438	REF	18	LAST	177	06,2245	7 4736 0		MASK	BIT14	SEE IF TURN-ON REQUEST.
0439	REF	5	LAST	179	06,2246	10 000 0		CCS	A	
0440	REF	1			06,2247	1 2347 1		TCF	OPONLY	OPERATE ON ONLY.
0441	REF	10	LAST	179	06,2250	4 1302 0		CS	IMODES30	IF TURN-ON REQUEST, WE SHOULD HAVE IMU
0442	REF	16	LAST	175	06,2251	7 4743 1		MASK	BIT9	OPERATE.
0443	REF	6	LAST	179	06,2252	10 000 0		CCS	A	
0444					06,2253	1 2256 0		TCF	+3	
0445	REF	1			06,2254	0 5567 0		TC	ALARM	ALARM IF NOT.
0446					06,2255	00213 1		OCT	213	
0447	REF	1			06,2256	0 2735 1	+3	TC	CAGESUB	
0448	REF	1			06,2257	3 3005 1		CAF	90SECS	
0449	REF	1			06,2260	0 5203 0		TC	WAITLIST	
0450	REF	3	LAST	170	E6,1412			EBANK=	M11	
0451	REF	1			06,2261	02266 1		2CADR	ENDTNON	
0451	REF	1			06,2262	14106 0				
0452	REF	3	LAST	179	06,2263	1 2374 1		TCF	C33TEST	
0453	REF	2	LAST	179	06,2264	3 3005 1	RETNON	CAF	90SECS	
0454	REF	1			06,2265	0 5224 0		TC	VARDELAY	
0455	REF	13	LAST	104	06,2266	4 4752 1	ENDTNON	CS	BIT2	RESET TURN-ON REQUEST FAIL BIT.
0456	REF	11	LAST	179	06,2267	7 1302 0		MASK	IMODES30	
0457	REF	12	LAST	179	06,2270	57 302 1		XCH	IMODES30	
0458	REF	14	LAST	179	06,2271	7 4752 1		MASK	BIT2	IF IT WAS OFF, SEND ISS DELAY COMPLETE.
0459					06,2272	0 0006 1		EXTEND		
0460	REF	1			06,2273	1 2306 1		BZF	ENDTNON2	
0461	REF	19	LAST	179	06,2274	3 4736 1		CAF	BIT14	IF IT WAS ON AND TURN-ON REQUEST NOW

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0462	REF	13	LAST	179	06,2275	7 1302 0	MASK	IMODES30	PRESENT, RE-ENTER 90 SEC DELAY IN WL.
0463					06,2276	0 0006 1	EXTEND		
0464	REF	1			06,2277	1 2264 1	BZF	RETNON	
0465	RFF	1			06,2300	4 0074 0	CS	FLAGWRD0	IF IT IS NOT ON NOW, SEE IF A PROG WAS
0466	REF	1			06,2301	7 4744 0	MASK	IMUSEBIT	WAITING.
0467	REF	7	LAST	179	06,2302	10 000 0	CCS	A	
0468	REF	1			06,2303	1 5261 0	TCF	TASKOVER	
0469	REF	1			06,2304	0 4635 0	TC	POSTJUMP	
0470	REF	1			06,2305	17612 1	CADR	IMUBAD	UNSUCCESSFUL TURN-ON.
0471	REF	12	LAST	103	06,2306	3 4735 1	ENDTNON2 CAF	BIT15	SEND ISS DFLAY COMPLETE.
0472					06,2307	0 0006 1	EXTFND		
0473	REF	1			06,2310	05 012 1	WOR	CHAN12	
0474	REF	1			06,2311	0 4674 0	TC	IBNKCALL	TURN OFF NO ATT LAMP.
0475	REF	1			06,2312	17241 0	CADR	NOATTOFF	
0476	REF	1			06,2313	0 5457 1	UNZ2 TC	ZERDICDU	
0477	REF	1			06,2314	4 4763 0	CS	BITS485	REMOVE ZERO AND COARSE.
0478					06,2315	0 0006 1	EXTEND		
0479	REF	2	LAST	180	06,2316	03 012 1	WAND	CHAN12	
0480	RFF	14	LAST	145	06,2317	3 4741 1	CAF	BIT11	WAIT 10 SECS FOR CTRS TO FIND GIMBALS
0481	REF	2	LAST	179	06,2320	0 5224 0	TC	VARDELAY	
0482	REF	1			06,2321	4 2774 0	ISSUP CS	DCT54	REMOVE CAGING, IMU FAIL INHIBIT, AND
0483	REF	14	LAST	180	06,2322	7 1302 0	MASK	IMODES30	ICDUFALL INHIBIT FLAGS.
0484	REF	15	LAST	180	06,2323	55'302 0	TS	IMODES30	
0485	REF	14	LAST	104	06,2324	4 4746 1	CS	BIT6	FNABLE DAP
0486	REF	4	LAST	173	06,2325	7 1303 1	MASK	IMODES33	
0487	REF	5	LAST	180	06,2326	55'303 1	TS	IMODES33	
04871	REF	1			06,2327	4 0076 1	CS	FLAGWRD2	TEST DRIFTFLG: IF ON, DO NOTHING BECAUSE
04872	REF	1			06,2330	7 4735 0	MASK	DRFTBIT	IMUCOMP SHOULD BE ALL SET UP(RESTART
04873					06,2331	0 0006 1	EXTEND		WITH IMUSE DOWN). IF OFF, SET DRIFTFLG
04874					06,2332	1 2336 1	BZF	+4	AND 1/PIPADT TO GET FREEFALL IMUCOMP
04875	REF	2	LAST	180	06,2333	26 076 1	ADS	FLAGWRD2	GOING (FRESH START OR ISS TURN-ON).
04876	REF	1			06,2334	3 0025 0	CA	TIME1	
04877	REF	1			06,2335	57'075 1	XCH	1/PIPADT	CANNOT GET HERE IF RESTART WITH IMUSE UP
0488	REF	1			06,2336	0 2703 1	TC	SETISSW	ISS WARNING MIGHT HAVE BEEN INHIBITED.
0489	REF	13	LAST	180	06,2337	4 4735 0	CS	BIT15	REMOVE IMU DELAY COMPLETE DISCRETE.
0490					06,2340	0 0006 1	EXTEND		
0491	REF	3	LAST	180	06,2341	03 012 1	WAND	CHAN12	
0492	REF	1			06,2342	3 5003 1	CAF	4SECS	DONT ENABLE PROG ALARM ON PIP FAIL FOR

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0493	REF	2	LAST	179	06,2343	0 5203 0		TC	WAITLIST	ANOTHER 4 SECS.
0494	REF	1			E3,1474			EBANK=	CDUIND	
0495	REF	1			06,2344	03227 0		2CADR	PFALOK	
0495	REF	1			06,2345	16103 1				
0499	REF	2	LAST	180	06,2346	1 5261 0		TCF	TASKOVER	
0502	REF	11	LAST	104	06,2347	3 4750 1	OPONLY	CAF	BIT4	IF OPERATE ON ONLY, AND WE ARE IN COARSE
0503					06,2350	0 0006 1		EXTEND		ALIGN, DONT ZERO THE CDUS BECAUSE WE
0504	REF	4	LAST	190	06,2351	02 012 0		RAND	CHAN12	MIGHT BE IN GIMBAL LOCK
0505	REF	8	LAST	180	06,2352	10 000 0		CCS	A	
0506	REF	4	LAST	179	06,2353	1 2374 1		TCF	C33TEST	
0507	REF	2	LAST	180	06,2354	3 4744 1		CAF	IMUSEBIT	OTHERWISE, ZERO THE COUNTERS.
0508	REF	2	LAST	180	06,2355	7 0074 0		MASK	FLAGWRDO	UNLESS SOMEONE IS USING THE IMU.
0509	REF	9	LAST	181	06,2356	10 000 0		CCS	A	
0510	REF	5	LAST	181	06,2357	1 2374 1		TCF	C33TEST	
0511	REF	1			06,2360	0 2746 0		TC	CAGESUB2	SET TURNON FLAGS.
05115	REF	2	LAST	180	06,2361	0 4674 0	ISSZERO	TC	IBNKCALL	TURN OFF NO ATT LAMP
05116	REF	2	LAST	180	06,2362	17241 0		CADR	NOATTOFF	IMU CAGE OFF ENTRY
0512	REF	12	LAST	104	06,2363	3 4747 1		CAF	BIT5	ISS CDU ZERO
0513					06,2364	0 0006 1		EXTEND		
0514	REF	5	LAST	181	06,2365	05 012 1		WOR	CHAN12	
05141	REF	2	LAST	180	06,2366	0 5457 1		TC	ZEROICDU	
0515	REF	15	LAST	180	06,2367	3 4746 0		CAF	BIT6	WAIT 300 MS FOR AGS TO RECEIVE SIGNAL.
0516	REF	3	LAST	181	06,2370	0 5203 0		TC	WAITLIST	
0517	REF	4	LAST	179	E6,1412			EBANK=	M11	
0518	REF	1			06,2371	02313 1		2CADR	UNZ2	
0518	REF	1			06,2372	14106 0				
0519	REF	6	LAST	181	06,2373	1 2374 1		TCF	C33TEST	

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P0520 PRCGRAM NAME: C33TEST

R0521 FUNCTIONAL DESCRIPTION: THIS PROGRAM MONITORS THREE FLIP-FLOP INBITS OF CHANNEL 33 AND CALLS THE APPROPRIATE
 R0523 SUBROUTINE TO PROCESS A CHANGE. IT IS ANALOGOUS TO IMUMON, WHICH MONITORS CHANNEL 30, EXCEPT THAT IT READS
 R0525 CHANNEL 33 WITH A WAND INSTRUCTION BECAUSE A 'WRITE' PULSE IS REQUIRED TO RESET THE FLIP-FLOPS. THE BITS
 R0527 PROCESSED AND THE SUBROUTINES CALLED ARE:

	BIT	FUNCTION	SUBROUTINE
R0528			
R0529			
R0530	13	PIPA FAIL	PIPFALL
R0531	12	DOWNLINK TOO FAST	DNTMFAST
R0532	11	UPLINK TOO FAST	UPTMFAST

R0533 UPCN ENTRY TO THE SUBROUTINE, THE NEW BIT STATE IS IN A.

R0534 CALLING SEQUENCE: EVERY 480 MILLISECONDS AFTER TNONTEST.

R0535 JCBS CR TASKS INITIATED: NONE.

R0536 SUBROUTINES CALLED: PIPFALL, DNTMFAST AND UPTMFAST ON BIT CHANGES.

R0537 ERASABLE INITIALIZATION: C(IMODES33) = OCT 16000 ON A FRESH START OR RESTART, THEREFORE, THESE ALARMS WILL
 R0539 REAPPEAR IF THE CONDITIONS PERSIST.

R0540 ALARMS: NONE.

R0541 EXIT: GLOCKMON.

R0542 OUTPUT: UPDATED BITS 13, 12 AND 11 OF IMODES33 WITH CHANGES PROCESSED.

0543	REF	6	LAST	180	06,2374	3 1303 0	C33TEST	CA	IMODES33	SEE IF RELEVANT CHAN 33 BITS HAVE
0544	REF	1			06,2375	7 5026 1		MASK	33RDMSK	
0545	REF	2	LAST	109	06,2376	54 001 1		TS	L	CHANGED.
0546	REF	2	LAST	182	06,2377	3 5026 0		CAF	33RDMSK	
0547					06,2400	0 0006 1		EXTEND		
0548	REF	1			06,2401	03 033 1		WAND	CHAN33	RESETS FLIP-FLOP INPUTS
0549					06,2402	0 0006 1		EXTEND		
0550	REF	3	LAST	176	06,2403	06 001 0		RXOR	LCHAN	
0551					06,2404	0 0006 1		EXTEND		
0552	REF	1			06,2405	1 2434 1		BZF	GLOCKMON	ON NO CHANGE.
0553	REF	8	LAST	177	06,2406	54 070 1		TS	RUPTREG1	SAVE BITS WHICH HAVE CHANGED.
0554	REF	7	LAST	182	06,2407	23 303 0		LXCH	IMODES33	
0555					06,2410	0 0006 1		EXTEND		
0556	REF	4	LAST	182	06,2411	06 001 0		RXOR	LCHAN	
0557	REF	8	LAST	182	06,2412	55 303 1		TS	IMODES33	UPDATED IMODES33.
0558	REF	3	LAST	172	06,2413	3 4755 1		CAF	ZERO	
0559	REF	9	LAST	182	06,2414	56 070 0		XCH	RUPTREG1	
0560					06,2415	6 0000 1		DOUBLE		

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0561	REF	1		06,2416	1 2421 0		TCF	NXTIBT +1	
0562	REF	4	LAST	177	06,2417	6 4753 1	-1	AD	ONE
0563	REF	10	LAST	182	06,2420	24 070 0	NXTIBT	INCR	RUPTREG1
0564					06,2421	6 0000 1	+1	DOUBLE	
0565	REF	10	LAST	181	06,2422	54 000 0		TS	A
0566	REF	2	LAST	183	06,2423	1 2420 1		TCF	NXTIBT
0567	REF	3	LAST	177	06,2424	56 071 1		XCH	RUPTREG2
0568	REF	11	LAST	183	06,2425	50 070 0		INDEX	RUPTREG1
0569	REF	14	LAST	103	06,2426	3 4737 0		CAF	BIT13
0570	REF	9	LAST	182	06,2427	7 1303 1		MASK	IMODES33
0571	REF	12	LAST	183	06,2430	50 070 0		INDEX	RUPTREG1
0572	REF	1			06,2431	0 2763 1		TC	C33JMP
0573	REF	4	LAST	183	06,2432	10 071 0	NXTFL33	CCS	RUPTREG2
0574	REF	3	LAST	183	06,2433	1 2417 0		TCF	NXTIBT -1

SCAN FOR BIT CHANGES.

(CODING IDENTICAL TO CHAN 30).

GET NEW VALUE OF BIT WHICH CHANGED.

PROCESS POSSIBLE ADDITIONAL CHANGES.

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P0575 PROGRAM NAME: GLOCKMON

R0576 FUNCTIONAL DESCRIPTION: THIS PROGRAM MONITORS THE CDUZ COUNTER TO DETERMINE WHETHER THE ISS IS IN GIMBAL LOCK
 R0578 AND TAKES ACTION IF IT IS. THREE REGIONS OF MIDDLE GIMBAL ANGLE (MGA) ARE USED:

R0580 1) ABS(MGA) LESS THAN OR EQUAL TO 70 DEGREES - NORMAL MODE.
 R0581 2) ABS(MGA) GREATER THAN 70 DEGREES AND LESS THAN OR EQUAL TO 85 DEGREES - GIMBAL LOCK LAMP TURNED ON.
 R0583 3) ABS(MGA) GREATER THAN 85 DEGRFES - ISS PUT IN COARSE ALIGN AND NO ATT LAMP TURNED ON.

R0585 CALLING SEQUENCE: EVERY 480 MILLISECONDS AFTER C33TEST.

R0586 JCBS OR TASKS INITIATED: NONE.

R0587 SUBROUTINES CALLED: 1) SETCOARS WHEN ABS(MGA) GREATER THAN 85 DEGREES AND ISS NOT IN COARSE ALIGN.
 R0589 2) LAMPTST BEFORE TURNING OFF GIMBAL LOCK LAMP.

R0590 ERASABLE INITIALIZATION:

R0591 1) FRESH START OR RESTART WITH NO GROUPS ACTIVE: C(CDUZ) = 0, IMODES30 BIT 6 = 0, IMODES33 BIT 1 = 0.
 R0593 2) RESTART WITH GROUPS ACTIVE: SAME AS FRESH START EXCEPT C(CDUZ) NOT CHANGED SO GIMBAL MONITOR
 R0595 PROCEEDS AS BEFORE.

R0596 ALARMS: 1) MGA REGION (2) CAUSES GIMBAL LOCK LAMP TO BE LIT.
 R0597 2) MGA REGION (3) CAUSES THE ISS TO BE PUT IN COARSE ALIGN AND THE NO ATT LAMP TO BE LIT IF EITHER NOT
 R0599 SO ALREADY.

0600	REF	1		06,2434	10 034 1	GLOCKMON	CCS	CDUZ	
0601	REF	1		06,2435	1 2441 0		TCF	GLOCKCHK	SEE IF MAGNITUDE OF MGA IS GREATER THAN
0602	REF	1		06,2436	1 2465 0		TCF	SETGLOCK	70 DEGREES.
0603	REF	2	LAST 184	06,2437	1 2441 0		TCF	GLOCKCHK	
0604	REF	2	LAST 184	06,2440	1 2465 0		TCF	SETGLOCK	
0605	REF	1		06,2441	6 2512 0	GLOCKCHK	AD	-70DEGS	
0606				06,2442	0 0006 1		EXTEND		
0607	REF	3	LAST 184	06,2443	6 2464 0		BZMF	SETGLOCK -1	NO LOCK.
0608	REF	1		06,2444	6 2513 1		AD	-15DEGS	SEE IF ABS(MGA) GREATER THAN 85 DEGREES.
0609				06,2445	0 0006 1		EXTEND		
0610	REF	1		06,2446	6 2462 0		BZMF	NOGIMRUN	
0611	REF	12	LAST 181	06,2447	3 4750 1		CAF	BIT4	IF SO, SYSTEM SHOULD BE IN COARSE ALIGN
0612				06,2450	0 0006 1		EXTEND		TO PREVENT GIMBAL RUNAWAY.
0613	REF	6	LAST 181	06,2451	02 012 0		RAND	CHAN12	
0614	REF	11	LAST 183	06,2452	10 000 0		CCS	A	
0615	REF	2	LAST 184	06,2453	1 2462 1		TCF	NOGIMRUN	
0616	REF	3	LAST 181	06,2454	0 4674 0		TC	IBNKCALL	
0617	REF	1		06,2455	17117 0		CADR	SETCOARS	
06173	REF	1		06,2456	3 6241 0		CAF	SIX	ENABLE ISS ERROR COUNTERS IN 60 MS
06174	REF	4	LAST 181	06,2457	0 5203 0		TC	WAITLIST	

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06175	REF	2	LAST	181	E3,1474		EBANK=	CDUIND	
06176	REF	1			06,2460	03113 1	2CADR	CA+ECE	
06176	REF	1			06,2461	16103 1			
0618	REF	16	LAST	181	06,2462	3 4746 0	NOGIMRUN	CAF	BIT6
0619	REF	4	LAST	184	06,2463	1 2465 0	TCF	SETGLOCK	TURN ON GIMBAL LOCK LAMP.
0620	REF	4	LAST	182	06,2464	3 4755 1	-1	CAF	ZERO
0621	REF	6	LAST	172	06,2465	6 1036 0	SETGLOCK	AD	DSPTAB +11D
0622	REF	17	LAST	185	06,2466	7 4746 1		MASK	BIT6
0623					06,2467	0 0006 1		EXTEND	
0624	REF	1			06,2470	1 5270 0		BZF	GLDCKOK
0625	REF	7	LAST	185	06,2471	7 1036 1		MASK	DSPTAB +11D
0626	REF	12	LAST	184	06,2472	10 000 0		CCS	A
0627	REF	1			06,2473	1 2507 0		TCF	GLAMPTST
0628	REF	18	LAST	185	06,2474	3 4746 0		CAF	BIT6
0629	REF	16	LAST	180	06,2475	7 1302 0		MASK	IMODES30
0630	REF	13	LAST	185	06,2476	10 000 0		CCS	A
0631	REF	2	LAST	185	06,2477	1 5270 0		TCF	GLDCKOK
0632	REF	8	LAST	185	06,2500	4 1036 1	GLINVERT	CS	DSPTAB +11D
0633	REF	19	LAST	185	06,2501	7 4746 1		MASK	BIT6
0634	REF	14	LAST	180	06,2502	6 4735 1		AD	BIT15
0635	REF	9	LAST	185	06,2503	57'036 0		XCH	DSPTAB +11D
0636	REF	1			06,2504	7 2162 1		MASK	OCT37737
0637	REF	10	LAST	185	06,2505	27'036 1		ADS	DSPTAB +11D
0638	REF	3	LAST	185	06,2506	1 5270 0		TCF	GLDCKOK
0639	REF	1			06,2507	0 2766 1	GLAMPTST	TC	LAMPTST
0640	REF	4	LAST	185	06,2510	1 5270 0		TCF	GLDCKOK
0641	REF	1			06,2511	1 2500 1		TCF	GLINVERT
0642					06,2512	63434 1	-70DEGS	DEC	-.38888
0643					06,2513	75252 0	-15DEGS	DEC	-.08333

SEE IF PRESENT STATE OF GIMBAL LOCK LAMP AGREES WITH DESIRED STATE BY HALF ADDING THE TWO.
OK AS IS.

IF OFF, DONT TURN ON IF IMU BEING CAGED.

TURN OFF UNLESS LAMP TEST IN PROGRESS.

INVERT GIMBAL LOCK LAMP.

TO INDICATE CHANGE IN DSPTAB +11D.

TURN OFF UNLESS LAMP TEST IN PROGRESS.

-70 DEGREES SCALED IN HALF-REVOLUTIONS.

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P0644 PROGRAM NAME: TLIM.

R0645 FUNCTIONAL DESCRIPTION: THIS PROGRAM MAINTAINS THE TEMP LAMP (BIT 4 OF CHANNEL 11) ON THE DSKY TO AGREE WITH
 R0647 THE TEMP SIGNAL FROM THE ISS (BIT 15 OF CHANNEL 30). HOWEVER, THE LIGHT WILL NOT BE TURNED OFF IF A LAMP TEST
 R0649 IS IN PROGRESS.

R0650 CALLING SEQUENCE: CALLED BY IMUMON ON A CHANGE OF BIT 15 OF CHANNEL 30.

R0651 JOBS OR TASKS INITIATED: NONE.

R0652 SUBROUTINES CALLED: LAMPTEST.

R0653 ERASABLE INITIALIZATION: FRESH START AND RESTART TURN THE TEMP LAMP OFF.

R0655 ALARMS: TEMP LAMP TURNED ON WHEN IMU TEMP GOES OUT OF LIMITS.

R0656 EXIT: NXTIFAIL.

R0657 OUTPUT: SERVICE OF TEMP LAMP.

IN A, EXCEPT FOR TLIM.

0659	REF	1			06,2514	7 4733 0	TLIM	MASK	POS MAX	REMOVE BIT FROM WORD OF CHANGES AND SET
0660	REF	5	LAST	183	06,2515	54 071 0		TS	RUPTREG2	DSKY TEMP LAMP ACCORDINGLY.
0661	REF	17	LAST	185	06,2516	11'302 0		CCS	IMODES30	
0662	REF	1			06,2517	1 2525 0		TCF	TEMPOK	
0663	REF	2	LAST	186	06,2520	1 2525 0		TCF	TEMPOK	
0664	REF	13	LAST	184	06,2521	3 4750 1		CAF	BIT4	TURN ON LAMP.
0665					06,2522	0 0006 1		EXTEND		
0666	REF	1			06,2523	05 011 1		WOR	DSALMOUT	
0667	REF	1			06,2524	1 2225 1		TCF	NXTIFAIL	
0668	REF	2	LAST	185	06,2525	0 2766 1	TEMPOK	TC	LAMPTEST	IF TEMP NOW OK, DONT TURN OFF LAMP IF
0669	REF	2	LAST	186	06,2526	1 2225 1		TCF	NXTIFAIL	LAMP TEST IN PROGRESS.
0670	REF	14	LAST	186	06,2527	4 4750 0		CS	BIT4	
0671					06,2530	0 0006 1		EXTEND		
0672	REF	2	LAST	186	06,2531	03 011 1		WAND	DSALMOUT	TURN OFF LAMP
0673	REF	3	LAST	136	06,2532	1 2225 1		TCF	NXTIFAIL	

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P0674 PROGRAM NAME: ITURNON.

R0675 FUNCTIONAL DESCRIPTION: THIS PROGRAM IS CALLED BY IMUMON WHEN A CHANGE OF BIT 14 OF CHANNEL 30 (ISS TURN-ON
 R0677 REQUEST) IS DETECTED. UPON ENTRY, ITURNON CHECKS IF A TURN-ON DELAY SEQUENCE HAS FAILED, AND IF SO, IT EXITS.
 R0679 IF NOT, IT CHECKS WHETHER THE TURN-ON REQUEST CHANGE IS TO ON OR OFF. IF ON, IT SETS BIT 7 OF IMODES30 TO 1 SO
 R0681 THAT INONTEST WILL INITIATE THE ISS INITIALIZATION SEQUENCE. IF OFF, THE TURN-ON DELAY SIGNAL, CHANNEL 12 BIT
 R0683 15, IS CHECKED AND IF IT IS ON, ITURNON EXITS. IF THE DELAY SIGNAL IS OFF, PROGRAM ALARM 00207 IS ISSUED, BIT 2
 R0685 OF IMODES30 IS SET TO 1 AND THE PROGRAM EXITS.
 R0686 THE SETTING OF BIT 2 OF IMODES30 (ISS DELAY SEQUENCE FAIL) INHIBITS THIS ROUTINE AND IMUOP FROM
 R0688 PROCESSING ANY CHANGES. THIS BIT WILL BE RESET BY THE ENDINON ROUTINE WHEN THE CURRENT 90 SECOND DELAY PERIOD
 R0690 ENDS.

R0691 CALLING SEQUENCE: FROM IMUMON WHEN ISS TURN-ON REQUEST CHANGES STATE.

R0692 JOBS OR TASKS INITIATED: NONE.

R0693 SUBROUTINES CALLED: ALARM, IF THE ISS TURN-ON REQUEST IS NOT PRESENT FOR 90 SECONDS.

R0695 ERASABLE INITIALIZATION: FRESH START AND RESTART SET BIT 15 OF CHANNEL 12 AND BITS 2 AND 7 OF IMODES30 TO 0,
 R0697 AND BIT 14 OF IMODES30 TO 1.

R0698 ALARMS: PROGRAM ALARM 00207 IS ISSUED IF THE ISS TURN-ON REQUEST SIGNAL IS NOT PRESENT FOR 90 SECONDS.

R0700 EXIT: NXTIFAIL.

R0701 OUTPUT: BIT 7 OF IMODES30 TO START ISS INITIALIZATION, OR BIT 2 OF IMODES30 AND PROGRAM ALARM 00207 TO INDICATE
 R0703 A FAILED TURN-ON SEQUENCE.

0704	REF	15	LAST	179	06,2533	3 4752 0	ITURNON	CAF	BIT2	IF DELAY REQUEST HAS GONE OFF
0705	REF	18	LAST	186	06,2534	7 1302 0		MASK	IMODES30	PREMATURELY, DO NOT PROCESS ANY CHANGES
0706	REF	14	LAST	185	06,2535	10 000 0		CCS	A	UNTIL THE CURRENT 90 SEC WAIT EXPIRES.
0707	REF	4	LAST	186	06,2536	1 2225 1		TCF	NXTIFAIL	
0708	REF	20	LAST	179	06,2537	3 4736 1		CAF	BIT14	SEE IF JUST ON OR OFF.
0709	REF	19	LAST	187	06,2540	7 1302 0		MASK	IMODES30	
0710					06,2541	0 0006 1		EXTEND		
0711	REF	1			06,2542	1 2556 1		BZF	ITURNON2	IF JUST ON.
0712	REF	15	LAST	185	06,2543	3 4735 1		CAF	BIT15	
0713					06,2544	0 0006 1		EXTEND		SEE IF DELAY PRESENT DISCRETE HAS BEEN
0714	REF	7	LAST	184	06,2545	02 012 0		RAND	CHAN12	SENT. IF SO, ACTION COMPLETE
0715					06,2546	0 0006 1		EXTEND		
0716					06,2547	1 2551 0		BZF	+2	
0717	REF	5	LAST	187	06,2550	1 2225 1		TCF	NXTIFAIL	
0718	REF	16	LAST	187	06,2551	3 4752 0		CAF	BIT2	IF NOT, SET BIT TO INDICATE REQUEST NOT
0719	REF	20	LAST	187	06,2552	27 1302 0		ADS	IMODES30	PRESENT FOR FULL DURATION.
0720	REF	2	LAST	179	06,2553	0 5567 0		TC	ALARM	
0721					06,2554	00207 1		OCT	207	
0722	REF	6	LAST	187	06,2555	1 2225 1		TCF	NXTIFAIL	

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0723	REF	21	LAST	187	06,2556	4 1302 0	ITURNON2	CS	IMODES30	SET BIT7 TO INDICATE WAIT OF 1 SAMPLE
0724	REF	16	LAST	179	06,2557	7 4745 1		MASK	BIT7	
0725	REF	22	LAST	188	06,2560	27 1302 0		ADS	IMODES30	
0726	REF	1			06,2561	3 2564 1		CAF	RRINIT	
07261	REF	2	LAST	169	06,2562	54 110 0		TS	RADMODES	
0727	REF	7	LAST	187	06,2563	1 2225 1		TCF	NXIFAIL	
07271					06,2564	00102 1	RRINIT	OCT	00102	

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P0728 PROGRAM NAME: IMUCAGE.

R0729 FUNCTIONAL DESCRIPTION: THIS PROGRAM PROCESSES CHANGES OF THE IMUCAGE INBIT, CHANNEL 30 BIT 11. IF THE BIT
 R0731 CHANGES TO 0 (CAGE BUTTON PRESSED), THE ISS IS CAGED (ICDU ZERO + COARSE ALIGN + NO ATT LAMP) UNTIL THE
 R0733 ASTRONAUT SELECTS ANOTHER PROGRAM TO ALIGN THE ISS. ANY PULSE TRAINS TO THE ICDU'S AND GYRO'S ARE TERMINATED,
 R0735 THE ASSOCIATED OUTCOUNTERS ARE ZEROED AND THE GYRO'S ARE DE-SELECTED. NO ACTION OCCURS WHEN THE BUTTON IS
 R0737 RELEASED (INBIT CHANGES TO 1).

R0738 CALLING SEQUENCE: BY IMUMON WHEN IMU CAGE BIT CHANGES.

R0739 JOBS OR TASKS INITIATED: NONE.

R0740 SUBROUTINES CALLED: CAGESUB.

R0741 ERASABLE INITIALIZATION: FRESH START AND RESTART SET BIT 11 OF IMODES30 TO 1.

R0743 ALARMS: NONE.

R0744 EXIT: NXTIFAIL.

R0745 OUTPUT: ISS CAGED, COUNTERS ZEROED, PULSE TRAINS TERMINATED AND NO ATT LAMP LIT.

0747	REF	15	LAST	187	06,2565	10 000 0	IMUCAGE	CCS	A	NO ACTION IF GOING OFF.
0748	REF	1			06,2566	1 2361 0		TCF	ISSZERO	
0749	REF	1			06,2567	4 3002 1		CS	OCT77000	TERMINATE ICDU,RCDU, GYRO PULSE TRAINS
0750					06,2570	0 0006 1		EXTEND		
0751	REF	1			06,2571	03 014 1		WAND	CHAN14	
0752	REF	1			06,2572	4 2776 1		CS	OCT272	KNOCK DOWN DISPLAY INERTIAL DATA, IMU
07521					06,2573	0 0006 1		EXTEND		ERROR COUNTER ENABLE, ZERO ICDU, COARSE
07522	REF	8	LAST	187	06,2574	03 012 1		WAND	CHAN12	ALIGN ENABLE, RR ERROR COUNTER ENABLE.
075221	REF	1			06,2575	4 4745 1		CS	ENGONBIT	INSURE ENGONFLG IS CLEAR.
075222	REF	2	LAST	172	06,2576	7 0101 0		MASK	FLAGWRD5	
075223	REF	3	LAST	189	06,2577	54 101 0		TS	FLAGWRD5	
07523	REF	1			06,2600	4 4355 1		CS	PRIO30	TURN ENGINE OFF.
07524					06,2601	0 0006 1		EXTEND		
07525	REF	3	LAST	186	06,2602	02 011 0		RAND	DSALMOUT	
075251	REF	21	LAST	187	06,2603	6 4736 1		AD	BIT14	
075252					06,2604	0 0006 1		EXTEND		
075253	REF	4	LAST	189	06,2605	01 011 0		WRITE	DSALMOUT	FORCE BIT14=1, BIT13=0.
07526	REF	1			06,2606	0 2743 0		TC	CAGESUB1	
07527	REF	4	LAST	184	06,2607	0 4674 0		TC	IBNKCALL	KNOCK DOWN TRACK, REFSMMAT, DRIFT FLAGS
07528	REF	1			06,2610	17150 0		CADR	RNDREFDR	
0753	REF	5	LAST	185	06,2611	4 4755 0		CS	ZERO	
0754	REF	1			06,2612	54 050 0		TS	CDUXCMD	
0755	REF	1			06,2613	54 051 1		TS	CDUYCMD	

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0756	REF	1		06,2614	54 052 1
0757	REF	1		06,2615	54 047 0

TS	CDUZCMD
TS	GYROCMD

0758	REF	1		06,2616	4 3001 1
0759				06,2617	0 0006 1
0760	REF	2	LAST 189	06,2620	03 014 1
0761	REF	8	LAST 188	06,2621	1 2225 1

CS	OCT740
EXTEND	
WAND	CHAN14
TCF	NXTIFAIL

HAVING WAITED AT LEAST 27 MCT FROM
GYRO PULSE TRAIN TERMINATION, WE CAN
DE-SELECT THE GYROS

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P0762 PROGRAM NAME: IMUOP.

R0763 FUNCTIONAL DESCRIPTION: THIS PROGRAM PROCESSES CHANGES IN THE ISS OPERATE DISCRETE, BIT 9 OF CHANNEL 30.
 R0765 IF THE INBIT CHANGES TO 0, INDICATING ISS ON, IMUOP GENERALLY SETS BIT 7 OF IMODES30 TO 1 TO REQUEST ISS
 R0767 INITIALIZATION VIA TNONTEST. AN EXCEPTION IS DURING A FAILED ISS DELAY DURING WHICH BIT 2 OF IMODES30 IS SET
 R0769 TO 1 AND NC FURTHER INITIALIZATION IS REQUIRED. WHEN THE INBIT CHANGES TO 1, INDICATING ISS OFF, IMUSEFLG IS
 R0771 TESTED TO SEE IF ANY PROGRAM WAS USING THE ISS. IF SO, PROGRAM ALARM 00214 IS ISSUED.

R0773 CALLING SEQUENCE: BY IMUMON WHEN BIT 9 OF CHANNEL 30 CHANGES.

R0774 JOBS CR TASKS INITIATED: NONE.

R0775 SUBROUTINES CALLED: ALARM, IF ISS IS TURNED OFF WHILE IN USE.

R0776 ERASABLE INITIALIZATION: ON FRESH START AND RESTART, BIT 9 OF IMODES30 IS SET TO 1 EXCEPT WHEN THE GIMBAL LOCK
 R0778 LAMP IS ON, IN WHICH CASE IT IS SET TO 0. THIS PREVENTS ICDU ZERO BY TNONTEST WITH THE ISS IN GIMBAL LOCK.

R0780 ALARMS: PROGRAM ALARM 00214 IF THE ISS IS TURNED OFF WHILE IN USE.

R0781 EXIT: NXTIFAIL.

R0782 OUTPUT: ISS INITIALIZATION REQUEST (IMODES30 BIT 7) OR PROGRAM ALARM 00214.

0784				06,2622	0 0006	1	IMUOP	EXTEND		
0785	REF	1		06,2623	1 2643	0		BZF	IMUOP2	
0786	REF	10	LAST	183	06,2624	4 1303	1	CS	IMODES33	DISABLE DAP
0787	REF	20	LAST	185	06,2625	7 4746	1	MASK	BIT6	
0788	REF	11	LAST	191	06,2626	27'303	1	ADS	IMODES33	
07885	REF	5	LAST	189	06,2627	0 4674	0	TC	IBNKCALL	KNOCK DOWN TRACK, REFSMMAT, DRIFT FLAGS
07886	REF	2	LAST	189	06,2630	17150	0	CADR	RNDREFDR	
07887	REF	2	LAST	179	06,2631	4 2777	0	CS	BITS7&8	KNOCK DOWN RENDEZVOUS, IMUUSE FLAGS
07888	REF	3	LAST	181	06,2632	7 0074	0	MASK	FLAGWRDO	
0789	REF	4	LAST	191	06,2633	56 074	1	XCH	FLAGWRDO	IF GOING OFF, ALARM IF PROG USING IMU.
07891					06,2634	4 0000	0	COM		
0790	REF	1			06,2635	7 4744	0	MASK	IMUSEFLG	
0791	REF	16	LAST	189	06,2636	10 000	0	CCS	A	
0792	REF	9	LAST	190	06,2637	1 2225	1	TCF	NXTIFAIL	
0793	REF	3	LAST	187	06,2640	0 5567	0	TC	ALARM	
0794					06,2641	00214	0	OCT	214	
0795	REF	10	LAST	191	06,2642	1 2225	1	TCF	NXTIFAIL	
0796	REF	17	LAST	187	06,2643	3 4752	0	IMUOP2	CAF	SEE IF FAILED ISS TURN-ON SEQ IN PROG.
0797	REF	23	LAST	188	06,2644	7 1302	0	MASK	IMODES30	
0798	REF	17	LAST	191	06,2645	10 000	0	CCS	A	
0799	REF	11	LAST	191	06,2646	1 2225	1	TCF	NXTIFAIL	IF SO, DONT PROCESS UNTIL PRESENT 90
0800	REF	2	LAST	187	06,2647	1 2556	1	TCF	ITJRNON2	SECONDS EXPIRES.

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P0801 PROGRAM NAME: PIPFAIL

R0802 FUNCTIONAL DESCRIPTION: THIS PROGRAM PROCESSES CHANGES OF BIT 13 OF CHANNEL 33, PIPA FAIL. IT SETS BIT 10 OF
 R0804 IMODES30 TO AGREE. IT CALLS SETISSW IN CASE A PIPA FAIL NECESSITATES AN ISS WARNING. IF NOT, I.E., IMODES30
 R0806 BIT 1 = 1, AND A PIPA FAIL IS PRESENT AND THE ISS IS NOT BEING INITIALIZED, PROGRAM ALARM 00212 IS ISSUED.

R0808 CALLING SEQUENCE: BY C33TEST ON CHANGES OF CHANNEL 33 BIT 13.

R0809 JCBS CR TASKS INITIATED: NONE.

R0810 SUBROUTINES CALLED: 1) SETISSW, AND 2) ALARM (SEE FUNCTIONAL DESCRIPTION).

R0812 ERASABLE INITIALIZATION: SEE IMUMON FOR INITIALIZATION OF IMODES30. THE RELEVANT BITS ARE 5, 7, 8, 9, AND 10.

R0814 ALARMS: PROGRAM ALARM 00212 IF PIPA FAIL IS PRESENT BUT NEITHER ISS WARNING IS TO BE ISSUED NOR THE ISS IS
 R0816 BEING INITIALIZED.

R0817 EXIT: NXTFL33.

R0818 OUTPUT: PROGRAM ALARM 00212 AND ISS WARNING MAINTENANCE.

0819	REF	18	LAST	191	06,2650	10 000 0	PIPEAIL	CCS	A	SET BIT10 IN IMODES30 SO ALL ISS WARNING
0820	REE	14	LAST	145	06,2651	3 4742 1		CAF	BIT10	INCO IS IN ONE REGISTER.
0821	REF	24	LAST	191	06,2652	57'302 1		XCH	IMODES30	
0822	REE	1			06,2653	7 3004 1		MASK	-BIT10	
0823	REE	25	LAST	192	06,2654	27'302 0		ADS	IMODES30	
0824	REE	2	LAST	180	06,2655	0 2703 1		TC	SETISSW	
0825	REE	26	LAST	192	06,2656	4 1302 0		CS	IMODES30	IF PIP FAIL DOESNT LIGHT ISS WARNING, DO
0826	REE	13	LAST	104	06,2657	7 4753 0		MASK	BIT1	A PROGRAM ALARM IF IMU OPERATING BUT NOT
0827	REE	19	LAST	192	06,2660	10 000 0		CCS	A	CAGED OR BEING TURNED ON.
0828	REE	1			06,2661	1 2432 1		TCE	NXTFL33	
0829	REF	27	LAST	192	06,2662	3 1302 1		CA	IMODES30	
0830	REE	1			06,2663	7 3000 0		MASK	OCT1720	
0831	REF	20	LAST	192	06,2664	10 000 0		CCS	A	
0832	REF	2	LAST	192	06,2665	1 2432 1		TCE	NXTFL33	ABOVE CONDITION NOT MET.
0833	REF	4	LAST	191	06,2666	0 5567 0		TC	ALARM	
0834					06,2667	00212 0		OCT	212	
0835	REE	3	LAST	192	06,2670	1 2432 1		TCE	NXTFL33	

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P0836 PROGRAM NAMES: DNTMFAST, UPTMFAST

R0837 FUNCTIONAL DESCRIPTION: THESE PROGRAMS PROCESS CHANGES OF BITS 12 AND 11 OF CHANNEL 33. IF A BIT CHANGES TO A
 R0839 0, A PROGRAM ALARM IS ISSUED. THE ALARMS ARE:

	BIT	ALARM	CAUSE
R0840	---	----	-----
R0841			
R0842	12	01105	DOWNLINK TOO FAST
R0843	11	01106	UPLINK TOO FAST

R0844 CALLING SEQUENCE: BY C33TEST ON A BIT CHANGE.

R0845 SUBROUTINES CALLED: ALARM, IF A BIT CHANGES TO A 0.

R0846 ERASABLE INITIALIZATION: FRESH START OR RESTART, BITS 12 AND 11 OF IMODES33 ARE SET TO 1.

R0848 ALARMS: SEE FUNCTIONAL DESCRIPTION.

R0849 EXIT: NXTFL33.

R0850 OUTPUT: PROGRAM ALARM ON A BIT CHANGE TO 0.

0851	REF	21	LAST	192	06,2671	10 000 0	DNTMFAST	CCS	A	DO PROG ALARM IF TM TOO FAST.
0852	REF	4	LAST	192	06,2672	1 2432 1		TCF	NXTFL33	
0853	REF	5	LAST	192	06,2673	0 5567 0		TC	ALARM	
0854					06,2674	01105 1		OCT	1105	
0855	REF	5	LAST	193	06,2675	1 2432 1		TCF	NXTFL33	
0856	REF	22	LAST	193	06,2676	10 000 0	UPTMFAST	CCS	A	SAME AS DNLINK TOO FAST WITH DIFFERENT
0857	REF	6	LAST	193	06,2677	1 2432 1		TCF	NXTFL33	ALARM CODE.
0858	REF	6	LAST	193	06,2700	0 5567 0		TC	ALARM	
0859					06,2701	01106 1		OCT	1106	
0860	REF	7	LAST	193	06,2702	1 2432 1		TCF	NXTFL33	

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P0861 PROGRAM NAME: SETISSW

R0862 FUNCTIONAL DESCRIPTION: THIS PROGRAM TURNS THE ISS WARNING LAMP ON AND OFF (CHANNEL 11 BIT 1 = 1 FOR ON, _____
 R0864 0 FOR OFF) DEPENDING ON THE STATUS OF IMODES30 BITS 13 (IMJ FAIL) AND 4 (INHIBIT IMU FAIL), 12 (ICDU FAIL) AND
 R0866 3 (INHIBIT ICDU FAIL), AND 10 (PIPA FAIL) AND 1 (INHIBIT PIPA FAIL). THE LAMP IS LEFT ON IF A LAMP TEST IS IN
 R0868 PROGRESS.

R0869 CALLING SEQUENCE: CALLED BY IMUMON ON CHANGES TO IMU FAIL AND ICDU FAIL. CALLED BY IFAILOK AND PFAILOK UPON
R0871 REMOVAL OF THE FAIL INHIBITS. CALLED BY PIPFAIL WHEN THE PIPA FAIL DISCRETE CHANGES. IT IS CALLED BY PIPUSE
R0873 SINCE THE PIPA FAIL PROGRAM ALARM MAY NECESSITATE AN ISS WARNING, AND LIKEWISE BY PIPFREE WHEN THE ALARM DEPARTS
R0875 AND IT IS CALLED BY IMUZERO3 AND ISSUP AFTER THE FAIL INHI8ITS HAVE BEEN REMOVED.

R0877 JC8S CR TASKS INITIATED: NONE.

R0878 - SUBROUTINES CALLED: - NONE.

R0879 ERASABLE INITIALIZATION:

R0880 1) IMODES30 - SEE IMUMON.
R0881 2) IMODES33 BIT 1 = 0 (LAMP TEST NOT IN PROGRESS).

R0882 ALARMS: ISS WARNING.

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R08821 THE FOLLOWING PROGRAM ALARMS WILL SHOW WHICH FAILURE CAUSED THE ISS WARN
R08822 PROGRAM ALARM 00777 PIPA FAIL
R08823 PROGRAM ALARM 03777 ICDU FAIL
R08824 PROGRAM ALARM 04777 ICDU , PIPA FAILS
R08825 PROGRAM ALARM 07777 IMU FAIL
R08826 PROGRAM ALARM 10777 IMU , PIPA FAILS
R08827 PROGRAM ALARM 13777 IMU , ICDU FAILS
R08828 PROGRAM ALARM 14777 IMU , ICDU , PIPA FAILS

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R0883 EXIT: VIA Q.

R0884 OUTPUT: ISS WARNING LAMP SET PROPERLY.

0885	REF	1			06,2703	3 4761 0	SETISSW	CAF	ICT15	SET ISS WARNING USING THE FAIL BITS IN
0886	REF	28	LAST	192	06,2704	7 1302 0		MASK	IMODES30	8ITS 13, 12, AND 10 OF IMODES30 AND THE
0887					06,2705	0 0006 1		EXTEND		FAILURE INHIBIT BITS IN POSITIONS
0888	REF	15	LAST	192	06,2706	7 4742 0		MP	BIT10	4, 3, AND 1.
0889	REF	29	LAST	194	06,2707	3 1302 1		CA	IMODES30	
0890					06,2710	0 0006 1		EXTEND		
0891	REF	5	LAST	182	06,2711	04 001 1		ROR	LCHAN	0 INDICATES FAILURE
0892					06,2712	4 0000 0		COM		
0893	REF	1			06,2713	7 5025 1		MASK	ICT15000	
0894	REF	23	LAST	193	06,2714	10 000 0		CCS	A	
0895	REF	1			06,2715	1 2726 1		TCF	ISSWON	FAILURE.
0896	REF	14	LAST	192	06,2716	3 4753 1	ISSWOFF	CAF	8IT1	DONT TURN OFF ISS WARNING IF LAMP TEST
0897	REF	12	LAST	191	06,2717	7 1303 1		MASK	IMODES33	IN PROGRESS.

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0898 REF 24 LAST 194 06,2720 10 000 0
 0899 REF 3 LAST 172 06,2721 0 0002 0

CCS A
 TC Q

0900 REF 15 LAST 194 06,2722 4 4753 0
 0901 06,2723 0 0006 1
 0902 REF 5 LAST 189 06,2724 03 011 1
 0903 REF 4 LAST 195 06,2725 0 0002 0

CS BIT1
 EXTEND
 WAND DSALMOUT
 TC Q

0904 06,2726 0 0006 1
 090402 REF 1 06,2727 22 066 1
 090404 REF 1 06,2730 0 5735 0
 09041 REF 16 LAST 195 06,2731 3 4753 1
 0905 06,2732 0 0006 1
 0906 REF 6 LAST 195 06,2733 05 011 1
 0907 REF 2 LAST 195 06,2734 0 0066 1

ISSWON EXTEND
 QXCH ITEMP6
 TC VARALARM
 CAF BIT1
 EXTEND
 WOR DSALMOUT
 TC ITEMP6

TELL EVERYONE WHAT CAUSED THE ISSWARNING

0908 REF 1 06,2735 4 3003 0
 0909 06,2736 0 0006 1
 0910 REF 9 LAST 189 06,2737 03 012 1
 0911 REF 2 LAST 180 06,2740 3 4763 1
 0912 06,2741 0 0006 1
 0913 REF 10 LAST 195 06,2742 05 012 1

CAGESUB CS BITS6&15
 EXTEND
 WAND CHAN12
 CAF BITS4&5
 EXTEND
 WOR CHAN12

SET OUTBITS AND INTERNAL FLAGS FOR
 SYSTEM TURN-ON OR CAGE. DISABLE THE
 ERROR COUNTER AND REMOVE IMU DELAY COMP.
 SEND ZERO AND COARSE.

0914 REF 11 LAST 185 06,2743 4 1036 1
 0915 REF 1 06,2744 7 2773 1
 0916 REF 12 LAST 195 06,2745 27'036 1

CAGESUB1 CS DSPTAB +11D
 MASK OC40010
 ADS DSPTAB +11D

TURN ON NO ATT LAMP

0918 REF 30 LAST 194 06,2746 4 1302 0
 0919 REF 1 06,2747 7 2775 1
 0920 REF 31 LAST 195 06,2750 27'302 0

CAGESUB2 CS IMODES30
 MASK OCT75
 ADS IMODES30

SET FLAGS TO INDICATE CAGING OR TURN-ON
 AND INHIBIT ALL ISS WARNING INFO

0922 REF 13 LAST 194 06,2751 4 1303 1
 0923 REF 21 LAST 191 06,2752 7 4746 1
 0924 REF 14 LAST 195 06,2753 27'303 1

CS IMODES33
 MASK BIT6
 ADS IMODES33

DISABLE DAP AUTO AND HOLD MODES

0925 REF 5 LAST 195 06,2754 0 0002 0

TC Q

0926 REF 3 LAST 192 06,2703
 0927 REF 4 LAST 195 06,2703

IMUFAIL EQUALS SETISSW
 1CDUFAIL EQUALS SET1SSW

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P0928 JUMP TABLES AND CONSTANTS.

0929	REF	1		06,2755	1 2533 1	IFAILJMP	TCF	ITURNON	CHANNEL 30 DISPATCH.
0930	REF	1		06,2756	1 2703 0		TCF	IMUFAIL	
0931	REF	1		06,2757	1 2703 0		TCF	ICDUFAIL	
0932	REF	1		06,2760	1 2565 1		TCF	IMUCAGE	
0933				06,2761	76400 1	3ORDMSK	OCT	76400	{BIT 10 NOT SAMPLED HERE}.
0934	REF	1		06,2762	1 2622 1		TCF	IMUOP	
0935	REF	1		06,2763	1 2650 1	C33JMP	TCF	PIPFail	CHANNEL 33 DISPATCH.
0936	REF	1		06,2764	1 2671 1		TCF	DNTMFAST	
0937	REF	1		06,2765	1 2676 0		TCF	UPTMFAST	

R0938 SUBROUTINE TO SKIP IF LAMP TEST NOT IN PROGRESS.

0939	REF	15	LAST 195	06,2766	4 1303 1	LAMPTEST	CS	IMODES33	BIT 1 OF IMODES33 = 1 IF LAMP TEST IN PROGRESS.
0940	REF	17	LAST 195	06,2767	7 4753 0		MASK	BIT1	
0941	REF	25	LAST 195	06,2770	10 000 0		CCS	A	
0942	REF	6	LAST 195	06,2771	24 002 0		INCR	Q	
0943	REF	7	LAST 196	06,2772	0 0002 0		TC	Q	

0944	REF	1		5026		33RDMSK	EQUALS	PRI016
0945				06,2773	40010 1	OC40010	OCT	40010
0947				06,2774	00054 0	OCT54	OCT	54
0948				06,2775	00075 0	OCT75	OCT	75
09485				06,2776	00272 0	OCT272	OCT	00272
0949				06,2777	00300 1	BITS768	OCT	300
0950				06,3000	01720 0	OCT1720	OCT	1720
0951				06,3001	00740 1	OCT740	OCT	00740
0952	REF	1		5025		OCT15000	EQUALS	PRI015
0953				06,3002	77000 1	OCT77000	OCT	77000
0954				06,3003	40040 1	BITS6&15	OCT	40040
0955				06,3004	76777 1	-BIT10	OCT	-1000

0956				06,3005	21450 0	90SECS	DEC	9000	{DEC12}
0957	REF	1		5742		120MS	=	OCT14	
0958	REF	4	LAST 175	5270		GLOCKOK	EQUALS	RESUME	

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P0959 PROGRAM NAME_ RRAUTCHK

R0960 FUNCTIONAL DESCRIPTION_
 R0961 RRAUTCHK IS THE RENDEZVOUS RADAR INBIT MONITOR. INITIALLY THE RR
 R0962 POWER ON AUTO (CHAN 33 BIT 2) INBIT IS CHECKED. IF NO CHANGE, THE
 R0963 PROGRAM EXITS TO RRCDUCHK. IF A CHANGE, RADMODES IS UPDATED
 R0964 AND A CHECK MADE IF RR POWER HAS JUST COME ON. IF JUST OFF, A CHECK
 R0965 IS MADE TO SEE IF A PROGRAM WAS USING THE RR (STATE BIT 7). IF NO,
 R0966 THE PROGRAM EXITS TO RRCDUCHK. IF YES, PROGRAM ALARM 00514
 R0967 IS REQUESTED BEFORE EXITING TO RRCDUCHK. IF RR POWER HAS JUST COME
 R0968 ON, A CHECK IS MADE TO SEE IF A PROGRAM WAS USING THE RR (STATE BIT 7).
 R0969 IF YES, THE PROGRAM EXITS TO RRCDUCHK WITHOUT REQUESTING THE TURN-ON
 R0970 SEQUENCE. IF NO, RADMODES IS UPDATED TO INDICATE RR CDU ZERO AND
 R0971 RR TURN-ON SEQUENCE (BITS 13, 1). A 10 MILLISECOND WAITLIST CALL
 R0972 IS THEN SET FOR RRTURNON BEFORE THE PROGRAM EXITS TO NORRGMON.

R0973 CALLING SEQUENCE_
 R0974 T4RUPT EVERY 480 MILLISECONDS

R0975 ERASABLE INITIALIZATION REQUIRED_
 R0976 RADMODES, STATE

R0977 SUBROUTINES CALLED_
 R0978 WAITLIST

R0979 JCBS CR TASKS INITIATED_
 R0980 RRTURNON

R0981 ALARMS_ PROGRAM ALARM 00514 - RADAR GOES OUT OF AUTO MODE WHILE BEING
 R0982 USED

R0983 EXIT_ RRCDUCHK, NORRGMON

0984	REF	3	LAST	188	06,3006	3 0110 1	RRAUTCHK CA	RADMODES	SEE IF CHANGE IN RR AUTO MODE BIT.
0985					06,3007	0 0006 1	EXTEND		
0986	REF	2	LAST	182	06,3010	06 033 1	RXOR	CHAN33	
0987	REF	18	LAST	191	06,3011	7 4752 1	MASK	BIT2	
0988					06,3012	0 0006 1	EXTEND		
0989	REF	1			06,3013	1 3037 1	BZF	RRCDUCHK	
0990	REF	4	LAST	197	06,3014	22 110 1	LXCH	RADMODES	UPDATE RADMODES.
0991					06,3015	0 0006 1	EXTEND		
0992	REF	6	LAST	194	06,3016	06 001 0	RXOR	LCHAN	
09925	REF	1			06,3017	7 3033 0	MASK	OCT05776	CLR CONT. DES., REMODE, REPOS, CDUZERO,
0993	REF	5	LAST	197	06,3020	54 110 0	TS	RADMODES	AND TURNON BITS.
0994	REF	19	LAST	197	06,3021	7 4752 1	MASK	BIT2	SEE IF JUST ON.
0995	REF	26	LAST	196	06,3022	10 000 0	CCS	A	
0996	REF	2	LAST	197	06,3023	1 3034 1	TCF	RRCDUCHK -3	OFF. GO DISABLE RR CDU ERROR COUNTERS.
0999	REF	1			06,3024	3 7662 1	CA	OCT10001	SET RRCDUZRO AND TURNON BITS.
1000	REF	6	LAST	197	06,3025	26 110 0	ADS	RADMODES	

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1001	REF	5	LAST	183	06,3026	3 4753 1	CAF	ONE
1002	REF	5	LAST	184	06,3027	0 5203 0	TC	WAITLIST
1003	REF	1			E7,1454		EBANK=	LCSC.OUNT
1004	REF	1			06,3030	02062 1	2CADR	RTURNON
1004	REF	1			06,3031	52107 0		
1005	REF	1			06,3032	1 3132 0	TCF	NORRGMON
1006					06,3033	05776 1 OCT05776	OCT	5776

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P1007 PROGRAM NAME_ RRCDUCHK

R1008 FUNCTIONAL DESCRIPTION_
 R1009 RRCDUCHK CHECKS FOR RR CDU FAIL (CHAN 30 BIT 7). INITIALLY THE
 R1010 RR CDU FAIL BIT IS SAMPLED (CHAN 30 BIT 7). IF NO CHANGE, THE
 R1011 PROGRAM EXITS TO RRGIMON. IF A CHANGE, THE RR AUTO MODE
 R1012 (RADMCDES BIT 2) BIT IS CHECKED. IF NOT IN RR AUTO MODE, THE
 R1013 PROGRAM EXITS TO NORRGIMON. IF IN AUTO MODE, RADMODES BIT 7
 R1014 (RR CDU OK) IS UPDATED AND IF P-20 IS OPERATING PROGRAM ALARM 00515 IS
 R1015 REQUESTED. CONTROL IS TRANSFERRED TO SETTRKF TO UPDATE
 R1016 THE TRACKER FAIL LAMP (DSPTAB+11D BIT 8). CONTROL RETURNS TO
 R1017 RRGIMON.

R1018 CALLING SEQUENCE_
 R1019 EVERY 480 MILLISECONDS FROM RRAUTCHK (VIA T4RUPT) UNLESS A
 R1020 TURN-CN SEQUENCE HAS JUST BEEN INITIATED.

R1021 ERASABLE INITIALIZATION REQUIRED_
 R1022 RADMCDES

R1023 SUBROUTINES CALLED_
 R1024 SETTRKF

R1025 JOBS OR TASKS INITIATED_
 R1026 NCNE

R1027 ALARMS_
 R1028 TRACKER FAIL
 R1029 PROGRAM ALARM 00515 - RRCDU FAIL DURING P-20

R1030 EXIT_
 R1031 RRGIMON, NORRGIMON

10315	REF	20	LAST	197	06,3034	4 4752	1	-3	CS	BIT2	
10316					06,3035	0 0006	1		EXTEND		
10317	REF	11	LAST	195	06,3036	03 012	1		WAND	CHAN12	AT TURNON, DISABLE CDU ERROR COUNTERS.

1032	REF	7	LAST	197	06,3037	3 0110	1	RRCDUCHK	CA	RADMCDES	LAST SAMPLED BIT IN RADMCDES.
1033					06,3040	0 0006	1		EXTEND		
1034	REF	2	LAST	176	06,3041	06 030	1		RXOR	CHAN30	
1035	REF	17	LAST	188	06,3042	7 4745	1		MASK	BIT7	
1036					06,3043	0 0006	1		EXTEND		
1037	REF	1			06,3044	1 3071	0		BZF	RRGIMON	

1038	REF	21	LAST	199	06,3045	3 4752	0		CAF	BIT2	IF RR NOT IN AUTO MODE, DONT CHANGE BIT
1039	REF	8	LAST	199	06,3046	7 0110	0		MASK	RADMCDES	7 OF RADMCDES. IF THIS WERE NOT DONE,
1040	REF	27	LAST	197	06,3047	10 000	0		CCS	A	THE TRACKER FAIL MIGHT COME ON WHEN
1041	REF	2	LAST	198	06,3050	1 3132	0		TCF	NORRGIMON	JUST READING LR DATA.

1042	REF	18	LAST	199	06,3051	3 4745	0		CAF	BIT7	SET BIT 7 OF RADMCDES FOR SETTRKF.
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1043	REF	9	LAST	199	06,3052	22 110 1	LXCH	RADMODES	UPDATE RADMODES.
1044					06,3053	0 0006 1	EXTEND		
1045	REF	3	LAST	182	06,3054	06 001 0	RXOR	L	
1046	REF	10	LAST	200	06,3055	54 110 0	TS	RADMODES	
1047	REF	11	LAST	200	06,3056	3 0110 1	CA	RADMODES	DID RR CDU FAIL
1048	REF	19	LAST	199	06,3057	7 4745 1	MASK	BIT7	
1049	REF	28	LAST	199	06,3060	10 000 0	CCS	A	
1050	REF	1			06,3061	1 3070 1	TCF	TRKFCDU	NO
1051	REF	5	LAST	191	06,3062	4 0074 0	CS	FLAGWRD	RNDVFLG P20 OR P22 OPERATING
1052	REF	1			06,3063	7 4745 1	MASK	RNDVZBIT	
1053	REF	29	LAST	200	06,3064	10 000 0	CCS	A	
1054	REF	2	LAST	200	06,3065	1 3070 1	TCF	TRKFCDU	NO
1055	REF	7	LAST	193	06,3066	0 5567 0	TC	ALARM	YES
1056					06,3067	00515 0	OCT	00515	
1057	REF	1			06,3070	0 4564 1	TRKFCDU TC	SETTRKF	UPDATE TRACKER FAIL LAMP ON DSKY.

L T4RUPT PROGRAM

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P1058 PROGRAM NAME_ RRGIMON

E AUTO MODE EXCEPT WHEN THE RR CDUS ARE

R1060 FUNCTIONAL DESCRIPTION_
 R1062 RRGIMON IS THE RR GIMBAL LIMIT MONITOR. INITIALLY THE FOLLOWING IS
 R1064 CHECKED_ REMODE, RR CDU:S BEING ZEROED, REPOSITION, AND RR
 R1065 NOT IN AUTO MODE (RADMODES BITS 14, 13, 11 2). IF ANY OF THESE
 R1066 EXIST THE PROGRAM EXITS TO GPMATRIX. IF NONE ARE PRESENT RRLIMCHK
 R1067 IS CALLED TO SEE IF THE PRESENT RR CDU ANGLES (OPTY, OPTX) ARE WITHIN
 R1068 THE LIMITS OF THE CURRENT MODE. IF WITHIN LIMITS, THE PROGRAM EXITS
 R1069 TO NORRGMON. IF NOT WITHIN LIMITS, THE REPOSITION FLAG (RADMODES
 R1070 BIT 11) IS SET, THE RR AUTO TRACKER AND RR ERROR COUNTER
 R1071 (CHAN 12 BITS 14, 2) ARE DISABLED, AND A 20 MILLISECOND WAITLIST
 R1072 CALL IS SET FOR DORREPOS AFTER WHICH THE PROGRAM EXITS TO NORRGMON.

TTER IS INITIATED BY THIS MONITOR WHEN
 ED TO DRIVE THE GIMBALS TO T = 0 AND

R1073 CALLING SEQUENCE_
 R1074 EVERY 480 MILLISECONDS FROM RRCDUCHK (VIA T4RUPT) UNLESS TURN-ON
 R1075 HAS JUST BEEN INITIATED VIA RRAUTCHK OR IF THERE HAS BEEN A CHANGE IN
 R1076 THE RR CDU FAIL BIT (CHAN 30 BIT 7) AND THE RR IS NOT IN THE AUTO MODE
 R1077 (RADMODES BIT 2).

R1078 ERASABLE INITIALIZATION_ RADMODES

R1079 SUBROUTINES CALLED_
 R1080 RRLIMCHK, WAITLIST

R1081 JOBS OR TASKS INITIATED_
 R1082 DORREPOS

R1083 ALARMS_
 R1084 NCNE

R1085 EXIT_
 R1086 NORRGMON

1087	REF	4	LAST	189	06,3071	30 101 1	RRGIMON	CAF	FLAGWRD5	IS NO ANGLE MONITOR FLAG SET
1088	REF	1			06,3072	7 4750 0		MASK	NORRMBIT	
1089	REF	30	LAST	200	06,3073	10 000 0		CCS	A	
1090	REF	3	LAST	199	06,3074	1 3132 0		TCF	NORRGMON	YES - SKIP LIMIT CHECK
10901	REF	1			06,3075	4 0103 1		CS	FLAGWRD7	IS SERVICER RUNNING?
10902	REF	1			06,3076	7 4747 0		MASK	AVEGFBIT	
10903	REF	31	LAST	201	06,3077	10 000 0		CCS	A	
10904					06,3100	1 3105 1		TCF	+5	NO. DO R25
10905	REF	1			06,3101	3 0102 1		CA	FLAGWRD6	YES. IS MUNFLAG SET?
10906	REF	1			06,3102	7 4744 0		MASK	MUNFLBIT	
10907	REF	32	LAST	201	06,3103	10 000 0		CCS	A	
10908	REF	4	LAST	201	06,3104	1 3132 0		TCF	NORRGMON	YES. DON'T DO R25
1091	REF	1			06,3105	3 3127 0	+5	CAF	OCT32002	INHIBIT BY REMODE,ZEROING,MONITOR.
1092	REF	12	LAST	200	06,3106	7 0110 0		MASK	RADMODES	OR RR NOT IN AUTO.
1093	REF	33	LAST	201	06,3107	10 000 0		CCS	A	
1094	REF	5	LAST	201	06,3110	1 3132 0		TCF	NORRGMON	

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1095	REF	1		06,3111	0 4523 1		TC	RRLIMCHK	SEE IF ANGLES IN LIMITS.
1096	REF	1		06,3112	00035 1		ADRES	CDUT	
1097	REF	1		06,3113	1 3115 0		TCF	MONREPOS	
1098	REF	6	LAST 201	06,3114	1 3132 0		TCF	NORRGMON	(ADDITIONAL CODING MAY GO HERE).
1099	REF	15	LAST 180	06,3115	3 4741 1	MONREPOS	CAF	BIT11	SET FLAG TO SHOW REPOSITION IN PROGRESS.
1100	REF	13	LAST 201	06,3116	26 110 0		ADS	RADMODES	
1101	REF	1		06,3117	4 3130 1		CS	OCT20002	DISABLE TRACKER AND ERROR COUNTER.
1102				06,3120	0 0006 1		EXTEND		
1103	REF	12	LAST 199	06,3121	03 012 1		WAND	CHAN12	
1104	REF	2	LAST 36	06,3122	3 4752 0		CAF	TWO	
1105	REF	6	LAST 198	06,3123	0 5203 0		TC	WAITLIST	
1106	REF	2	LAST 198	E7,1454			EBANK=	LOSCOUNT	
1107	REF	1		06,3124	02127 1		2CADR	DORREPOS	
1107	REF	1		06,3125	52107 0				
1108	REF	7	LAST 202	06,3126	1 3132 0		TCF	NORRGMON	
1109				06,3127	32002 1	OCT32002	OCT	32002	
1110				06,3130	20002 1	OCT20002	OCT	20002	
1111				06,3131	02100 1	OCT02100	OCT	02100	P20,P22 MASK BITS

L T4RUPT PROGRAM

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P1112 PROGRAM NAME: GPMATRIX (DAPT4S) MOD. NO. 2 DATE: OCTOBER 27, 1966

R1113 AUTHOR: JONATHAN C. ADDELSTON (ADAMS ASSOCIATES)

R11131 MODIFIED: 7FEB. 1968 BY P. S. WEISSMAN TO DELETE COMPUTATION OF MR12 AND MR13, WHICH ARE NO LONGER REQUIRED.

R1114 THIS PROGRAM CALCULATES ALL THE SINGLE-PRECISION MATRIX ELEMENTS WHICH ARE USED BY LEM DAP TO TRANSFORM VECTORS
 R1116 FROM GIMBAL TO PILOT (BODY) AXES AND BACK AGAIN. THESE ELEMENTS ARE USED EXCLUSIVELY BY BASIC LANGUAGE ROUTINES
 R1118 AND THEREFORE ARE NOT ARRAYED FOR USE BY INTERPRETIVE PROGRAMS.

R1119 CALLING SEQUENCE: GPMATRIX IS TRANSFERRED TO FROM DAPT4S AND IS THUS EXECUTED 4 TIMES A SECOND BY T4RUPT.
 R1121 DAPT4S IS LISTED IN T4JUMP TABLE TWICE EXPLICITLY AND ALSO OCCURS AFTER BRAUTCHK (WHICH IS ALSO LISTED TWICE).

R1123 SUBROUTINES CALLED: SPSIN, SPCOS.

R1124 NORMAL EXIT MODE: TCF RESUME

R1125 ALARM AND ABORT MODES: NONE.

R1130 INPUT: CDUX, CDUY, CDUZ.

R1131 OUTPUT: M11, M21, M31, M22, M32.

R1132 AGG = CDUX, AIG = CDUY, AMG = CDUZ: MNEMONIC IS: OIM = XYZ

R1133 * * SIN(MG) 0 1 *
 R1134 M = * COS(MG)COS(OG) SIN(OG) 0 *
 R1135 GP * -COS(MG)SIN(OG) COS(OG) 0 *

R1136 * * 0 COS(OG)/COS(MG) -SIN(OG)/COS(MG) *
 R1137 M = * 0 SIN(OG) COS(OG) *
 R1138 PG * 1 -SIN(MG)COS(OG)/COS(MG) SIN(MG)SIN(OG)/COS(MG) *

1143 REF 5 LAST 181 E6,1412 EBANK= M11
 1144 REF 1 06,3132 DAPT4S EQUALS GPMATRIX
 R1145 T4RUPT DAP LOGIC:

1146	REF	2	LAST	184	06,3132	30 034 0	GPMATRIX	CAE	CDUZ	SINGLE ENTRY POINT
1147	REF	1			06,3133	0 5033 1		TC	SPSIN	SIN(CDUZ) = SIN(MG)
1148	REF	6	LAST	203	06,3134	55'412 0		TS	M11	SCALED AT 1
1149	REF	3	LAST	203	06,3135	30 034 0		CAE	CDUZ	
1150	REF	1			06,3136	0 5032 0		TC	SPCOS	COS(CDUZ) = COS(MG)
1151	REF	1			06,3137	54 061 1		TS	COSMG	SCALED AT 1 (ONLY A FACTOR)
1152	REF	1			06,3140	30 032 0		CAE	CDUX	
1153	REF	2	LAST	203	06,3141	0 5033 1		TC	SPSIN	SIN(CDUX) = SIN(OG)
1154	REF	1			06,3142	55'415 1		TS	M22	SCALED AT 1 (ALSO IS MR22)
1155	REF	2	LAST	203	06,3143	4 1415 1		CS	M22	

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1156				06,3144	0 0006 1	EXTEND		
1157	REF	2	LAST	203	06,3145	7 0061 1	MP	COSMG -SIN(OG)COS(MG)
1158	REF	1			06,3146	55'414 0	TS	M31 SCALED AT 1
1159	REF	2	LAST	203	06,3147	30 032 0	CAE	CDUX
1160	REF	2	LAST	203	06,3150	0 5032 0	TC	SPCOS COS(CDUX) = COS(OG)
1161	REF	1			06,3151	55'416 1	TS	M32 SCALED AT 1 (ALSO IS MR 23)
1162					06,3152	0 0006 1	EXTEND	
1163	REF	3	LAST	204	06,3153	7 0061 1	MP	COSMG COS(OG)COS(MG)
1164	REF	1			06,3154	55'413 1	TS	M21 SCALED AT 1
1191	REF	5	LAST	196	06,3155	0 5270 1	TC	RESUME
1192	REF	3	LAST	174	06,3132		NORRGMON	EQUALS DAPT4S
1193	REF	6	LAST	204	5270		ENDDAPT4	EQUALS RESUME

L RCS FAILURE MONITOR

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R0001 PROGRAM DESCRIPTION

R0002 AUTHOR: J S MILLER

R00025 MODIFIED 6 MARCH 1968 BY P S WEISSMAN TO SET UP JOB FOR 1/ACCS WHEN THE MASKS ARE CHANGED.

R0003 THIS ROUTINE IS ATTACHED TO T4RUPT, AND IS ENTERED EVERY 480 MS. ITS FUNCTION IS TO EXAMINE THE LOW 8 BITS
R0005 OF CHANNEL 32 TO SEE IF ANY ISOLATION-VALVE CLOSURE BITS HAVE APPEARED OR DISAPPEARED (THE CREW IS WARNED OF JET
R0007 FAILURES BY LAMPS LIT BY THE GRUMMAN FAILURE-DETECTION CIRCUITRY; THEY MAY RESPOND BY OPERATING SWITCHES WHICH
R0009 ISOLATE PAIRS OF JETS FROM THE PROPELLANT TANKS AND SET BITS IN CHANNEL 32). IN THE EVENT THAT CHANNEL 32 BITS
R0011 DIFFER FROM 'PVALVEST', THE RECORD OF ACTIONS TAKEN BY THIS ROUTINE, THE APPROPRIATE BITS IN 'CH5MASK' &
R0013 'CH6MASK', USED BY THE DAP JET-SELECTION LOGIC, ARE UPDATED, AS IS 'PVALVEST'. TO SPEED UP & SHORTEN THE
R0015 ROUTINE, NO MORE THAN ONE CHANGE IS ACCEPTED PER ENTRY. THE HIGHEST-NUMBERED BIT IN CHANNEL 32 WHICH REQUIRES
R0017 ACTION IS THE ONE PROCESSED.

R0018 THE CODING IN THE FAILURE MONITOR HAS BEEN WRITTEN SO AS TO HAVE ALMOST COMPLETE RESTART PROTECTION. FOR
R0020 EXAMPLE, NO ASSUMPTION IS MADE WHEN SETTING A 'CH5MASK' BIT TO 1 THAT THE PREVIOUS STATE IS 0, ALTHOUGH IT OF
R0022 COURSE SHOULD BE. ONE CASE WHICH MAY BE SEEN TO EVADE PROTECTION IS THE OCCURRENCE OF A RESTART AFTER UPDATING
R0024 ONE OR BOTH DAP MASK-WORDS BUT BEFORE UPDATING 'PVALVEST', COUPLED WITH A CHANGE IN THE VALVE-BIT BACK TO ITS
R0026 FORMER STATE. THE CONSEQUENCE OF THIS IS THAT THE NEXT ENTRY WOULD NOT SEE THE CHANGE INCOMPLETELY INCORP-
R0028 ORATED BY THE LAST PASS (BECAUSE IT WENT AWAY AT JUST THE RIGHT TIME), BUT THE DAP MASK-WORDS WILL BE INCORRECT.
R0030 THIS COMBINATION OF EVENTS SEEMS QUITE REMOTE, BUT NOT IMPOSSIBLE UNLESS THE CREW OPERATES THE SWITCHES AT HALF-
R0032 SECOND INTERVALS OR LONGER. IN ANY EVENT, A DISAGREEMENT BETWEEN REALITY AND THE DAP MASKS WILL BE CURED IF
R0034 THE MISINTERPRETED SWITCH IS REVERSED AND THEN RESTORED TO ITS CORRECT POSITION (SLOWLY).

R0036 CALLING SEQUENCE:

R0037 TCF RCSMONIT (IN INTERRUPT MODE, EVERY 480 MS.)

R0038 EXIT: TCF RCSMONEX (ALL PATHS EXIT VIA SUCH AN INSTRUCTION)
0039 REF 7 LAST 204 5270 RCSMONEX EQUALS RESUME

R0040 ERASABLE INITIALIZATION REQUIRED:

R0041 VIA FRESH START: PVALVEST = +0 (ALL JETS ENABLED)
R0042 CH5MASK, CH6MASK = +0 (ALL JETS OK)

R0043 OUTPUT: CH5MASK & CH6MASK UPDATED (1'S WHERE JETS NOT TO BE USED, IN CHANNEL 5 & 6 FORMAT)
R0045 PVALTEST UPDATED (1'S WHEN VALVE CLOSURES HAVE BEEN TRANSLATED INTO CH5MASK & CH6MASK; CHAN 32 FORMAT)
R00465 JOB TO DO 1/ACCS.

R0047 DEBRIS: A, L, Q AND DEBRIS OF NOVAC.

R0048 SUBROUTINE CALLED: NOVAC.

0052 REF 1 1262 EBANK= CH5MASK

0059 23,2000 BANK 23
0060 REF 1 06,2000 SETLOC RCSMONT
0061 06,3156 BANK

L RCS FAILURE MONITOR

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					COUNT* \$\$/T4RCS				
0062	REF	1					RCSMONIT	EQUALS	RCSMON
00625	REF	1	06,3156						
0063	REF	6	LAST	189	06,3156	4 4755 0	RCSMON	CS	ZERO
0064					06,3157	0 0006 1		EXTEND	
0065	REF	2	LAST	173	06,3160	06 032 0		RXOR	CHAN32
0066	REF	1			06,3161	7 4357 0		MASK	LOW8
0067	REF	8	LAST	196	06,3162	54 002 1		TS	Q
PICK UP + INVERT INVERTED CHANNEL 32. KEEP JET-FAIL BITS ONLY.									
0068	REF	1			06,3163	4 1276 1		CS	PVALVEST
0069	REF	9	LAST	206	06,3164	7 0002 1		MASK	Q
0070	REF	4	LAST	200	06,3165	54 001 1		TS	L
0071	REF	10	LAST	206	06,3166	4 0002 1		CS	Q
0072	REF	2	LAST	206	06,3167	7 1276 1		MASK	PVALVEST
0073	REF	5	LAST	206	06,3170	26 001 1		ADS	L
RESULT NZ INDICATES ACTION REQUIRED.									
0074					06,3171	0 0006 1		EXTEND	
0075	REF	1			06,3172	1 5270 0		BZF	RCSMONEX
QUIT IF NO ACTION REQUIRED.									
0076					06,3173	0 0006 1		EXTEND	
0077	REF	20	LAST	200	06,3174	7 4745 1		MP	BIT7
0078	REF	6	LAST	206	06,3175	56 001 0		XCH	L
MOVE BITS 8 - 1 OF A TO 14 - 7 OF L. ZERO TO L IN THE PROCESS.									
0079	REF	7	LAST	206	06,3176	24 001 0	-3	INCR	L
0080					06,3177	6 0000 1		DOUBLF	
0081					06,3200	54 000 0		OVSF	
0082					06,3201	1 3176 0		TCE	-3
BOUND TO GET OVERFLOW IN THIS LOOP, SINCE WE ASSURED INITIAL NZ IN A.									
0083	REF	8	LAST	206	06,3202	50 001 0		INDEX	L
0084	REF	16	LAST	179	06,3203	3 4743 0		CA	BIT8 -1
0085	REF	11	LAST	206	06,3204	54 002 1		TS	Q
0086	REF	3	LAST	206	06,3205	7 1276 1		MASK	PVALVEST
0087	REF	34	LAST	201	06,3206	10 000 0		CCS	A
0088	REF	1			06,3207	1 3223 0		TCF	VOPENED
THE VALVE HAS JUST BEEN OPENED.									
0089	REF	2	LAST	205	06,3210	4 1262 1		CS	CH5MASK
0090	REF	9	LAST	206	06,3211	50 001 0		INDEX	L
0091	REF	1			06,3212	7 3242 1		MASK	5FAILTAB
0092	REF	3	LAST	206	06,3213	27*262 1		ADS	CH5MASK
THE VALVE HAS JUST BEEN CLOSED. SET INHIBIT BIT FOR CHANNEL 5 JET.									
0093	REF	1			06,3214	4 1263 0		CS	CH6MASK
0094	REF	10	LAST	206	06,3215	50 001 0		INDEX	L
0095	REF	1			06,3216	7 3252 0		MASK	6FAILTAB
0096	REF	2	LAST	206	06,3217	27*263 0		ADS	CH6MASK
SET INHIBIT BIT FOR CHANNEL 6 JET.									
0097	REF	12	LAST	206	06,3220	3 0002 0		CA	Q
0098	REF	4	LAST	206	06,3221	27*276 1		ADS	PVALVEST
RECORD ACTION TAKEN.									
0099	REF	1			06,3222	1 3236 1		TCF	1/ACCFIX
SET UP 1/ACCFIX AND EXIT.									

L RCS FAILURE MONITOR

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0100	REF	11	LAST	206	06,3223	50 001 0	VOPENEO	INDEX	L
0101	REF	2	LAST	206	06,3224	4 3242 1		CS	5FAILTAB
0102	REF	4	LAST	206	06,3225	7 1262 1		MASK	CH5MASK
0103	REF	5	LAST	207	06,3226	55*262 1		TS	CH5MASK

A VALVE HAS JUST BEEN OPENED.

REMOVE INHIBIT BIT FOR CHANNEL 5 JET.

0104	REF	12	LAST	207	06,3227	50 001 0		INDEX	L
0105	REF	2	LAST	206	06,3230	4 3252 0		CS	6FAILTAB
0106	REF	3	LAST	206	06,3231	7 1263 0		MASK	CH6MASK
0107	REF	4	LAST	207	06,3232	55*263 0		TS	CH6MASK

REMOVE INHIBIT BIT FOR CHANNEL 6 JET.

0108	REF	13	LAST	206	06,3233	4 0002 1		CS	Q
0109	REF	5	LAST	206	06,3234	7 1276 1		MASK	PVALVEST
0110	REF	6	LAST	207	06,3235	55*276 1		TS	PVALVEST

RECORD ACTION TAKEN.

0111	REF	1			06,3236	3 7714 1	1/ACCFIX	CAF	PRID27
0112	REF	2	LAST	173	06,3237	0 5072 1		TC	NOVAC
0113	REF	4	LAST	148	E6,1537			EBANK=	AOSQ
0114	REF	1			06,3240	02454 0		2CADR	1/ACCJOB
0114	REF	1			06,3241	40106 1			
0115	REF	2	LAST	206	06,3242	1 5270 0		TCF	RCSMCNEX

SET UP 1/ACCS SO THAT THE SWITCH CURVES
FOR TJETLAW CAN BE MODIFIED IF CH5MASK
HAS BEEN ALTERED.

EXIT.

0117					06,3241			5FAILTAB	EQUALS	-1
0118					06,3243	00040 0		OCT	00040	8
0119					06,3244	00020 0		OCT	00020	7
0120					06,3245	00100 0		OCT	00100	6
0121					06,3246	00200 0		OCT	00200	5
0122					06,3247	00010 0		OCT	00010	4
0123					06,3250	00001 0		OCT	00001	3
0124					06,3251	00004 0		OCT	00004	2
0125					06,3252	00002 0		OCT	00002	1

CH 5 JET BIT CORRESPONDING TO CH 32 BIT:

0126					06,3251			6FAILTAB	EQUALS	-1
0127					06,3253	00010 0		OCT	00010	8
0128					06,3254	00020 0		OCT	00020	7
0129					06,3255	00004 0		OCT	00004	6
0130					06,3256	00200 0		OCT	00200	5
0131					06,3257	00001 0		OCT	00001	4
0132					06,3260	00002 0		OCT	00002	3
0133					06,3261	00040 0		OCT	00040	2
0134					06,3262	00100 0		OCT	00100	1

CH 6 JET BIT CORRESPONDING TO CH 32 BIT:

L DOWNLINK LISTS

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0001 REE 1 22,2004 BANK 22
 0002 05,2000 SETLOC DOWNTLM
 0003 05,2065 BANK

0004 REF 2 LAST 169 0340 EBANK= DNTMBUEF

R0005 SPECIAL DOWNLINK OP CODES

OP CODE	ADDRESS(EXAMPLE)	SENDS..	BIT 15	BITS 14-12	BITS 11
A0006					-0
A0007					--
A0008					
A0009					
A0010	1DNADR TIME2	(2 AGC WDS)	0	0	ECADR
A0011	2DNADR TEPHEM	(4 AGC WDS)	0	1	ECADR
A0012	3DNADR VGBODY	(6 AGC WDS)	0	2	ECADR
A0013	4DNADR STATE	(8 AGC WDS)	0	3	ECADR
A0014	5DNADR UPBUEF	(10AGC WDS)	0	4	ECADR
A0015	6DNADR DSPTAB	(12AGC WDS)	0	5	ECADR
A0016	DNCHAN 30	CHANNELS	0	7	CHANNEL ADDRESS
A0017					
A0018	DNPTR NEXTLIST	POINTS TO NEXT LIST.	0	6	ADRES
A0019					

R0020 DOWNLIST ECRMAT DEFINITIONS AND RULES-

- R0021 1. END OF A LIST = -XDNADR (X = 1 TO 6), -DNPTR, OR -DNCHAN.
 R0022 2. SNAPSHOT SUBLIST = LIST WHICH STARTS WITH A -1DNADR.
 R0023 3. SNAPSHOT SUBLIST CAN ONLY CONTAIN 1DNADRS.
 R0024 4. TIME2 1DNADR MUST BE LOCATED IN THE CONTROL LIST OF A DOWNLIST.
 R0025 5. ERASABLE DOWN TELEMETRY WORDS SHOULD BE GROUPED IN SEQUENTIAL
 R0026 LOCATIONS AS MUCH AS POSSIBLE TO SAVE STORAGE USED BY DOWNLINK LISTS.

0027 REF 1 COUNT* \$\$/DLIST
 0028 0007 ERASZERO EQUALS 7
 0029 REF 1 0007 UNKNOWN EQUALS ERASZERO
 0030 REF 2 LAST 208 0007 SPARE EQUALS ERASZERO
 0032 05,2065 77340 0 LOWIDCOD OCT 77340 USE SPARE TO INDICATE AVAILABLE SPACE
 LOW ID CODE

0033 REF 1 05,2172 NOMDNLIST EQUALS LMCSTADL FRESH START AND POST P27 DOWNLIST

0034 REE 1 05,2407 AGSLIST EQUALS LMAGSIDL

0035 REE 2 LAST 208 05,2407 UPDNLIST EQUALS LMAGSIDL UPDATE PROGRAM (P27) DOWNLIST

L DOWNLINK LISTS

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P0036 LM ORBITAL MANEUVERS LIST

R0037 ----- CONTROL LIST -----

0038				05,2066		LMORBMDL	EQUALS	SEND ID BY SPECIAL CODING
0039	REF	1		05,2066	32127 1		DNPTR LMJRBMO1	COLLECT SNAPSHOT
0040	REF	3	LAST 208	05,2067	24340 0		6DNADR DNTMBUFF	SEND SNAPSHOT
0041	REF	1		05,2070	03447 0		1DNADR DELLT4	DELLT4,+1
0042	REF	1		05,2071	13441 1		3DNADR RTARG	RTARG,+1...+5
0043	REF	1		05,2072	02262 0		1DNADR ELEV	ELEV,+1
0044	REF	1		05,2073	01344 0		1DNADR TEVENT	TEVENT,+1
0045	REF	1		05,2074	25733 1		6DNADR REFSMMAT	REFSMMAT+0...+110
0046	REF	1		05,2075	03631 0		1DNADR TCSI	TCSI,+1
0047	REF	1		05,2076	12272 0		3DNADR DELVEET1	DELVEET1+0...+5
0048	REF	2	LAST 158	05,2077	13704 0		3DNADR VGTIG	VGTIG+0...+5
0049	*REF	2	LAST 123	05,2100	01340 1		1DNADR DNLRVELZ	DNLRVELZ,DNLRALT
0050	REF	2	LAST 159	05,2101	03626 0		1DNADR TPASS4	TPASS4,+1
0051	REF	1		05,2102	32136 1		DNPTR LMORBM02	COMMON DATA
0052	REF	1		05,2103	00024 1		1DNADR TIME2	TIME2/1
0053	REF	1		05,2104	32145 0		DNPTR LMORBM03	COLLECT SNAPSHOT
0054	REF	4	LAST 209	05,2105	24340 0		6DNADR DNTMBUFF	SEND SNAPSHOT
0055	REF	1		05,2106	32154 0		DNPTR LMORBM04	COMMON DATA
0056	REF	1		05,2107	07115 0		2DNADR POSTORKU	POSTORKU,NEGORKU,POSTORKV,NEGORKV
0058	REF	1		05,2110	00007 0		1DNADR SPARE	
0059	REF	1		05,2111	03373 0		1DNADR TCDH	TCDH,+1
0060	REF	1		05,2112	12300 1		3DNADR DELVEET2	DELVEET2+0...+5
0061	REF	1		05,2113	03633 1		1DNADR TTPI	TTPI,+1
0062	REF	1		05,2114	13365 0		3DNADR DELVFET3	DELVEET3+0...+5
0063	*REF	2	LAST 123	05,2115	01333 0		1DNADR DNRRANGE	DNRRANGE,DNRRDOT
0065	REF	2	LAST 123	05,2116	05336 1		2DNADR DNLRVELX	DNLRVELX,DNLRVELY,DNLRVELZ,DNLRALT
0066	REF	1		05,2117	03575 0		1DNADR DIFFALT	DIFFALT,+1
0067	REF	1		05,2120	01331 1		1DNADR LEMMASS	LEMASS,CSMASS
0068	REF	32	LAST 195	05,2121	01302 1		1DNADR IMODES30	IMODES30,IMODES33
0069	REF	1		05,2122	03437 1		1DNADR TIG	TIG,+1
0070	REF	1		05,2123	32157 0		DNPTR LMORBM05	COMMON DATA
0071	REF	1		05,2124	32170 0		DNPTR LMJRBMO6	COMMON DATA
0072	REF	2	LAST 209	05,2125	00007 0		1DNADR SPARE	FORMERLY PIF
0073	REF	2	LAST 162	05,2126	74263 0		-1DNADR TGO	TGO,+1

R0074 ----- SUB-LISTS -----

0075	REF	2	LAST 136	05,2127	76056 0	LMORBM01	1DNADR R-OTHER +2	R-OTHER+2,+3	SNAPSHOT
0076	REF	3	LAST 209	05,2130	01723 0		1DNADR R-OTHER +4	R-OTHER+4,+5	
0077	REF	2	LAST 136	05,2131	01725 0		1DNADR V-OTHER	V-OTHER,+1	
0078	REF	3	LAST 209	05,2132	01727 1		1DNADR V-OTHER +2	V-OTHER+2,+3	
0079	REF	4	LAST 209	05,2133	01731 0		1DNADR V-OTHER +4	V-OTHER+4,+5	
0080	REF	1		05,2134	01570 1		1DNADR T-OTHER	T-OTHER,+1	
0081	REF	4	LAST 209	05,2135	76060 0		-1DNADR R-OTHER	R-OTHER+0,+1	
0082	REF	1		05,2136	04320 1	LMORBM02	2DNADR REDOCTR	REDOCTR,THETAD,+1,+2	COMMON DATA

L DOWNLINK LISTS

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0083	REF	1		05,2137	01432 0	1DNADR RSBBQ	RSBBQ,+1	
0084	REF	5	LAST 144	05,2140	07017 0	2DNADR OMEGAP	OMEGAP,OMEGAQ,OMEGAR,GARBAGE	
0085	REF	4	LAST 151	05,2141	07233 1	2DNADR CDUXD	CDUXD,CDUYD,CDUZD,GARBAGE	
0086	REF	3	LAST 204	05,2142	04032 1	2DNADR CDUX	CDUX,CDUY,CDUZ,CDUT	
0087	REF	16	LAST 112	05,2143	24074 1	6DNADR STATE	STATE+0...+11D (FLAGWORDS)	
0088	REF	13	LAST 195	05,2144	52754 0	-6DNADR DSPTAB	DSPTAB TABLES	
0089	REF	1		05,2145	76555 0	LMORBM03-1DNADR RN +2	RN +2,+3	SNAPSHOT
0090	REF	2	LAST 210	05,2146	01224 1	1DNADR RN +4	RN +4,+5	
0091	REF	1		05,2147	01226 0	1DNADR VN	VN,+1	
0092	REF	2	LAST 210	05,2150	01230 1	1DNADR VN +2	VN +2,+3	
0093	REF	3	LAST 210	05,2151	01232 0	1DNADR VN +4	VN +4,+5	
0094	REF	1		05,2152	01234 0	1DNADR PIPTIME	PIPTIME,+1	
0095	REF	3	LAST 210	05,2153	76557 1	-1DNADR RN	RN,+1	
0096	REF	3	LAST 145	05,2154	07241 1	LMORBM04 2DNADR OMEGAPD	OMEGAPD,OMEGAQD,OMEGARD,GARBAGE	
0097	REF	1		05,2155	10372 0	3DNADR CADRFLSH	CADRFLSH,+1,+2,FAILREG,+1,+2	
0098	REF	14	LAST 202	05,2156	77667 0	-1DNADR RADMODES	RADMODES,DAPBOOLS	COMMON DATA
0099	REF	6	LAST 210	05,2157	07017 0	LMORBM05 2DNADR OMEGAP	OMEGAP,OMEGAQ,OMEGAR,GARBAGE	
0100	REF	5	LAST 210	05,2160	07233 1	2DNADR CDUXD	CDUXD,CDUXD,CDUZD,GARBAGE	
0101	REF	4	LAST 210	05,2161	04032 1	2DNADR CDJX	CDUX,CDUY,CDUZ,CDUT	
0102	REF	1		05,2162	03022 1	1DNADR ALPHAQ	ALPHAQ,ALPHAR	COMMON DATA
0103	REF	1		05,2163	03113 1	1DNADR POSTORKP	POSTORKP,NEGTORKP	
0104				05,2164	34011 0	DNCHAN 11	CHANNELS11,12	
0105				05,2165	34013 1	DNCHAN 13	CHANNELS13,14	
0106				05,2166	34030 0	DNCHAN 30	CHANNELS30,31	
0107				05,2167	43745 0	-DNCHAN 32	CHANNELS32,33	
0108	REF	2	LAST 162	05,2170	03556 1	LMORBM06 1DNADR PIPTIME1	PIPTIME,+1	COMMON DATA
0109	REF	4	LAST 115	05,2171	67453 1	-3DNADR DELV	DELV+0...+5	

R0110

L DOWNLINK LISTS

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P0111 LM COAST AND ALIGNMENT DOWNLIST

R0112 ----- CONTROL LIST -----

0113					05,2172	LMCSTADL	EQUALS		SEND ID BY SPECIAL CODING
0114	REF	1			05,2172	32127	1	DNPTR LMCSTA01	COLLECT SNAPSHOT
0115	REF	5	LAST	209	05,2173	24340	0	6DNADR DNTMBUFF	SEND SNAPSHOT
0116	REF	1			05,2174	02020	1	1DNADR AGSK	AGSK,+1
0117	REF	1			05,2175	02774	1	1DNADR TALIGN	TALIGN,+1
0118	REF	2	LAST	209	05,2176	07115	0	2DNADR POSTORKU	POSTORKU,NEGORKU,POSTORKV,NEGORKV
0120	REF	3	LAST	209	05,2177	01333	0	1DNADR DNRRANGE	DNRRANGE,DNRRDOT
0121	REF	2	LAST	209	05,2200	01344	0	1DNADR TEVENT	TEVENT,+1
0122	REF	2	LAST	209	05,2201	25733	1	6DNADR REFSMMAT	REFSMMAT+0...+11D
0123	REF	1			05,2202	00735	0	1DNADR AOTCODE	AOTCODE,GARBAGE
0124	REF	3	LAST	209	05,2203	13704	0	3DNADR VGTIG	VGTIG+0...+5
0125	REF	3	LAST	209	05,2204	05336	1	2DNADR DNLVELX	DNLVELX,DNLVELY,DNLVELZ,DNLRLT
0126	REF	1			05,2205	32224	1	DNPTR LMCSTA06	COMMON DATA
0127	REF	1			05,2206	32136	1	DNPTR LMCSTA02	COMMON DATA
0128	REF	2	LAST	209	05,2207	00024	1	1DNADR TIME2	TIME2/I
0129	REF	1			05,2210	32145	0	DNPTR LMCSTA03	COLLECT SNAPSHOT
0130	REF	6	LAST	211	05,2211	24340	0	6DNADR DNTMBUFF	SEND SNAPSHOT
0131	REF	1			05,2212	32154	0	DNPTR LMCSTA04	COMMON DATA
0132	REF	1			05,2213	32226	0	DNPTR LMCSTA07	COMMON DATA
0133	REF	4	LAST	211	05,2214	05336	1	2DNADR DNLVELX	DNLVELX,DNLVELY,DNLVELZ,DNLRLT
0134	REF	1			05,2215	04036	0	2DNADR CDUS	CDUS,PIPAV,PIPAY,PIPAZ
0135	REF	2	LAST	112	05,2216	00112	0	1DNADR LASTYCMD	LASTYCMD,LASTXCMD
0136	REF	2	LAST	209	05,2217	01331	1	1DNADR LEMMASS	LEMASS,CSMASS
0137	REF	33	LAST	209	05,2220	01302	1	1DNADR IMODES30	IMODES30,IMODES33
0138	REF	2	LAST	209	05,2221	03437	1	1DNADR TIG	TIG,+1
0139	REF	1			05,2222	32157	0	DNPTR LMCSTA05	COMMON DATA
0140	REF	14	LAST	210	05,2223	52754	0	-6DNADR DSPTAB	DSPTAB+0...+11D TABLE

R0141 ----- SUB-LISTS -----

0142	REF	2	LAST	209	05,2127	LMCSTA01	EQUALS	LMORBM01	COMMON DOWNLIST DATA
0143	REF	2	LAST	209	05,2136	LMCSTA02	EQUALS	LMORBM02	COMMON DOWNLIST DATA
0144	REF	2	LAST	209	05,2145	LMCSTA03	EQUALS	LMORBM03	COMMON DOWNLIST DATA
0145	REF	2	LAST	209	05,2154	LMCSTA04	EQUALS	LMORBM04	COMMON DOWNLIST DATA
0146	REF	2	LAST	209	05,2157	LMCSTA05	EQUALS	LMORBM05	COMMON DOWNLIST DATA
0147	REF	1			05,2224	05700	0	LMCSTA06 2DNADR X789	X789+0...+3 COMMON DATA
0148	REF	3	LAST	211	05,2225	77665	1	-1DNADR LASTYCMD	LASTYCMD,LASTXCMD
0149	REF	2	LAST	138	05,2226	12737	1	LMCSTA07 3DNADR OGC	OGC,+1,IGC,+1,MGC,+1 COMMON DATA
0150	REF	2	LAST	139	05,2227	02755	1	1DNADR BESTI	BESTI,BESTJ
0151	REF	2	LAST	139	05,2230	12760	0	3DNADR STARS AV1	STARS AV1+0...+5
0152	REF	3	LAST	143	05,2231	65011	1	-3DNADR STARS AV2	STARS AV2+0...+5

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L DOWNLINK LISTS

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P0154 LM RENDEZVUS AND PRE-THRUST DOWNLIST

R0155 ----- CONTROL LIST -----

0156				05,2232	LMREND01	EQUALS	SEND ID BY SPECIAL CODING
0157	REF	1		05,2232	DNPTR	LMFEND01	COLLECT SNAPSHOT
0158	REF	7	LAST 211	05,2233	6DNADR	DNTMBUFF	SEND SNAPSHOT
0159	REF	1		05,2234	DNPTR	LMREND07	COLLECT SNAPSHOT
0160	REF	8	LAST 213	05,2235	4DNADR	DNTMBUFF	SEND SNAPSHOT
0161	REF	2	LAST 209	05,2236	1DNADR	DELLT4	DELLT4,+1
0162	REF	2	LAST 209	05,2237	3DNADR	RTARG	RTARG+0...+5
0163	REF	1		05,2240	3DNADR	DELVSLV	DELVSLV+0...+5
0164	REF	2	LAST 209	05,2241	1DNADR	TCSI	TCSI,+1
0165	REF	2	LAST 209	05,2242	3DNADR	DELVFET1	DELVEET+0-...+5
0166	REF	3	LAST 209	05,2243	1DNADR	SPARE	
0167	REF	3	LAST 209	05,2244	1DNADR	TPASS4	TPASS4,+1
0168	REF	1		05,2245	DNPTR	LMREND06	COMMON DATA
0169	REF	1		05,2246	DNPTR	LMREND02	COMMON DATA
0170	REF	3	LAST 211	05,2247	1DNADR	TIME2	TIME2/1
0171	REF	1		05,2250	DNPTR	LMREND03	COLLECT SNAPSHOT
0172	REF	9	LAST 213	05,2251	6DNADR	DNTMBUFF	SEND SNAPSHOT
0173	REF	1		05,2252	DNPTR	LMREND04	COMMON DATA
0174	REF	3	LAST 211	05,2253	2DNADR	POSTORKU	POSTORKU,NEGORKU,POSTORKV,NEGORKV
0176	REF	4	LAST 213	05,2254	1DNADR	SPARE	
0177	REF	2	LAST 209	05,2255	1DNADR	TCDH	TCDH,+1
0178	REF	2	LAST 209	05,2256	3DNADR	DELVFET2	DELVEET2+0...+5
0179	REF	2	LAST 209	05,2257	1DNADR	TTPI	TTPI,+1
0180	REF	2	LAST 209	05,2260	3DNADR	DELVFET3	DELVEET3+0...+5
0181	REF	2	LAST 209	05,2261	1DNADR	ELEV	ELEV,+1
0182	REF	2	LAST 211	05,2262	2DNADR	CDUS	CDUS,PIPAZ,PIPAY,PIPAZ
0183	REF	4	LAST 211	05,2263	1DNADR	LASTYCMD	LASTYCMD,LASTXCMD
0184	REF	3	LAST 211	05,2264	1DNADR	LEMMASS	LEMMASS,CSMMASS
0185	REF	34	LAST 211	05,2265	1DNADR	IMODES30	IMODES30,IMODES33
0186	REF	3	LAST 211	05,2266	1DNADR	TIG	TIG,+1
0187	REF	1		05,2267	DNPTR	LMREND05	COMMON DATA
0188	REF	3	LAST 133	05,2270	1DNADR	DELTAR	DELTAR,+1
0189	REF	1		05,2271	1DNADR	CENTANG	CENTANG,+1
0190	REF	1		05,2272	1DNADR	NN	NN,+1
0191	REF	2	LAST 209	05,2273	1DNADR	DIFFALT	DIFFALT,+1
0192	REF	1		05,2274	1DNADR	DELVTPE	DELVTPE,+1
0193	REF	5	LAST 213	05,2275	-1DNADR	SPARE	

R0194 ----- SUB-LISTS -----

0195	REF	3	LAST 211	05,2127	LMREND01	EQUALS	LMORBM01	COMMON DOWNLIST DATA
0196	REF	3	LAST 211	05,2136	LMREND02	EQUALS	LMORPM02	COMMON DOWNLIST DATA
0197	REF	3	LAST 211	05,2145	LMREND03	EQUALS	LMORBM03	COMMON DOWNLIST DATA

L DCWNLINK LISTS

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0198	REF	3	LAST	211	05,2154	LMREND04 EQUALS LMORBM04	COMMON DOWNLIST DATA
0199	REF	3	LAST	211	05,2157	LMREND05 EQUALS LMORBM05	COMMON DOWNLIST DATA
0200	REF	2	LAST	211	05,2224	LMREND06 EQUALS LMCSTA06	COMMON DOWNLIST DATA
0201	REF	1			05,2276	74322 1 LMREND07-1DNADR AIG	AIG,AMG SNAPSHOT
0202	REF	1			05,2277	03457 1 1DNADR AD3	A0G,TRKMKCNT
0203	REF	2	LAST	161	05,2300	03750 0 1DNADR TANGNB	TANGNB,+1
0204	REF	2	LAST	161	05,2301	03752 1 1DNADR MKTIME	MKTIME,+1
0205	REF	4	LAST	211	05,2302	76444 1 -1DNADR DNRRANGE	DNRRANGE,DNRRDOT

R0206

L DOWNLINK LISTS

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P0207 LM DESCENT AND ASCENT DOWNLIST

R0208 ----- CONTROL LIST -----

				05,2303	LMDSASDL	EQUALS	SEND ID BY SPECIAL CODING
0209				05,2303	32341 0	DNPTR LMDSAS07	COLLECT SNAPSHOT
0210	REF	1		05,2303	32341 0	DNPTR LMDSAS08	SEND SNAPSHOT
0211	REF	1		05,2304	32355 0	1DNADR TEVENT	TEVENT,+1
0212	REF	3	LAST 211	05,2305	01344 0	3DNADR UNFC/2	UNFC/2+0...+5
0213	REF	2	LAST 151	05,2306	13251 0	3DNADR VGVECT	VGVECT+0...+5
0214	REF	2	LAST 167	05,2307	13645 1	1DNADR TTF/8	TTF/8,+1
0215	REF	2	LAST 165	05,2310	03640 0	1DNADR DELTAH	DELTAH,+1
0216	REF	2	LAST 165	05,2311	03662 0	3DNADR RLS	RLS+0...+5
0217	REF	1		05,2312	12022 1	1DNADR SPARE	
0220	REF	6	LAST 213	05,2313	00007 0	DNPTR LMDSAS09	COMMON DATA
0221	REF	1		05,2314	32224 1	DNPTR LMDSAS02	COMMON DATA
0222	REF	1		05,2315	32136 1	1DNADR TIME2	TIME2/1
0223	REF	4	LAST 213	05,2316	00024 1	DNPTR LMDSAS03	COLLECT SNAPSHOT
0224	REF	1		05,2317	32145 0	6DNADR DNTMBUFF	SEND SNAPSHOT
0225	REF	10	LAST 213	05,2320	24340 0	DNPTR LMDSAS04	COMMON DATA
0226	REF	1		05,2321	32154 0	2DNADR POSTORKU	POSTORKU,NEGTRKU,POSTORKV,NEGTRKV
0227	REF	4	LAST 213	05,2322	07115 0	3DNADP RGU	RGU+0...+5
0229	REF	1		05,2323	12543 0	3DNADR VGU	VGU+0...+5
0230	REF	2	LAST 165	05,2324	13624 0	3DNADR LAND	LAND+0...+5
0231	REF	2	LAST 165	05,2325	13632 1	1DNADR AT	AT,+1
0232	REF	2	LAST 135	05,2326	02256 1	1DNADR TLAND	TLAND,+1
0233	REF	2	LAST 137	05,2327	02400 1	1DNADR FC	FC,GARBAGE
0234	REF	2	LAST 164	05,2330	03613 0	1DNADR LASTYCMD	LASTYCMD,LASTXCMD
0235	REF	5	LAST 213	05,2331	00112 0	1DNADR LEMMASS	LEMASS,CSMASS
0236	REF	4	LAST 213	05,2332	01331 1	1DNADR IMODES30	IMODES30,IMODES33
0237	REF	35	LAST 213	05,2333	01302 1	1DNADR TIG	TIG,+1
0238	REF	4	LAST 213	05,2334	03437 1	DNPTR LMDSAS05	COMMON DATA
0239	REF	1		05,2335	32157 0	DNPTR LMDSAS06	COMMON DATA
0240	REF	1		05,2336	32170 0	1DNADR PSEUDO55	PSEUDO55,GARBAGE
0241	REF	2	LAST 164	05,2337	03612 1	-1DNADR TTOGO	TTOGO,+1
0242	REF	2	LAST 154	05,2340	74326 0		

R0243 ----- SUB-LISTS -----

0244	REF	4	LAST 213	05,2136	LMDSAS02 EQUALS	LMORBM02	COMMON DOWNLIST DATA
0245	REF	4	LAST 213	05,2145	LMDSAS03 EQUALS	LMORBM03	COMMON DOWNLIST DATA
0246	REF	4	LAST 214	05,2154	LMDSAS04 EQUALS	LMORBM04	COMMON DOWNLIST DATA
0247	REF	4	LAST 214	05,2157	LMDSAS05 EQUALS	LMORBM05	COMMON DOWNLIST DATA
0248	REF	2	LAST 209	05,2170	LMDSAS06 EQUALS	LMORBM06	COMMON DOWNLIST DATA
0249	REF	2	LAST 135	05,2341	75435 1	LMDSAS07-1DNADR LRZCDUDL	LRZCDUDL,GARBAGE
0250	REF	2	LAST 165	05,2342	03647 1	1DNADR VSELECT	VSELECT,GARBAGE
0251	REF	1		05,2343	02343 1	1DNADR LRVTIMDL	LRVTIMDL,+1

SNAPSHOT

L DOWNLINK LISTS

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0252	REF	2	LAST	165	05,2344	03650 1	1DNADR VMEAS	VMEAS,+1
0253	REF	3	LAST	214	05,2345	03752 1	1DNADR MKTIME	MKTIME,+1
0254	REF	2	LAST	165	05,2346	03652 0	1DNADR HMEAS	HMEAS,+1
0255	REF	2	LAST	161	05,2347	03754 1	1DNADR RM	RM,+1
0256	REF	2	LAST	214	05,2350	03455 0	1DNADR AIG	AIG,AMG
0257	REF	2	LAST	214	05,2351	03457 1	1DNADR AOG	AOG,TRKMKCNT
0258	REF	3	LAST	214	05,2352	03750 0	1DNADR TANGNB	TANGNB,+1
0259	REF	4	LAST	216	05,2353	03752 1	1DNADR MKTIME	MKTIME,+1
0260	REF	2	LAST	135	05,2354	75437 0	-1DNADR LRXCUDPL	LRXCUDPL, LRYCDUDL
0261	REF	11	LAST	215	05,2355	24340 0	LMDSAS08 6DNADR DNTMBUFF	SEND SNAPSHOT
0262	REF	12	LAST	216	05,2356	57423 0	-5DNADR DNTMBUFF +12D	
0263	REF	3	LAST	214	05,2224		LMDSAS09 EQUALS LMCSTA06	COMMON DOWNLIST DATA

R0264

L DOWNLINK LISTS

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P0265 LM LUNAR SURFACE ALIGN DOWNLIST

R0266 ----- CONTROL LIST -----

0267					05,2357		LMLSALDL	EQUALS		SEND ID BY SPECIAL CODING
0268	RFF	1			05,2357	32127 1	DNPTR	LMLSAL01		COLLECT SNAPSHOT
0269	REF	13	LAST	216	05,2360	24340 0	6DNADR	DNTMBUFF		SEND SNAPSHOT
0270	REF	1			05,2361	32276 0	DNPTR	LMLSAL07		COLLECT SNAPSHOT
0271	RFF	14	LAST	217	05,2362	14340 0	4DNADR	DNTMBUFF		SEND SNAPSHOT
0272	RFF	2	LAST	211	05,2363	02774 1	1DNADR	TALIGN		TALIGN,+1
0273	REF	3	LAST	211	05,2364	25733 1	6DNADR	REFSMMAT		REFSMMAT+0...+11D
0274	REF	2	LAST	132	05,2365	26242 1	6DNADR	YNBSAV		YNBSAV+0...+5,ZNBSAV+0...+5
0275	RFF	1			05,2366	32224 1	DNPTR	LMLSAL08		COMMON DATA
0276	REF	1			05,2367	32136 1	DNPTR	LMLSAL02		COMMON DATA
0277	REF	5	LAST	215	05,2370	00024 1	1DNADR	TIME2		TIME/1
0278	RFF	1			05,2371	32145 0	DNPTR	LMLSAL03		COLLECT SNAPSHOT
0279	REF	15	LAST	217	05,2372	24340 0	6DNADR	DNTMBUFF		SEND SNAPSHOT
0280	REF	1			05,2373	32154 0	DNPTR	LMLSAL04		COMMON DATA
0281	REF	1			05,2374	32226 0	DNPTR	LMLSAL09		COMMON DATA
0282	RFF	4	LAST	132	05,2375	12234 1	3DNADR	GSAV		GSAV+0...+5
0283	RFF	2	LAST	211	05,2376	02020 1	1DNADR	AGSK		AGSK,+1
0284	RFF	6	LAST	215	05,2377	00112 0	1DNADR	LASTYCMD		LASTYCMD, LASTXCMD
0285	REF	5	LAST	215	05,2400	01331 1	1DNADR	LEMMASS		LEMMASS,CSMMASS
0286	REF	36	LAST	215	05,2401	01302 1	1DNADR	IMODES30		IMODES30,IMODES33
0287	REF	5	LAST	215	05,2402	03437 1	1DNADR	TIG		TIG,+1
0288	REF	1			05,2403	32157 0	DNPTR	LMLSAL05		COMMON DATA
0289	REF	1			05,2404	32170 0	DNPTR	LMLSAL06		COMMON DATA
0290	REF	7	LAST	215	05,2405	00007 0	1DNADR	SPARF		
0291	REF	8	LAST	217	05,2406	77770 1	-1DNADR	SPARE		

R0292 ----- SUB-LISTS -----

0293	RFF	4	LAST	213	05,2127		LMLSAL01	EQUALS	LMORBM01	COMMON DOWNLIST DATA
0294	REF	5	LAST	215	05,2136		LMLSAL02	EQUALS	LMORBM02	COMMON DOWNLIST DATA
0295	REF	5	LAST	215	05,2145		LMLSAL03	EQUALS	LMORBM03	COMMON DOWNLIST DATA
0296	RFF	5	LAST	215	05,2154		LMLSAL04	EQUALS	LMORBM04	COMMON DOWNLIST DATA
0297	REF	5	LAST	215	05,2157		LMLSAL05	EQUALS	LMORBM05	COMMON DOWNLIST DATA
0298	REF	3	LAST	215	05,2170		LMLSAL06	EQUALS	LMOPBM06	COMMON DOWNLIST DATA
0299	REF	2	LAST	213	05,2276		LMLSAL07	EQUALS	LMREND07	COMMON DOWNLIST DATA
0300	REF	4	LAST	216	05,2224		LMLSAL08	EQUALS	LMCSTA06	COMMON DOWNLIST DATA
0301	RFF	2	LAST	211	05,2226		LMLSAL09	EQUALS	LMCSTA07	COMMON DOWNLIST DATA

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L DOWNLINK LISTS

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R0302

L DOWNLINK LISTS

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P0303 LM AGS INITIALIZATION AND UPDATE DOWNLIST

R0304 CONTROL LIST

0305				05,2407		LMAGSIDL	EQUALS	SEND ID BY SPECIAL CODING
0306	REF	2	LAST	133	05,2407	12204	1	3DNADR AGSBUFF +0
0307	REF	3	LAST	219	05,2410	02220	0	1DNADR AGSBUFF +12D
0308	REF	4	LAST	219	05,2411	12205	0	3DNADR AGSBUFF +1
0309	REF	5	LAST	219	05,2412	02221	1	1DNADR AGSBUFF +13D
0310	REF	6	LAST	219	05,2413	12212	0	3DNADR AGSBUFF +6
0311	RFF	7	LAST	219	05,2414	02220	0	1DNADR AGSBUFF +12D
0312	REF	8	LAST	219	05,2415	12213	1	3DNADR AGSBUFF +7
0313	REF	9	LAST	219	05,2416	02221	1	1DNADR AGSBUFF +13D
0314	REF	2	LAST	120	05,2417	25170	0	6DNADR COMPNUMB
A0315								UPBUFF+0...+7
0316	REF	1			05,2420	25204	0	6DNADR UPBUFF +8D
0317	REF	1			05,2421	32136	1	DNPTR LMAGSI02
0318	REF	6	LAST	217	05,2422	00024	1	1DNADR TIME2
0319	RFF	1			05,2423	32145	0	DNPTR LMAGSI03
0320	REF	16	LAST	217	05,2424	24340	0	6DNADR DNTMBUFF
0321	REF	1			05,2425	32154	0	DNPTR LMAGSI04
0322	REF	5	LAST	215	05,2426	07115	0	2DNADR POSTORKU
0324	REF	9	LAST	217	05,2427	00007	0	1DNADR SPARE
0325	REF	10	LAST	219	05,2430	00007	0	1DNADR SPARE
0326	RFF	3	LAST	217	05,2431	02020	1	1DNADR AGSK
0327	REF	2	LAST	219	05,2432	25174	1	6DNADR UPBUFF
0328	REF	3	LAST	219	05,2433	15210	0	4DNADR UPBUFF +12D
0329	REF	6	LAST	217	05,2434	01331	1	1DNADR LFMMASS
0330	REF	37	LAST	217	05,2435	01302	1	1DNADR IMODFS30
0331	REF	11	LAST	219	05,2436	00007	0	1DNADR SPARE
0332	REF	1			05,2437	32157	0	DNPTR LMAGSI05
0333	REF	15	LAST	211	05,2440	52754	0	-6DNADR DSPTAB

R0334 SUB-LISTS

0335	REF	6	LAST	217	05,2136	LMAGSI02	EQUALS	LMORBM02	COMMON DOWNLIST DATA
0336	REF	6	LAST	217	05,2145	LMAGSI03	EQUALS	LMORBM03	COMMON DOWNLIST DATA
0337	RFF	6	LAST	217	05,2154	LMAGSI04	EQUALS	LMORBM04	COMMON DOWNLIST DATA
0338	REF	6	LAST	217	05,2157	LMAGSI05	EQUALS	LMORBM05	COMMON DOWNLIST DATA

R0339

0340	REF	2	LAST	208	05,2441	02172	1	DNTABLF	GENADR LMCSTADL	LM COAST AND ALIGN DOWNLIST
0341	REF	3	LAST	208	05,2442	02407	0		GENADR LMAGSIDL	LM AGS INITIALIZATION/UPDATE DOWNLIST
0342	REF	1			05,2443	02232	0		GENADR LMRFNDDL	LM RENDEZVOUS AND PRE-THRUST DOWNLIST
0343	REF	1			05,2444	02066	0		GFNADR LMORBMDL	LM ORBITAL MANEUVERS DOWNLIST
0344	REF	1			05,2445	02303	0		GENADR LMDSASDL	LM DESCENT AND ASCENT DOWNLIST

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L DOWNLINK LISTS

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0345 REF 1

05,2446 02357 1

GENADR LMLSALDL

LM LUNAR SURFACE ALIGN DOWNLIST

R0346

L AGS INITIALIZATION

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R0001 PROGRAM NAME: AGS INITIALIZATION (R47)

R0002 WRITTEN BY : RPODE / KILROY / FOLLETT

R0003 MOD NO. : 0

R0004 DATE : 23 MARCH 1967

R0005 MOD BY : KILROY

R0006 MOD NO. : 1

R0007 DATE : 28 OCTOBER 1967

R0008 MOD BY : FOLLETT

R0009 FUNCT. DESC.: (1) TO PROVIDE THE AGS ABORT ELECTRONICS ASSEMBLY(AEA) WITH THE LEM AND CSM STATE VECTORS
 R0011 (POSITION,VELOCITY,TIME) IN LEM IMU COORDINATES BY MEANS OF THE LGC DIGITAL DOWNLINK.

R0013 (2) TO ZERO THE ICDU, LGC AND AEA GIMBAL ANGLE COUNTERS SIMULTANEOUSLY IN ORDER TO ESTABLISH A
 R0015 COMMON ZERO REFERENCE FOR THE MEASUREMENT OF GIMBAL(EULER) ANGLES WHICH DEFINE LEM ATTITUDE

R0019 (3) TO ESTABLISH THE GROUND ELAPSED TIME OF AEA CLOCK ZERO.(IF AN AEA CLOCK ZERO IS
 R0021 REQUESTED DURING THIS PROGRAM

R0022 LOG SECTION : AGS INITIALIZATION

R0023 CALLING SEQ : PROGRAM IS ENTERED WHEN ASTRONAUT KEYS V47E ON DSKY.

R0024 R47 MAY BE CALLED AT ANY TIME EXCEPT WHEN ANOTHER EXTENDED VERB IS IN PROGRESS

R0026 SUBROUTINES
 R0027 CALLED :

R0028 NORMAL EXIT : ENDEXT

R0029 ALARM/ABORT : ALARM - BAD REFSMMAT - CODE:220

R0030 OPERATOR ERROR IF V47 SELECTED DURING ANOTHER EXTENDED VERB.

R0032 ERASABLES

R0033 USED : SAMPTIME (2) TIME OF :ENTER: KEYSTROKE

R0034 AGSK (2) GROUND ELAPSED TIME OF THE AEA CLOCK :ZERO:

R0036 AGSBUFF (140) CONTAINS AGS INITIALIZATION DATA (SEE :OUTPUT: BELOW)

R0038 AGSWORD (1) PREVIOUS DOWNLIST SAVED HERE

0039 REF 10 LAST 219 E4,1604 EBANK= AGSBUFF

0040 40,2000 BANK 40
 0041 REF 1 32,2000 SETLOC R47
 0042 32,2015 BANK

0043 REF 1 COUNT* \$\$/R47

0044 REF 1 32,2015 3 4737 0 AGSINIT CAF REFSMBIT

0045 REF 1 32,2016 7 0077 0 MASK FLAGWRD3

0046 REF 35 LAST 206 32,2017 10 000 0 CCS A

CHECK REFSMFLG.

L AGS INITIALIZATION

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0047	RFF	1		32,2020	0 2027 0	TC	REDSPTEM	REFSMMAT IS OK
0048	REF	8	LAST 200	32,2021	0 5567 0	TC	ALARM	REFSMMAT IS BAD
0049				32,2022	00220 1	DCI	220	
0050	REF	1		32,2023	0 5472 0	TC	ENDEXT	
0061				32,2024	0 0006 1	NEWAGS	EXTEND	
0062	REF	1		32,2025	3 0014 1	DCA	SAMPTIME	TIME OF THE ENTER: KEYSTROKE
0063	REF	4	LAST 219	32,2026	53'421 0	DXCH	AGSK	BECOMES NEW AFA CLOCK :ZERO:
0064				32,2027	0 0006 1	REDSPTEM	EXTEND	
0065	REF	5	LAST 222	32,2030	3 1421 1	DCA	AGSK	
0066	REF	2	LAST 118	32,2031	53'052 0	DXCH	DSPIEMX	
0067	REF	1		32,2032	3 2202 0	AGSDISPK	CAF	V06N16
0068	REF	1		32,2033	0 4616 1	TC	BANKCALL	R1 = 00XXX. HRS., R2 = 000XX MIN.,
0069	REF	1		32,2034	20212 1	CADR	GOMARKE	R3 = 0XX.XX SEC.
0070	REF	2	LAST 222	32,2035	0 5472 0	TC	ENDEXT	TERMINATE RETURN
0071	REF	1		32,2036	0 2046 1	TC	AGSVCALC	PROCEED RETURN
00711	REF	22	LAST 195	32,2037	4 4746 1	CS	BIT6	IS ENTER VIA A V32
00712	REF	12	LAST 114	32,2040	6 0154 1	AD	MPAC	
00713				32,2041	0 0006 1	EXTEND		
00714	REF	1		32,2042	1 2024 1	BZF	NEWAGS	YES, USE KEYSTROKE TIME FOR NEW AGSK
0072				32,2043	0 0006 1	EXTEND		
0073	REF	3	LAST 222	32,2044	3 1052 1	DCA	DSPIEMX	NO, NEW AGSK LOADED VIA V25
0074	REF	2	LAST 222	32,2045	0 2026 1	TC	REDSPTEM -1	LOADED INTO DSPTMX BY KEYING
A0075								V25E FOLLOWED BY HRS.,MINS.,SECS.
								DISPLAY THE NEW K
0076	REF	1		32,2046	0 6036 1	AGSVCALC	TC	INTPRET
00761				32,2047	77614 1	SET		
00762	REF	1		32,2050	01076 1		NODOFLAG	DONT ALLOW V37
0077				32,2051	77414 0	SET	EXIT	
0078	REF	1		32,2052	02076 1		XDSPFLAG	
0079	REF	2	LAST 222	32,2053	3 2202 0	CAF	V06N16	
00795	REF	2	LAST 222	32,2054	0 4616 1	TC	BANKCALL	
00796	REF	1		32,2055	20473 0	CADR	EXDSPRET	
0082	REF	2	LAST 222	32,2056	0 6036 1	TC	INTPRET	EXTRAPOLATE LEM AND CSM STATE VECTORS
0083				32,2057	77634 0	RTB		TO THE PRESENT TIME
0084	REF	1		32,2060	21462 1		LOADTIME	LOAD MPAC WITH TIME2,TIME1
0085	REF	1		32,2061	34041 0	STCALL	TDEC1	CALCULATE LEM STATE VECTOR
0086	REF	2	LAST 36	32,2062	27057 0		LEMPREC	
0087				32,2063	77624 1	CALL		CALL ROUTINE TO CONVERT TO SM COORDS AND
0088	REF	1		32,2064	64142 1		SCALEVEC	PROVIDE PROPER SCALING
0089	REF	11	LAST 221	32,2065	16205 1	STODL	AGSBUFF	(LEMPREC AND CSMPREC LEAVE TDEC1 IN TAT)
0090	REF	1		32,2066	00015 0		TAT	TAT = TIME TO WHICH RATT1 AND VATT1 ARE
0091	REF	2	LAST 222	32,2067	34041 0	STCALL	TDEC1	COMPUTED(CSEC SINCE CLOCK START 8-28).
0092	REF	2	LAST 36	32,2070	27043 0		CSMPREC	CALCULATE CSM STATE VECTOR FOR SAME TIME
0093				32,2071	77624 1	CALL		
0094	REF	2	LAST 222	32,2072	64142 1		SCALEVEC	

L AGS INITIALIZATION

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0095	REF	12	LAST	222	32,2073	16213 0		STODL	AGSBUFF +6	
0096	REF	2	LAST	222	32,2074	00015 0			TAT	
0097					32,2075	56225 1		DSU	DDV	CALCULATE AND STORE THE TIME
0098	REF	6	LAST	222	32,2076	02021 0			AGSK	
0099	REF	1			32,2077	24205 0			TSCALE	
0100	REF	13	LAST	223	32,2100	02221 1		STORE	AGSBUFF +12D	
0101					32,2101	77776 1		EXIT		
0102	REF	1			32,2102	3 4753 1		CAF	LAGSLIST	
0103	REF	2	LAST	115	32,2103	54 332 1		TS	DNLSTCOD	
0104	REF	1			32,2104	3 2206 1		CAF	20SEC	DELAY FOR 20 SEC WHILE THE AGS
0105	REF	3	LAST	222	32,2105	0 4616 1		TC	BANKCALL	DOWNLIST IS TRANSMITTED
0106	REF	1			32,2106	01735 1		CADR	DELAYJOB	
0107	REF	1			32,2107	3 1324 0		CA	AGSWORD	
0108	REF	3	LAST	223	32,2110	54 332 1		TS	DNLSTCOD	RETURN TO THE OLD DOWNLIST
0109	REF	3	LAST	181	32,2111	3 4744 1		CAF	IMUSEBIT	
0110	REF	6	LAST	200	32,2112	7 0074 0		MASK	FLAGWRDO	CHECK IMUSE FLAG.
0111	REF	36	LAST	221	32,2113	10 000 0		CCS	A	
0112	REF	1			32,2114	0 2132 0		TC	AGSEND	IMU IS BEING USED - DO NOT ZERO
01121	REF	1			32,2115	11'304 0	CKSTALL	CCS	IMUCADR	CHECK FOR IMU USAGE WHICH AVOIDS THE
01122					32,2116	1 2121 0		TCF	+3	IMUSE BIT: I.E., IMU COMPENSATION.
01123					32,2117	1 2125 1		TCF	+6	FREE. GO AHEAD WITH THE IMU ZERO.
01124					32,2120	1 2121 0		TCF	+1	
01125	REF	1			32,2121	3 4363 0	+3	CAF	TEN	WAIT .1 SEC AND TRY AGAIN.
01126	REF	4	LAST	223	32,2122	0 4616 1		TC	BANKCALL	
01127	REF	2	LAST	223	32,2123	01735 1		CADR	DELAYJOB	
01128	REF	1			32,2124	1 2115 1		TCF	CKSTALL	
0113	REF	5	LAST	223	32,2125	0 4616 1	+6	TC	BANKCALL	IMU IS NOT IN USE
0114	REF	1			32,2126	16667 1		CADR	IMUZERO	SET IMU ZERO DISCRETE FOR 320MSECS
0115	REF	6	LAST	223	32,2127	0 4616 1		TC	BANKCALL	WAIT 3SEC FOR COUNTERS TO INCREMENT
0116	REF	1			32,2130	17671 1		CADR	IMUSTALL	
0117	REF	2	LAST	223	32,2131	0 2132 0		TC	AGSEND	
0118	REF	1			32,2132	0 5516 0	AGSEND	TC	DOWNFLAG	ALLOW V37
0119	REF	2	LAST	222	32,2133	00054 0		ADRES	NCDFFLAG	
0120	REF	1			32,2134	3 2203 1		CAF	V50N16	
0121	REF	7	LAST	223	32,2135	0 4616 1		TC	BANKCALL	
01211	REF	1			32,2136	20220 0		CADR	GOMARK3	
01212	REF	3	LAST	222	32,2137	1 5472 1		TCF	ENDEXT	
01213	REF	4	LAST	223	32,2140	1 5472 1		TCF	ENDEXT	
0122	REF	5	LAST	223	32,2141	0 5472 0		TC	ENDEXT	
0127					32,2142	64375 1	SCALEVEC	VLOAD	MXV	
0128	REF	1			32,2143	00025 0			VATT1	
0129	REF	4	LAST	217	32,2144	01734 0			REFSMAT	
0130					32,2145	72561 0		VXSC	VSL2	
0131	REF	1			32,2146	24212 0			VSCALF	

L AGS INITIALIZATION

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01311 32,2147 53255 0
 01312 REF 1 32,2150 24214 0
 01313 REF 1 32,2151 24222 0
 01314 32,2152 77634 0
 01315 REF 1 32,2153 21744 0
 0132 REF 2 LAST 223 32,2154 24025 0
 0133 REF 1 32,2155 00017 1
 0134 32,2156 74321 1
 0135 REF 5 LAST 223 32,2157 01734 0
 0136 REF 1 32,2160 24210 1
 0137 32,2161 53212 0
 01371 REF 2 LAST 224 32,2162 24214 0
 01372 32,2163 47055 1
 01373 REF 2 LAST 224 32,2164 24222 0
 01374 REF 2 LAST 224 32,2165 21744 0
 01375 32,2166 77750 0
 0138 REF 3 LAST 224 32,2167 00024 1
 0139 32,2170 72130 0
 0140 REF 13 LAST 222 32,2171 00155 0
 0141 REF 4 LAST 224 32,2172 00026 0
 0142 32,2173 72130 0
 0143 REF 14 LAST 224 32,2174 00160 0
 0144 REF 5 LAST 224 32,2175 00030 1
 0145 32,2176 43530 0
 0146 REF 15 LAST 224 32,2177 00162 1
 0147 REF 6 LAST 198 4753
 0148 32,2200 00216 1
 01485 32,2201 14400 0
 0149 REF 1 6010
 01495 32,2202 01420 0
 01496 REF 1 4242
 01497 32,2203 14420 1
 0150 32,2204 03100 0
 0150 32,2205 00000 1
 0151 32,2206 03720 1
 0152 32,2207 15077 0
 0152 32,2210 05041 1
 0153 32,2211 24402 1
 0153 32,2212 25724 1
 01531 32,2213 00000 1
 01531 32,2214 60000 1
 01532 32,2215 00000 1
 01532 32,2216 60000 1
 01533 32,2217 00000 1
 01533 32,2220 60000 1
 01534 32,2221 00000 1
 01534 32,2222 37777 1
 01535 32,2223 00000 1
 01535 32,2224 37777 1

VAD VAD
 AGSRND1
 AGSRND2
 RTB
 VECSGNAG
 STOVL VATT1
 RATT1
 MXV VXSC
 REFSMMAT
 RSCALE
 VSL8 VAD
 AGSRND1
 VAD RTB
 AGSRND2
 VECSGNAG
 LXA,1
 VATT1
 SXA,1 LXA,1
 MPAC +1
 VATT1 +2
 SXA,1 LXA,1
 MPAC +4
 VATT1 +4
 SXA,1 RVQ
 MPAC +6

THIS SECTION ROUNDS THE VECTOR, AND
 CORRECTS FOR THE FACT THAT THE AGS
 IS A 2 S COMPLIMENT MACHINE WHILE THE
 LGC IS A 1 S COMPLIMENT MACHINE.

AGAIN THIS SECTION ROUNDS. TWO VECTORS
 ARE ADDED TO DEFEAT ALSIGNAG IN THE
 CASE OF A HIGH-ORDER ZERO COUPLED WITH
 A LOW ORDER NEGATIVE PART.

LAGSLIST = ONE
 V01N14 VN 0114
 V50N00A VN 5000
 V00N25 EQUALS OCT31
 V06N16 VN 0616
 V00N34 EQUALS 34DEC
 V50N16 VN 5016
 TSCALE 2DEC 100B-10
 20SEC DEC 2000
 RSCALE 2DEC 3.280839 B-3
 VSCALE 2DEC 3.280839 E2 B-9
 AGSRND1 2OCT 0000060000
 2OCT 0000060000
 2OCT 0000060000
 AGSRND2 2OCT 0000037777
 2OCT 0000037777

CSEC TO SEC SCALE FACTOR

METERS TO FEET SCALE FACTOR

METERS/CS TO FEET/SEC SCALE FACTOR

L AGS INITIALIZATION

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01536	32,2225	00000 1	2OCT	0000037777
01536	32,2226	37777 1		
0154	REF 1	30,2000	SBANK=	LDWSUPER

FOR SUBSEQUENT LOW 2CADRS.

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NO	REF	MODE	PAGE	ADDR	COUNT	TS	CA	TS	DESCRIPTION	
00743				10,2000			BANK	10		
0075				05,2000			SETLOC	FRANDRES		
0076	REF	2	LAST	58			BANK			
0077				05,2447						
0078	REF	3	LAST	169	E3,1400		EBANK=	LST1		
0079	REF	2	LAST	58 TO	58:	1*	COUNT*	%1/START	FRESH AND RESTART	
0080				05,2447	0 0004	0	SLAP1	INHINT	FRESH START. COMES HERE FROM PINBALL.	
0081	REF	1		05,2450	0 3100	0	TC	STARTSUB	SUBROUTINE DOES MOST OF THE WORK.	
0082	REF	1		05,2451	1 2456	0	STARTSW	TCF	PATCH....TCF STARTSIM...FOR SIMULATION	
0083	REF	22	LAST	189	05,2452	3 4736	1	STARTSIM	CAF	
0084	REF	1		05,2453	0 5105	0	TC	FINDVAC	BIT14	
0085				05,2454	77777	0	SIM2CADR	OCT	77777	PATCH 2CADR (AND EBANK DESIGNATION) OF
0086				05,2455	77777	0	OCT	77777		SIMULATION START ADDRESS.
0087	REF	16	LAST	219	05,2456	3 1036	0	SKIPSIM	CA	DSPTAB +11D
00871	REF	1		05,2457	7 4771	0	MASK	BITS4E6		TURN OFF ALL DSPTAB +11D LAMPS
00872	REF	16	LAST	187	05,2460	6 4735	1	AD	BIT15	EXCEPT THE GIMBAL LOCK & NO ATT ONLY ON
0088	REF	17	LAST	226	05,2461	55'036	1	TS	DSPTAB +11D	REQUESTED FRESH START.
0089	REF	13	LAST	103	05,2462	3 4740	0	CA	BIT12	INITIALIZE DOWNLINK ERASABLE MEMORY
0090	REF	1		05,2463	54 333	0	TS	DUMPCNT		DUMP FOR ONE PASS.
0093	REF	7	LAST	206	05,2464	3 4755	1	CA	ZERO	
00931	REF	2	LAST	124	05,2465	55'365	1	TS	ERCOUNT	
009315	REF	1		05,2466	54 375	1	TS	FAILREG		
00932	REF	2	LAST	226	05,2467	54 376	1	TS	FAILREG +1	
009325	REF	3	LAST	226	05,2470	54 377	0	TS	FAILREG +2	
00933	REF	2	LAST	209	05,2471	54 320	1	TS	REDOCTR	
009335	REF	1		05,2472	4 4644	1	CS	PRI012		
00934	REF	9	LAST	175	05,2473	55'313	0	TS	DSRUPTSW	
0094	REF	23	LAST	226	05,2474	3 4736	1	DOFSTART	CAF	BIT14
0095				05,2475	0 0006	1	EXTEND			INSURE ENGINE IS OFF.
0096	REF	7	LAST	195	05,2476	01 011	0	WRITE	DSALMOUT	
0097	REF	8	LAST	226	05,2477	4 4755	0	CS	ZERO	
0098	REF	1		05,2500	54 055	0	TS	THRUST		
0099	REF	1		05,2501	3 4751	0	DOFSTR1	CAF	FOUR	
0100	REF	1		05,2502	55'273	1	TS	RCSFLAGS		INITIALIZE ATTITUDE ERROR DISPLAYS.
0101	REF	2	LAST	189	05,2503	3 4355	0	CA	PRI030	
0102	REF	1		05,2504	54 366	0	TS	RESTREG		SUPER BANK PRIORITY FOR DISPLAYS.
0103	REF	9	LAST	226	05,2505	3 4755	1	CA	ZERO	
0104	REF	2	LAST	121	05,2506	55'246	1	TS	ABDELV	DAP INITIALIZATION
0105	REF	1		05,2507	54 371	0	TS	NVSAVE		
0106	REF	1		05,2510	55'072	1	TS	EBANKTEM		

L FRESH START AND RESTART

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0107	REF	6	LAST	207	05,2511	55'262 1	TS	CH5MASK	
0108	REF	5	LAST	207	05,2512	55'263 0	TS	CH6MASK	
0109	REF	7	LAST	207	05,2513	55'276 1	TS	PVALVEST	FOR RCS FAILURE MONITOR
0110	REF	2	LAST	124	05,2514	55'360 1	TS	ERESTORE	***** MUST NOT BE REMOVED FROM DOFSTART
0111	REF	2	LAST	124	05,2515	55'362 0	TS	SMODE	***** MUST NOT BE REMOVED FROM DOFSTART
0112	REF	4	LAST	223	05,2516	54 332 1	TS	DNLSICOD	SELECT POD DOWNLIST
0113	REF	2	LAST	223	05,2517	55'324 1	TS	ACSWORD	ALLOW AGS INITIALIZATION
0114	REF	2	LAST	126	05,2520	55'501 0	TS	UPSVFLAG	ZERO UPDATE STATE VECTOR REQUEST FLAGWRD
0115					05,2521	0 0006 1	EXTEND		
0116	REF	1			05,2522	01 005 0	WRITE	CHAN5	TURN OFF RCS JETS.
0117					05,2523	0 0006 1	EXTEND		
0118	REF	1			05,2524	01 006 0	WRITE	CHAN6	TURN OFF RCS JETS.
0119					05,2525	0 0006 1	EXTEND		
0120	REF	13	LAST	202	05,2526	01 012 0	WRITE	CHAN12	
0121					05,2527	0 0006 1	EXTEND		
0122	REF	1			05,2530	01 013 1	WRITE	CHAN13	
0123					05,2531	0 0006 1	EXTEND		
0124	REF	3	LAST	190	05,2532	01 014 0	WRITE	CHAN14	
0125	REF	18	LAST	226	05,2533	4 1036 1	CS	DSPTAR +11D	
0126	REF	2	LAST	226	05,2534	7 4771 0	MASK	BITS4&6	
0127	REF	37	LAST	223	05,2535	10 000 0	CCS	A	
0128					05,2536	0 2542 0	TC	+4	
0129	REF	3	LAST	227	05,2537	3 4771 1	CA	BITS4&6	
0130					05,2540	0 0006 1	EXTEND		THE IMU WAS IN COARSE ALIGN IN GIMBAL
0131	REF	14	LAST	227	05,2541	05 012 1	WOR	CHAN12	LOCK, SO PUT IT BACK INTO COARSE ALIGN.
0132	REF	1			05,2542	0 2643 1	TC	MR.KLEAN	
							+4		
0133	REF	10	LAST	226	05,2543	4 4755 0	CS	ZERC	
0134	REF	1			05,2544	55'011 1	TS	MODREG	
0135	REF	1			05,2545	3 3350 1	CAF	IM30INIF	FRESH START IMU INITIALIZATION.
0136	REF	38	LAST	219	05,2546	55'302 0	TS	IMODES30	
0137	REF	1			05,2547	3 3062 0	CAF	MAXDB	
0138	REF	1			05,2550	55'346 0	TS	DB	
0139	REF	2	LAST	226	05,2551	3 4751 0	CAF	FCUR	
0140	REF	1			05,2552	55'325 0	TS	RATEINDX	INITIALIZE KALCMANU RATE
0141	REF	1			05,2553	3 3056 1	CA	BOOLSTRT	
0142	REF	1			05,2554	54 111 1	TS	DAPB COLS	
0143	REF	1			05,2555	3 5015 0	CAF	EBANK6	
0144	REF	1			05,2556	54 003 0	TS	EBANK	
0145	REF	1			E6,1400		FBANK=	HASCENT	
01451	REF	1			05,2557	3 3053 1	CA	STIKSTRT	
01452	REF	1			05,2560	55'442 0	TS	STIKSENS	
01453	REF	1			05,2561	3 3054 0	CA	RATESTRT	
01454	REF	2	LAST	145	05,2562	55'474 0	TS	-RATEDB	
0146	REF	1			05,2563	3 2000 0	CAF	FULLAPS	INITIALIZE MAXIMUM ASCENT MASS FOR USE
0147	REF	2	LAST	227	05,2564	55'400 0	TS	HASCENT	BY 1/ACCS UNTIL THE PAD LOAD IS DONE.
0148	REF	1			05,2565	3 3057 0	CA	77001OCT	LOAD DAP FILTER GAINS PAD LOAD

L FRESH START AND RESTART

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0149	REF	1		05,2566	55'403 0	TS	JKTRAP	TD BEST PRESENT ESTIMATE DF GODDIES
0150	REF	1		05,2567	55'406 0	TS	LMTRAP	.14 DEG
0151	REF	1		05,2570	3 3060 1	CA	60DEC	
0152	RFF	1		05,2571	55'405 0	TS	DKKAQSN	
0153	REF	1		05,2572	55'410 1	TS	LMKACSN	6 SEC GAIN FDR ALPHA
0154	REF	11	LAST 227	05,2573	3 4755 1	CA	ZERO	
0155	REF	1		05,2574	55'407 1	TS	LMDMFGAN	UNITY GAIN
0156	REF	2	LAST 223	05,2575	3 4363 0	CA	TEN	
0157	REF	1		05,2576	55'404 1	TS	DKDMEGAN	1 SEC GAIN FOR OMEGA
0158	REF	17	LAST 206	05,2577	3 4744 1	CAF	BIT8	SET DDCKED DB TO 1.4 DEG. MAY OVERWRITE
0159	REF	1		05,2600	55'411 0	TS	DKDB	WITH PAD LOAD.
0160	REF	1		05,2601	3 5026 0	CAF	IM33INIT	
0161	REF	23	LAST 222	05,2602	6 4746 0	AD	BIT6	KEEP BOTH DAP AND ERRDR-NEEDLES DISPLAY
0162	REF	16	LAST 196	05,2603	55'303 1	TS	IMDES33	OFF UNTIL ICDU ZERO IS FINISHED.
0163				05,2604	0 0006 1	EXTEND		INITIALIZE SWITCHES ONLY DN FRESH START.
0164	REF	1		05,2605	3 3355 1	DCA	SWINIT	
0165	REF	17	LAST 210	05,2606	52 075 1	DXCH	STATE	
0166	REF	2	LAST 228	05,2607	3 3356 1	CA	SWINIT +2	
0167	REF	18	LAST 228	05,2610	54 076 1	TS	STATE +2	
0168	REF	2	LAST 221	05,2611	3 4737 0	CA	REFSMBIT	DO NOT ALTER REFSMFLG ON FRESH START.
0169	REF	19	LAST 228	05,2612	7 0077 0	MASK	STATE +3	
0170	REF	3	LAST 228	05,2613	6 3357 0	AD	SWINIT +3	
0171	REF	20	LAST 228	05,2614	54 077 0	TS	STATE +3	
0172				05,2615	0 0006 1	EXTEND		
0173	REF	4	LAST 228	05,2616	3 3361 0	DCA	SWINIT +4	
0174	REF	21	LAST 228	05,2617	52 101 0	DXCH	STATE +4	
0175				05,2620	0 0006 1	EXTEND		
0176	REF	5	LAST 228	05,2621	3 3363 1	DCA	SWINIT +6	
0177	REF	22	LAST 228	05,2622	52 103 1	DXCH	STATE +6	
0178	REF	1		05,2623	3 4744 1	CA	SURFFBIT	DO NOT ALTER SURFFLAG DN FRESH START.
0179	REF	1		05,2624	6 4740 0	AD	CMOONBIT	CMDDNFLG
0180	REF	1		05,2625	6 4741 1	AD	LMOONBIT	LMDONFLG
0181	REF	23	LAST 228	05,2626	7 0104 0	MASK	STATE +8D	
0182	REF	6	LAST 228	05,2627	6 3364 0	AD	SWINIT +8D	
0183	REF	24	LAST 228	05,2630	54 104 0	TS	STATE +8D	
0184	REF	7	LAST 228	05,2631	3 3365 1	CA	SWINIT +9D	
0185	REF	25	LAST 228	05,2632	54 105 1	TS	STATE +9D	
0186	REF	1		05,2633	3 4737 0	CA	APSFLBIT	DO NOT ALTER APSFLAG ON FRESH START.
0187	REF	26	LAST 228	05,2634	7 0106 1	MASK	STATE +10D	
0188	REF	8	LAST 228	05,2635	6 3366 1	AD	SWINIT +10D	
0189	REF	27	LAST 228	05,2636	54 106 1	TS	STATE +10D	
0190	REF	9	LAST 228	05,2637	3 3367 0	CAF	SWINIT +11D	
0191	REF	28	LAST 228	05,2640	54 107 0	TS	STATE +11D	
0192	REF	2	LAST 180	05,2641	0 4635 0	ENDRSTRT TC	PDSTJUMP	NOW IN ANDTHER BANK.
0193	REF	1		05,2642	03205 0	CADR	DUMMYJOB + 2	PICKS UP AT REL INT. (DDNT ZERO NEWJOB)

0194 05,2643 0 0004 0 MR.KLEAN INHINT

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0195					05,2644	0 0006	1		EXTEND	
0196	REF	2	LAST	172	05,2645	3 4755	1		DCA	NEGO
0197	RFF	1			05,2646	52 755	1		DXCH	-PHASE2
0198					05,2647	0 0006	1	POOKLEAN	FXTFND	
0199	REF	3	LAST	229	05,2650	3 4755	1		DCA	NEGO
0200	REF	1			05,2651	52 761	0		DXCH	-PHASE4
0201					05,2652	0 0006	1	V37KLEAN	FXTEND	
0202	REF	4	LAST	229	05,2653	3 4755	1		DCA	NEGO
0203	REF	1			05,2654	52 753	1		DXCH	-PHASE1
0204					05,2655	0 0006	1		EXTEND	
0205	REF	5	LAST	229	05,2656	3 4755	1		DCA	NEGO
0206	REF	1			05,2657	52 757	0		DXCH	-PHASE3
0207					05,2660	0 0006	1		FXTFND	
0208	RFF	6	LAST	229	05,2661	3 4755	1		DCA	NEGO
0209	REF	1			05,2662	52 763	1		DXCH	-PHASE5
0210					05,2663	0 0006	1		EXTEND	
0211	REF	7	LAST	229	05,2664	3 4755	1		DCA	NEGO
0212	REF	1			05,2665	52 765	1		DXCH	-PHASE6
0213	REF	14	LAST	207	05,2666	0 0002	0		TC	Q

L FRESH START AND RESTART

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P0214 COMES HERE FROM LOCATION 4000, GOJAM. RESTART ANY PROGRAMS WHIC

0215	REF	4	LAST	226	E3,1400		EBANK= LST1	H MAY HAVE BEEN RUNNING AT THE TIME.
0217	REF	3	LAST	226	05,2667	24 320 0	INCR REDOCTR	ADVANCE RESTART COUNTER.
0218	REF	15	LAST	229	05,2670	22 002 0	LXCH Q	
0219					05,2671	0 0006 1	EXTEND	
0220	REF	1			05,2672	04 007 1	ROR SUPERBNK	
0221	REF	2	LAST	210	05,2673	53'433 0	DXCH RSBBQ	
0222	REF	19	LAST	227	05,2674	3 1036 0	CA DSPTAB +11D	
0223	REF	15	LAST	186	05,2675	7 4750 0	MASK BIT4	
0224					05,2676	0 0006 1	EXTEND	
0225					05,2677	1 2703 0	BZF +4	
0226	REF	24	LAST	228	05,2700	6 4746 0	AD BIT6	SET ERROR COUNTER ENABLE
0227					05,2701	0 0006 1	EXTEND	
0228	REF	15	LAST	227	05,2702	05 012 1	WOR CHAN12	ISS WAS IN COARS ALIGN SO GO BACK TO
0229	REF	2	LAST	226	05,2703	0 3100 0	TC STARTSUB	

R0230
R0232
R0234
R0236
R0238

ERASCHK TEMPORARILY STORES THE CONTENTS OF TWO ERASABLE LOCATIONS, X AND X+1 INTO SKEEP5 AND SKEEP6. IT ALSO STORES X INTO SKEEP7 AND ERESTORE. IF ERASCHK IS INTERRUPTED BY A RESTART, C(ERESTORE) SHOULD EQUAL C(SKEEP7), AND BE A + NUMBER LESS THAN 2000 OCT. OTHERWISE C(ERESTORE) SHOULD EQUAL +0.

0239	REF	2	LAST	172	05,2704	3 4350 0	CAF H15	
0240	REF	3	LAST	227	05,2705	7 1360 1	MASK ERESTORE	
0241					05,2706	0 0006 1	EXTEND	
0242					05,2707	1 2711 0	BZF +2	IF ERESTORE NOT = +0 OR +N LESS THAN 2K,
0243	REF	1			05,2710	1 2501 0	TCF DOFSTR1	DO FRESH START - E MEMORY MIGHT BE BAD.
0244	REF	4	LAST	230	05,2711	4 1360 1	CS ERESTORE	
0245					05,2712	0 0006 1	EXTEND	
0246	REF	1			05,2713	1 2730 0	BZF DORSTART	= +0 CONTINUE WITH RESTART.
0247	REF	1			05,2714	6 1377 0	AD SKEEP7	
0248					05,2715	0 0006 1	EXTEND	
0249					05,2716	1 2720 1	BZF +2	= SKEEP7, RESTORE E MEMORY.
0250	REF	2	LAST	230	05,2717	1 2501 0	TCF DOFSTR1	DO FRESH START - E MEMORY MIGHT BE BAD.
0251	REF	2	LAST	124	05,2720	3 1374 0	CA SKEEP4	
0252	REF	2	LAST	227	05,2721	54 003 0	TS EBANK	EBANK OF E MEMORY THAT WAS UNDER TEST.
0253					05,2722	0 0006 1	EXTEND	(NOT DXCH SINCE THIS MIGHT HAPPEN AGAIN)
0254	REF	2	LAST	124	05,2723	3 1376 1	DCA SKEEP5	
0255	REF	2	LAST	230	05,2724	51'377 0	INDEX SKEEP7	
0256					05,2725	52 001 1	DXCH 0000	E MEMORY RESTORED.
0257	REF	12	LAST	228	05,2726	3 4755 1	CA ZEPO	
0258	REF	5	LAST	230	05,2727	55'360 1	TS ERESTORE	
0259					05,2730	12 731 1	DORSTART NOOP	REMOVE OSC FAIL AND LGC WARNING LOGIC
A0260								SINCE SOFTWARE PROBLEMS NO LONGER
A0261								CAUSE HARDWARE RESTARTS (EXCEPT PARITY).
0269	REF	1			05,2731	0 3063 1	BUTTONS TC LIGHTSET	EXIT TO DOFSTART IF ERROR RESET AND
A0270								MARK REJECT DEPRESSED SIMULTANECUSLY

L FRESH START AND RESTART

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0271	RFF	1		05,2732	4 4736 0	SETINFL	CS	INTFLBIT	
0272	REF	2	LAST 98	05,2733	7 0106 1		MASK	FLGWRD10	
0273	REF	3	LAST 231	05,2734	54 106 1		TS	FLGWRD10	
0274	REF	1		05,2735	3 3352 0		CA	9,6,4	LEAVE PROG ALARM, GIMBAL LOCK, NO ATT
0275	REF	20	LAST 230	05,2736	7 1036 1		MASK	DSPTAB +11D	LAMPS INTACT ON HARDWARE RESTART
0276	REF	17	LAST 226	05,2737	6 4735 1		AD	BIT15	
0277	REF	21	LAST 231	05,2740	57 036 0		XCH	DSPTAB +11D	
0278	REF	1		05,2741	3 3336 1		CAF	1FAILINH	LEAVE IMU FAILURE INHIBITS INTACT ON
0279	REF	39	LAST 227	05,2742	7 1302 0		MASK	IMODFS30	HARDWARE RESTART. RESET ALL FAILURE
0280	REF	1		05,2743	6 3351 0		AD	IM30INIR	CODES.
0281	REF	40	LAST 231	05,2744	55 302 0		TS	IMODES30	
0282	RFF	3	LAST 227	05,2745	3 1324 0		CA	AGSWORD	BE SURE OF CORRECT DOWNLIST
0283	RFF	5	LAST 227	05,2746	54 332 1		TS	DNLSTCOD	
0284	REF	16	LAST 230	05,2747	3 4750 1		CA	BIT4	TURN ON THROTTLE COUNTER
0285				05,2750	0 0006 1		EXTEND		
0286	RFF	4	LAST 227	05,2751	05 014 1		WOR	CHAN14	TURN ON THRUST DRIVE
0287	REF	5	LAST 201	05,2752	4 0101 0		CS	FLAGWRD5	
0288	REF	2	LAST 189	05,2753	7 4745 1		MASK	ENGONBIT	
0289	RFF	38	LAST 227	05,2754	10 000 0		CCS	A	
0290				05,2755	1 2762 1		TCF	+5	
0291	REF	15	LAST 183	05,2756	3 4737 0		CAF	BIT13	
0292				05,2757	0 0006 1		EXTEND		
0293	REF	8	LAST 226	05,2760	05 011 1		WOR	DSALMOUT	TURN ENGINE ON
0294	REF	1		05,2761	1 2776 1		TCF	GOPROG3	
0295	REF	24	LAST 226	05,2762	3 4736 1	+5	CAF	BIT14	
0296				05,2763	0 0006 1		EXTEND		
0297	REF	9	LAST 231	05,2764	05 011 1		WOR	DSALMOUT	TURN ENGINE OFF.
0298	REF	2	LAST 231	05,2765	1 2776 1		TCF	GOPROG3	
0299				05,2766	0 0004 0	ENEMA	INHINT		
0300	REF	1		05,2767	0 3115 1		TC	STAFTSB1	
0301	REF	1		05,2770	1 2772 0		TCF	GOPROG2A	
0302	REF	1		05,2771	0 3137 1	GOPROG2	TC	STAFTSB2	
0303	REF	2	LAST 230	05,2772	0 3063 1	GOPROG2A	TC	LIGHTSFT	
0304	RFF	1		05,2773	4 3061 1		CS	R5FLGBTS	CLEAR BITS 7 AND 14.
0305	REF	4	LAST 231	05,2774	7 0106 1		MASK	FLGWRD10	
0306	REF	5	LAST 231	05,2775	54 106 1		TS	FLGWRD10	
0307	REF	1		05,2776	3 4756 1	GOPROG3	CAF	NUMGRPS	VERIFY PHASE TABLE AGREEMENTS
0308	REF	16	LAST 224	05,2777	54 161 0	PCLOOP	TS	MPAC +5	
0309				05,3000	6 0000 1		DOUBLE		
0310				05,3001	0 0006 1		EXTEND		
0311	REF	39	LAST 231	05,3002	5 0000 1		INDEX	A	
0312	REF	2	LAST 229	05,3003	3 0753 0		DCA	-PHASE1	COMPLEMENT INTO A, DIRECT INTO L.
0313				05,3004	0 0006 1		EXTEND		
0314	REF	7	LAST 197	05,3005	06 001 0		RXOR	LCHAN	RESULT MUST BE -0 FOR AGREEMENT.
0315	REF	40	LAST 231	05,3006	10 000 0		CCS	A	

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0316	REF	1		05,3007	1 3047 0		TCF	PTBAD	RESTART FAILURE.
0317	REF	2	LAST 232	05,3010	1 3047 0		TCF	PTBAD	
0318	REF	3	LAST 232	05,3011	1 3047 0		TCF	PTBAD	
0319	REF	17	LAST 231	05,3012	10 161 0		CCS	MPAC +5	PROCESS ALL RESTART GROUPS.
0320	REF	1		05,3013	1 2777 0		TCF	PCLJCP	
0321	REF	18	LAST 232	05,3014	54 162 0		TS	MPAC +6	SET TO +0.
0322	REF	1		05,3015	0 5315 0		TC	MMDSPLAY	DISPLAY MAJOR MODE
0323				05,3016	0 0004 0		INHINT		RELINT DONE IN MMDSPLAY
0324	REF	1		05,3017	4 4736 0		CS	DIDFLBIT	CLEAR DIDFLAG IN ORDER TO FORCE R10 TO
0325	REF	1		05,3020	7 0075 1		MASK	FLAGWRD1	RE-INITIALIZE ITSELF IF IT HAD BEEN
0326	REF	2	LAST 232	05,3021	54 075 1		TS	FLAGWRD1	OPERATING AT THE TIME OF THE RESTART.
0327	REF	2	LAST 231	05,3022	3 4756 1		CAF	NUMGRPS	SEE IF ANY GROUPS RUNNING.
0328	REF	19	LAST 232	05,3023	54 161 0	NXTRST	TS	MPAC +5	
0329				05,3024	6 0000 1		DOUBLE		
0330	REF	41	LAST 231	05,3025	50 000 1		INDEX	A	
0331	REF	1		05,3026	10 753 1		CCS	PHASE1	
0332	REF	1		05,3027	1 3031 1		TCF	PACTIVE	PNZ - GROUP ACTIVE.
0333	REF	1		05,3030	1 3036 0		TCF	PINACT	+0 - GROUP NOT RUNNING.
0334	REF	20	LAST 232	05,3031	54 154 0	PACTIVE	TS	MPAC	
0335	REF	21	LAST 232	05,3032	24 154 1		INCR	MPAC	ABS OF PHASE.
0336	REF	22	LAST 232	05,3033	24 162 1		INCR	MPAC +6	INDICATE GROUP DEMANDS PRESENT.
0337	REF	1		05,3034	3 3055 1		CA	RACTCADR	
0338	REF	1		05,3035	0 4622 0		TC	SWCALL	MUST RETURN TO SWRETURN.
0339	REF	23	LAST 232	05,3036	10 161 0	PINACT	CCS	MPAC +5	PROCESS ALL RESTART GROUPS.
0340	REF	1		05,3037	1 3023 1		TCF	NXTRST	
0341	REF	24	LAST 232	05,3040	10 162 0		CCS	MPAC +6	NO, CHECK PHASE ACTIVITY FLAG
0342	REF	1		05,3041	1 2641 1		TCF	ENDRSTRT	PHASE ACTIVE
0343	REF	18	LAST 231	05,3042	3 4735 1		CAF	BIT15	IS MODE -0
0344	REF	2	LAST 227	05,3043	7 1011 1		MASK	MODREG	
0345				05,3044	0 0006 1		EXTEND		
0346	REF	1		05,3045	1 6001 1		BZF	GOTOPGCH	NO
0347	REF	2	LAST 232	05,3046	1 2641 1		TCF	ENDRSTRT	YES
0348	REF	9	LAST 222	05,3047	0 5567 0	PTBAD	TC	ALARM	SET ALARM TO SHOW PHASE TABLE FAILURE.
0349				05,3050	01107 0		OCT	1107	
0350	REF	3	LAST 230	05,3051	1 2501 0		TCF	DCFSTR1	

R0351 *****

R0352

R0353 DC NOT USE GOPROG2 OR ENEMA WITHOUT CONSULTING POOH PEOPLE

R0354

0355 REF 16 LAST 231 4737 OCT10000 = BIT13

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0356	REF	3	LAST	226	4355	OCT30000 =	PRIC30	
0357					05,3052	07777 1	OCT7777 OCT	7777
03571					05,3053	32321 0	STIKSTR DEC	0.82526B
03572					05,3054	77445 1	RATESTRT DEC	-218
0358	REF	1			05,3055	03523 0	RACCADR CADR	RESTARTS
0359					05,3056	21312 1	BOOLSTR OCT	21312
0360					05,3057	77001 0	77001OCT OCT	77001
0361					05,3060	00074 1	6ODEC DEC	60
0363					05,3061	20100 1	RSFLGBTS OCT	20100
03631					05,3062	03434 1	MAXDB OCTAL	03434
								20 D/S MAXIMUM COMMANDED RATE
								.14 DEG SCALED AT 4.5 DEG
								5 DEG ATTITUDE DEADBAND, SCALED AT 45.
0364	REF	13	LAST	181	05,3063	3 4747 1	LIGHTSET CAF	BIT5
0365					05,3064	0 0006 1	EXTEND	
0366	REF	1			05,3065	02 016 1	RAND	NAVKEYIN
0367					05,3066	0 0006 1	EXTEND	
0368	REF	1			05,3067	1 3075 1	BZF	NONAVKEY
0369					05,3070	0 0006 1	EXTEND	
0370	REF	1			05,3071	00 015 0	READ	MNKEYIN
0371	REF	1			05,3072	6 3347 1	AD	-ELR
0372					05,3073	0 0006 1	EXTEND	
0373					05,3074	1 3076 1	BZF	+2
								NO MARK REJECT
								CHECK IF KEYS 2M AND 5M ON
								MAIN DSKY KEYCODE(BITS 1-5)
0374	REF	16	LAST	230	05,3075	0 0002 0	NONAVKEY TC	Q
0375	REF	3	LAST	230	05,3076	0 3100 0	TC	STAPTSUB
0376	REF	1			05,3077	1 2474 0	TCF	DCFSTART

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P0377 INITIALIZATION COMMON TO BOTH FRESH START AND RESTART.

0378	REF	5	LAST	207	E6,1537			EBANK= AOSQ
0379	REF	1			05,3100	3 3337 0	STARTSUB	CAF LDNPHAS1
0380	REF	2	LAST	115	05,3101	54 335 0	TS	DNTMGOTO
A0381								
A0382								
0383	REF	25	LAST	230	05,3102	3 4746 0	CAF	BIT6
0384					05,3103	0 0006 1	EXTEND	
0385	REF	3	LAST	197	05,3104	02 033 0	RAND	CHAN33
0386	REF	1			05,3105	6 3353 1	AD	RMODINIT
0387	REF	15	LAST	210	05,3106	54 110 0	TS	RADMODES
0388	REF	2	LAST	186	05,3107	3 4733 1	CAF	POS MAX
0389	REF	1			05,3110	54 026 1	TS	TIME3
0390	REF	1			05,3111	6 7745 0	AD	MINUS2
0391	REF	4	LAST	175	05,3112	54 027 0	TS	TIME4
0392	REF	1			05,3113	6 7746 0	AD	NEGONE
0393	REF	1			05,3114	54 030 0	TS	TIME5
0394	REF	2	LAST	227	05,3115	3 5015 0	STARTSB1	CAF EBANK6
0395	REF	3	LAST	230	05,3116	54 003 0	TS	EBANK
0396	REF	17	LAST	232	05,3117	4 4737 1	CS	BIT13
03961	REF	2	LAST	226	05,3120	7 1273 1	MASK	RCSFLAGS
0397	REF	3	LAST	234	05,3121	55 273 1	TS	RCSFLAGS
03971	REF	3	LAST	234	05,3122	3 4733 1	CAF	POS MAX
03972	REF	1			05,3123	55 464 1	TS	T6NEXT
03973					05,3124	0 0006 1	EXTEND	
03974	REF	2	LAST	227	05,3125	03 013 0	WAND	CHAN13
0398	REF	13	LAST	230	05,3126	3 4755 1	CAF	ZERO
0399	REF	1			05,3127	55 463 0	TS	NXT6ADR
0400	REF	3	LAST	145	05,3130	55 470 1	TS	NEXTP
0401	REF	1			05,3131	4 4751 1	CS	ACCSOKAY
0402	REF	2	LAST	227	05,3132	7 0111 1	MASK	DAPBOOLS
0403	REF	3	LAST	234	05,3133	54 111 1	TS	DAPBOOLS
0404					05,3134	0 0006 1	EXTEND	
0405	REF	1			05,3135	3 3335 1	DCA	IDLEADR
0406	REF	2	LAST	168	05,3136	53 275 1	DXCH	T5ADR
0407	REF	1			05,3137	3 3346 0	STARTSB2	CAF OCT30001
0408					05,3140	0 0006 1	EXTEND	
0409	REF	10	LAST	231	05,3141	03 011 1	WAND	DSALMOUT
04092	REF	1			05,3142	4 4743 1	CS	READPBIT
04093	REF	2	LAST	221	05,3143	7 0077 0	MASK	FLAGWRD3
04094	REF	3	LAST	234	05,3144	54 077 0	TS	FLAGWRD3

SET POINTER SO NEXT 20MS DOWNRUPT WILL
CAUSE THE CURRENT DOWNLIST TO BE
INTERRUPTED AND START SENDING FROM THE
BEGINNING OF THE CURRENT DOWNLIST.

CAUSE DAPIDLER TO CALL 1/ACCS

ZERO BIT 13
DISABLE TIME6 CLOCK. JUST IN CASE A T6
RUPT IS ALREADY IN THE PRIORITY CHAIN,
ENSURE THAT IT'S INPUTS WILL RENDER IT
INEFFECTUAL.

SET T5RUPT FOR DAPIDLER PROGRAM.

DURING SOFTWARE RESTART, DO NOT DISTURB
ENGINE ON, OFF AND ISS WARNING.

CLEAR READRFLG FOR R29.

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0410	REF	4	LAST	234	05,3145	4 0077 0	CS	FLAGWRD3	DURING SOFTWARE RESTART,CLEAR TURNON,
0411	REF	1			05,3146	7 4741 0	MASK	NR29F8IT	REPOSITION,CDU ZERO AND REMODE BITS
0412					05,3147	0 0006 1	EXTEND		IN RADMODES,SINCE TASKS ASSOCIATED
0413					05,3150	1 3152 0	BZF	+2	WITH THESE BITS HAVE BEEN KILLED
0414	REF	16	LAST	194	05,3151	3 4742 1	CAF	BIT10	ALSO IF R29 HAD BEEN REQUESTED,
0415	REF	1			05,3152	6 3342 1	AD	OCT32001	(NR29FLG = 0) CLEAR BIT 10 RADMODES
0416					05,3153	4 0000 0	COM		TO MAKE R29 FORGET IT HAD STARTED
0417	REE	16	LAST	234	05,3154	7 0110 0	MASK	RADMODES	DESIGNATING
0418	REF	17	LAST	235	05,3155	54 110 0	TS	RADMODES	
0419	REF	1			05,3156	3 3344 1	CAF	OCT27470	DURING SOFTWARE RESTART, DO NOT DISTURB
0420					05,3157	0 0006 1	EXTEND		IMU FLAGS. (COURSE ALIGN ENABLE, ZERO
0421	REF	16	LAST	230	05,3160	03 012 1	WAND	CHAN12	IMU CDUS, ENABLE IMU COUNTER) AND GIMBAL
A0422									TRIM DRIVES. LEAVE RR LOCKON ENABLE
A0423									ALONE.
04232	REF	2	LAST	201	05,3161	4 4750 0	CS	NORRMBIT	ENABLE R25.
04234	REF	6	LAST	231	05,3162	7 0101 0	MASK	FLAGWRD5	
04236	REF	7	LAST	235	05,3163	54 101 0	TS	FLAGWRD5	
0424	REE	1			05,3164	3 3345 0	CAF	OCT74160	DURING SOFTWARE RESTART, DO NOT DISTURB
0425					05,3165	0 0006 1	EXTEND		TELEMETRY FLAGS, RESET TRAP FLAGS, AND
0426	REF	3	LAST	234	05,3166	03 013 0	WAND	CHAN13	ENABLE T6RUPT FLAG.
0427	REF	14	LAST	226	05,3167	3 4740 0	CAF	BIT12	REENABLE RUPT10 (RUPT QUICKLY
0428					05,3170	0 0006 1	EXTEND		RESUMFS EXCEPT DURING P64)
0429	REE	4	LAST	235	05,3171	05 013 0	WOR	CHAN13	
0430	REF	26	LAST	234	05,3172	3 4746 0	CAF	BIT6	DURING SOFTWARE RESTART, DO NOT DISTURB
0431					05,3173	0 0006 1	EXTEND		GYRO ENABLE FLAG.
0432	REF	5	LAST	231	05,3174	03 014 1	WAND	CHAN14	
0433	REF	5	LAST	230	E3,1400		EBANK=	LST1	
0434	REF	1			05,3175	3 5007 0	CAF	STARTERB	
0435	REF	4	LAST	234	05,3176	54 003 0	TS	EBANK	SET EOR E3
0436	REF	1			05,3177	3 4734 0	CAF	NEG1/2	INITIALIZE WAITLIST DELTA-TS.
0437	REF	6	LAST	235	05,3200	55'407 1	TS	LST1 +7	
0438	REE	7	LAST	235	05,3201	55'406 0	TS	LST1 +6	
0439	REF	8	LAST	235	05,3202	55'405 0	TS	LST1 +5	
0440	REF	9	LAST	235	05,3203	55'404 1	TS	LST1 +4	
0441	REF	10	LAST	235	05,3204	55'403 0	TS	LST1 +3	
0442	REF	11	LAST	235	05,3205	55'402 1	TS	LST1 +2	
0443	REE	12	LAST	235	05,3206	55'401 1	TS	LST1 +1	
0444	REF	13	LAST	235	05,3207	55'400 0	TS	LST1	
0445	REF	1			05,3210	4 5236 1	CS	ENDTASK	
0446	REF	1			05,3211	55'410 1	TS	LST2	
0447	REF	2	LAST	235	05,3212	55'412 0	TS	LST2 +2	
0448	REF	3	LAST	235	05,3213	55'414 0	TS	LST2 +4	
0449	REF	4	LAST	235	05,3214	55'416 1	TS	LST2 +6	

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0450	REF	5	LAST	235	05,3215	55'420 1	TS	LST2 +8D	
0451	REF	6	LAST	236	05,3216	55'422 0	TS	LST2 +10D	
0452	REF	7	LAST	236	05,3217	55'424 0	TS	LST2 +12D	
0453	REF	8	LAST	236	05,3220	55'426 1	TS	LST2 +14D	
0454	REF	9	LAST	236	05,3221	55'430 0	TS	LST2 +16D	
0455	REF	2	LAST	235	05,3222	4 5237 0	CS	ENDTASK +1	
0456	REF	10	LAST	236	05,3223	55'411 0	TS	LST2 +1	
0457	REF	11	LAST	236	05,3224	55'413 1	TS	LST2 +3	
0458	REF	12	LAST	236	05,3225	55'415 1	TS	LST2 +5	
0459	REF	13	LAST	236	05,3226	55'417 0	TS	LST2 +7	
0460	REF	14	LAST	236	05,3227	55'421 0	TS	LST2 +9D	
0461	REF	15	LAST	236	05,3230	55'423 1	TS	LST2 +11D	
0462	REF	16	LAST	236	05,3231	55'425 1	TS	LST2 +13D	
0463	REF	17	LAST	236	05,3232	55'427 0	TS	LST2 +15D	
0464	REF	18	LAST	236	05,3233	55'431 1	TS	LST2 +17D	
0465	REF	14	LAST	234	05,3234	4 4755 0	CS	ZERO	MAKE ALL EXECUTIVE REGISTER SETS
0466	REF	1			05,3235	54 167 0	TS	PRIORITY	AVAILABLE.
0467	REF	2	LAST	236	05,3236	54 203 1	TS	PRIORITY +12D	
0468	RFF	3	LAST	236	05,3237	54 217 1	TS	PRIORITY +24D	
0469	REF	4	LAST	236	05,3240	54 233 1	TS	PRIORITY +36D	
0470	RFF	5	LAST	236	05,3241	54 247 1	TS	PRIORITY +48D	
0471	REF	6	LAST	236	05,3242	54 263 1	TS	PRIORITY +60D	
0472	REF	7	LAST	236	05,3243	54 277 1	TS	PRIORITY +72D	
0473	REF	8	LAST	236	05,3244	54 313 1	TS	PRIORITY +84D	
0474	REF	10	LAST	226	05,3245	55'313 0	TS	DSRUPTSW	
0475	REF	1			05,3246	54 067 1	TS	NFWJOB	SHOWS NO ACTIVE JOBS.
0476	REF	1			05,3247	3 3341 1	CAF	VAC1ADRC	MAKE ALL VAC AREAS AVAILABLE.
0477	RFF	1			05,3250	54 400 1	TS	VAC1USE	
0478	REF	1			05,3251	6 3343 0	AD	LTHVACA	
0479	REF	1			05,3252	54 454 0	TS	VAC2USE	
0480	REF	2	LAST	236	05,3253	6 3343 0	AD	LTHVACA	
0481	RFF	1			05,3254	54 530 0	TS	VAC3USE	
0482	REF	3	LAST	236	05,3255	6 3343 0	AD	LTHVACA	
0483	REF	1			05,3256	54 604 1	TS	VAC4USE	
0484	REF	4	LAST	236	05,3257	6 3343 0	AD	LTHVACA	
0485	REF	1			05,3260	54 660 0	TS	VAC5USE	
0486	REF	3	LAST	228	05,3261	3 4363 0	CAF	TEN	
0487	REF	25	LAST	232	05,3262	54 154 0	TS	MPAC	R1,R2,R3).
0489	REF	15	LAST	235	05,3263	4 4740 1	CS	BIT12	
0490	REF	26	LAST	236	05,3264	50 154 1	INDEX	MPAC	
0491	REF	22	LAST	231	05,3265	55'023 0	TS	DSPTAB	
0492	REF	27	LAST	236	05,3266	10 154 0	CCS	MPAC	
0493	REF	1			05,3267	1 3262 0	TCF	DSPOFF	
0494	RFF	1			05,3270	55'326 0	TS	DELAYLOC	
0495	REF	2	LAST	236	05,3271	55'327 1	TS	DELAYLOC +1	

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0496	REF	3	LAST	236	05,3272	55'330	1	TS	DELAYLOC +2	
0497	REF	1			05,3273	55'074	1	TS	RISAVE	
0498	REF	1			05,3274	54 045	1	TS	INLINK	
0499	REF	7	LAST	172	05,3275	54 776	0	TS	DSPCNT	
0500	REF	1			05,3276	55'042	1	TS	CADRSTOR	
0501	REF	1			05,3277	55'013	0	TS	REQRET	
0502	REF	1			05,3300	55'015	0	TS	CLPASS	
0503	REF	1			05,3301	55'012	1	TS	DSPLOCK	
0504	REF	1			05,3302	55'020	0	TS	MONSAVE	KILL MONITOR
0505	REF	1			05,3303	55'021	1	TS	MONSAVE1	
0506	REF	1			05,3304	55'001	0	TS	VERBREG	
0507	REF	1			05,3305	55'002	0	TS	NOUNREG	
0508	REF	1			05,3306	55'043	0	TS	DSPLIST	
0509	REF	1			05,3307	55'312	1	TS	MARKSTAT	
0510	REF	1			05,3310	55'044	1	TS	EXTVBACT	MAKE EXTENDED VERBS AVAILABLE
0511	REF	2	LAST	223	05,3311	55'304	0	TS	IMUCADR	
0512	REF	1			05,3312	55'305	1	TS	OPTCADR	
0513	REF	1			05,3313	55'306	1	TS	RADCADR	
0514	REF	2	LAST	122	05,3314	55'307	0	TS	ATTCADR	
0515	REF	1			05,3315	55'314	1	TS	LGYRO	
0516	REF	1			05,3316	54 100	1	TS	FLAGWRD4	KILL INTERFACE DISPLAYS
0517	REF	1			05,3317	3 4760	1	CAF	NOUTCON	
0518	REF	5	LAST	175	05,3320	55'016	0	TS	NOUT	
0519	REF	7	LAST	224	05,3321	4 4753	0	CS	DNF	
0520	REF	1			05,3322	55'100	0	TS	SAMPLIM	
0521	REF	27	LAST	235	05,3323	3 4746	0	CAF	BIT6	
0522	REF	17	LAST	228	05,3324	7 1303	1	MASK	IMODES33	LEAVE BIT 6 UNCHANGED
0523	REF	2	LAST	228	05,3325	6 5026	0	AD	IM33INIT	NO PIP OR TM FAILS.BIT6=0 IN THIS WORD.
0524	REF	18	LAST	237	05,3326	55'303	1	TS	IMODES33	
0525	REF	1			05,3327	3 3340	0	CAF	LESCHK	SELF CHECK GO-TO REGISTER.
0526	REF	2	LAST	124	05,3330	55'361	0	TS	SELFRET	
0527	REF	1			05,3331	4 4360	1	CS	VD1	
0528	REF	2	LAST	173	05,3332	54 777	1	TS	DSPCCUNT	
0529	REF	17	LAST	233	05,3333	0 0002	0	TC	Q	
0530	REF	6	LAST	234	E6,1537			EBANK=	AQSQ	
0531	REF	1			05,3334	02024	0	IDLEADR	2CADR	DAPIDLER
0531	REF	1			05,3335	34066	0			
0532					05,3336	00435	0	IFAILINH	OCT	435
0533	REF	1			05,3337	03437	1	LDNPHAS1	GENADR	DNPHASE1
0534	REF	1			05,3340	03344	1	LESCHK	GENADR	SELFCHK
0535	REF	2	LAST	236	05,3341	00400	0	VAC1ADRC	ADRES	VAC1USE
0536					05,3342	32001	1	OCT32001	OCT	32001
0537					05,3343	00054	0	LTHVACA	DEC	44
0538					05,3344	27470	1	OCT27470	OCT	27470

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0539		05,3345	74160 0	OCT74160 OCT	74160	
0540		05,3346	30001 0	OCT30001 OCT	30001	
0541	REF 1	5007		STARTEB EQUALS	EBANK3	
0542	REF 1	4756		NUMGRPS EQUALS	FIVE	
0543		05,3347	77755 0	-ELR OCT	-22	-ERROR LIGHT RESET KEY CODE.
0544		05,3350	37411 1	IM30INIF OCT	37411	INHIBITS IMU FAIL FOR 5 SEC AND PIP ISSW
0545		05,3351	37000 0	IM30INIR OCT	37000	
0546	REF 2 LAST 196	5026		IM33INIT =	PRI016	NO PIP OR TM FAIL SIGNALS.
0547		05,3352	00450 0	9,6,4 OCT	450	
0548		05,3353	00102 1	RMODINIT OCT	00102	
0549		05,3354	00000 1	SWINIT OCT	0	
0550		05,3355	00000 1	OCT	0	
0551		05,3356	00000 1	OCT	0	
0552		05,3357	02000 0	OCT	02000	BIT 11 = NOR29FLG
0553		05,3360	00000 1	OCT	0	
0554		05,3361	00000 1	OCT	0	
0555		05,3362	00000 1	OCT	0	
0556		05,3363	00100 0	OCT	00100	
0557		05,3364	00000 1	OCT	0	
0558		05,3365	00000 1	OCT	0	
0559		05,3366	00000 1	OCT	0	
0560		05,3367	40000 0	OCT	40000	BIT 15 = LRBYPASS.

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P0561 PROGRAM NAME GCTOPOOH ASSEMBLY SUNDANCE
 R0562 LOG SECTION FRESH START AND RESTART

R0563 FUNCTIONAL DESCRIPTION

R0564 FLASH V 37 ON DSKY %MM CHANGE REQUEST "

R0565 INPUT/OUTPUT INFORMATION

R0566 A. CALLING SEQUENCE TC GOTOPOOH

R0567 B. ERASABLE INITIALIZATION NONF

R0568 C. OUTPUT FLASH V 37 ON DSKY

R0569 D. DEBRIS L

R0570 PROGRAM ANALYSIS

R0571 A. SUBROUTINES CALLED PRIODSPR, LINUS

R0572 B. NCRMAL EXIT TCF ENDOFJOB

R0573 C. ALARM AND ABORT EXITS NONE

0574					6001			BLOCK 03
0575	REF	2	LAST	55	6000			SETLOC EFTAG5
0576					6001			BANK

0577	REF	1						COUNT* \$\$/POO	
0578	REF	1			6001	3 4764 0	GOTOPOOH	CAF OCT33	4.33SPOT FOR GOPOOFIX
0579	REF	13	LAST	207	6002	54 001 1		TS L	
0580					6003	4 0000 0		COM	
0581	REF	2	LAST	229	6004	52 761 0		DXCH -PHASE4	

0582	REF	3	LAST	228	6005	0 4635 0		TC POSTJUMP	
0583	REF	1			6006	10024 0		CADR GOPOOFIX	
0584					6007	00024 1	OCT24	MM 20	
0585					6010	00031 0	OCT31	MM 25	

0586					20,2004			BANK 20	
0587	REF	1			04,2000			SETLOC VERB37	
0588					04,2024			BANK	

0589	REF	1						COUNT* \$\$/POO	VERB 37 AND POO IN BANK 4.
0590	REF	2	LAST	223	04,2024	0 5516 0	GOPOOFIX	TC DOWNFLAG	ALLOW X-AXIS OVERRIDE
0591	REF	1			04,2025	00311 1		ADRES XOVINFLG	

0592	REF	3	LAST	239	04,2026	0 5516 0		TC DOWNFLAG	INSURE THAT ULLAGE IS OFF
0593	REF	1			04,2027	00314 1		ADRES ULLAGFLG	

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0594	REF	1		04,2030	3 2036 0	CAF	V37N99
0595	REF	8	LAST 223	04,2031	0 4616 1	TC	BANKCALL
0596	REF	1		04,2032	20351 1	CADR	GOFLASH
0597				04,2033	1 2030 1	TCF	-3
0598				04,2034	1 2030 1	TCF	-4
0599				04,2035	1 2030 1	TCF	-5
0600				04,2036	11343 0 V37N99	VN	3799

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R0601 PROGRAM NAME V37 ASSEMBLY SUNDANCE

R0602 LCG SECTION FRESH START AND RESTART

R0603 FUNCTIONAL DESCRIPTION

R0604 1. CHECK IF NEW PROGRAM ALLOWED. IF BIT 1 OF FLAGWRD2(NODOFLAG) IS SET, AN ALARM 1520 IS CALLED.
 R0606 2. CHECK FOR VALIDITY OF PROGRAM SELECTED. IF AN INVALID PROGRAM IS SELECTED, THE OPERATOR ERROR LIGHT IS
 R0608 SET AND CURRENT ACTIVITY, IF ANY, CONTINUES.
 R0609 3. SERVICER IS TERMINATED IF IT HAS BEEN RUNNING.
 R0610 4. INSTALL IS EXECUTED TO AVOID INTERRUPTING INTEGRATION.
 R0611 5. THE ENGINE IS TURNED OFF AND THE DAP IS INITIALIZED FOR CDAST.
 R0612 6. TRACK AND UPDATE FLAGS ARE SET TO ZERO.
 R0613 7. DISPLAY SYSTEM IS RELEASED.
 R0614 8. THE FOLLOWING ARE PERFORMED FOR EACH OF THE THREE CASES.
 R0615 A. PROGRAM SELECTED IS P00.
 R0616 1. RENDEZVOUS AND P25 FLAGS ARE RESET.(KILL P20 AND P25)
 R0617 2. STATINT1 IS SCHEDULED BY SETTING RESTART GROUP 2.
 R0618 3. MAJOR MODE 00 IS STORED IN THE MODE REGISTER(MODREG).
 R0619 4. SUPERBANK 3 IS SELECTED.
 R0620 5. NODOFLAG IS RESET.
 R0621 6. ALL RESTART GROUPS EXCEPT GROUP 2 ARE CLEARED. CONTROL IS TRANSFERRED TO RESTART PROGRAM (GOPROG2)
 R0623 WHICH CAUSES ALL CURRENT ACTIVITY TO BE DISCONTINUED AND A 9 MINUTE INTEGRATION CYCLE TO BE
 R0625 INITIATED.
 R0626 B. PROGRAM SELECTED IS P20 OR P25.
 R0627 1. IF THE CURRENT MAJOR MODE IS THE SAME AS THE SELECTED NEW PROGRAM, THE PROGRAM IS RE-INITIALIZED
 R0629 VIA V37XEQ, ALL RESTART GROUPS, EXCEPT GROUP 4 ARE CLEARED.
 R0631 2. IF THE CURRENT MAJOR MODE IS NOT EQUAL TO THE NEW REQUEST, A CHECK IS MADE TO SEE IF THE REQUEST-
 R0633 ED MAJOR MODE HAS BEEN RUNNING IN THE BACKGROUND,
 R0634 AND IF IT HAS, NO NEW PROGRAM IS SCHEDULED, THE EXISTING
 R0635 P20 OR P25 IS RESTARTED TO CONTINUE, AND ITS M M IS SET.
 R0636 3. CONTROL IS TRANSFERRED TO GOPROG2.
 R0637 C. PROGRAM SELECTED IS NEITHER P00, P20, NOR P25
 R0638 1. V37XEQ IS SCHEDULED (AS A JDB) BY SETTING RESTART GROUP 4
 R0639 2. ALL CURRENT ACTIVITY EXCEPT RENDEZVOUS AND TRACKING IS DISCONTINUED BY CLEARING ALL RESTART
 R0641 GROUPS. IF THE RENDEZVOUS OR THE P25 FLAG IS ON, GROUP 2 IS NOT CLEARED, ALLOWING THESE PROGRAMS
 R0643 TO CONTINUE.

R0644 INPLT/OUTPLT INFORMATION

R0645 A. CALLING SEQUENCE

R0646 CONTROL IS DIRECTED TO V37 BY THE VERBFAN ROUTINE.
 R0647 VERBFAN GOES TO C(VERBTAB+C(VERBREG)). VERB 37 = MMCHANG.
 R0648 MMCHANG EXECUTES A TC POSTJUMP, CADR V37.

R0649 B. ERASABLE INITIALIZATION NONE

R0650 C. OUTPUT
 R0651

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R0652 MAJOR MODE CHANGE

R0653 D. DEBRIS
 R0654 MMNUMBER, MPAC +1, MINDEX, 8ASETEMP +C(MINDEX), FLAGWRD0, FLAGWRD1, FLAGWRD2, MODREG, GOLOC -1,
 R0656 GOLOC, GOLOC +1, GOLOC +2, 8ASETEMP, -PHASE2, PHASE2, -PHASE4

R0657 PROGRAM ANALYSIS

R0658 A. SUBROUTINES CALLED
 R0659 ALARM, RELDSP, PINBRNCH, INTSTALL, ENGINOF2, ALLCOAST, V37KLEAN, GOPROG2, FALTON, FINDVAC, SUPERSW,
 R0661 DSPMM

R0662 8. NORMAL EXIT TC ENDOFJOB

R0663 C. ALARMS 1520 (MAJOR MODE CHANGE NOT PERMITTED)

0664	REF	1		04,2037	54 775 0	V37	TS	MMNUMBER	SAVE MAJOR MODE
0665	REF	4	LAST 233	04,2040	3 4355 0		CAF	PRIQ30	RESTART AT PINBALL PRIORITY
0666	REF	2	LAST 226	04,2041	54 366 0		TS	RESTREG	
0667	REF	41	LAST 231	04,2042	3 1302 1		CA	IMODES30	IS IMU BEING INITIALIZED
0668	REF	28	LAST 237	04,2043	7 4746 1		MASK	RIT6	
0669	REF	42	LAST 232	04,2044	10 000 0		CCS	A	
0670	REF	1		04,2045	1 2064 0		TCF	CANTROO	
0671	REF	2	LAST 242	04,2046	4 0775 0		CS	MMNUMBER	IS P70 REQUESTED?
0672	REF	1		04,2047	6 2375 1		AD	DEC70	
0673				04,2050	0 0006 1		EXTEND		
0674	REF	1		04,2051	1 2370 0		BZF	SETUP70	YES
0675	REF	8	LAST 237	04,2052	6 4753 1		AD	ONE	IS P71 REQUESTED?
0676				04,2053	0 0006 1		EXTEND		
0677	REF	1		04,2054	1 2367 0		BZF	SETUP71	YES
0678	REF	3	LAST 242	04,2055	3 0775 1		CA	MMNUMBER	IS NEW REQUEST POO
0679				04,2056	0 0006 1		EXTEND		
0680	REF	1		04,2057	1 2106 0		BZF	ISSERVON	YES, CHECK SERVICER STATUS
0681	REF	3	LAST 180	04,2060	4 0076 1		CS	FLAGWRD2	NO, IS NODD V37 FLAG SET
0682	REF	1		04,2061	7 4753 0		MASK	NODOBIT	
0683	REF	43	LAST 242	04,2062	10 000 0		CCS	A	
0684	REF	1		04,2063	1 2071 1		TCF	CHECKTAB	NO
0685	REF	10	LAST 232	04,2064	0 5567 0	CANTROO	TC	ALARM	
0686				04,2065	01520 1		OCT	1520	
0687	REF	1		04,2066	0 4457 0	V37BAD	TC	RELDSP	RELEASES DISPLAY FROM ASTRONAUT
0688	REF	4	LAST 239	04,2067	0 4635 0		TC	PDSTJUMP	BRING BACK LAST NORMAL DISPLAY IF THERE
0689	REF	1		04,2070	20723 0		CADR	PINBRNCH	WAS ONE. OTHERWISE DO AN EDJ.
0690	REF	1		04,2071	3 2474 1	CHECKTAB	CA	NOV37MM	INDEX FOR MM TABLES.

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0691	REF	28	LAST	236	04,2072	54 155 1	AGAINMM	TS	MPAC +1	
0692	REF	29	LAST	243	04,2073	50 155 0		NOX	MPAC +1	
0693	REF	1			04,2074	3 2436 1		CA	PREMM1	OBTAIN WHICH MM THIS IS FOR
0694	REF	1			04,2075	7 6073 1		MASK	LOW7	
0695					04,2076	4 0000 0		COM		
0696	REF	4	LAST	242	04,2077	6 0775 1		AO	MMNUMBER	
0697	REF	44	LAST	242	04,2100	10 000 0		CCS	A	
0698	REF	30	LAST	243	04,2101	10 155 1		CCS	MPAC +1	IF GR, SEE IF ANYMORE IN LIST
0699	REF	1			04,2102	1 2072 1		TCF	AGAINMM	YES, GET NEXT ONE
0700	REF	1			04,2103	1 2317 1		TCF	V37NONO	LAST TIME OR PASSED MM
0701	REF	31	LAST	243	04,2104	3 0155 0		CA	MPAC +1	
0702	REF	1			04,2105	54 774 1		TS	MINDEX	SAVE INDEX FOR LATER
0703	REF	2	LAST	201	04,2106	4 0103 1	ISSERVON	CS	FLAGWR07	V37 FLAG SET - 1.E. IS SERVICER GOING
0704	REF	1			04,2107	7 4746 1		MASK	V37FLBIT	
0705	REF	45	LAST	243	04,2110	10 000 0		CCS	A	
0706	REF	1			04,2111	1 2133 0		TCF	CANV37	NO
0707	REF	4	LAST	239	04,2112	0 5516 0		TC	00WNFLAG	YES,TURN OFF THE AVERAGE FLAG AND
0708	REF	1			04,2113	00163 0		AORES	AVEGFLAG	WAIT FOR SERVICER TO RETURN TO CANV37.
0709	REF	1			04,2114	3 2363 0		CAF	V37PETA0	
0710	REF	1			04,2115	55 260 0		TS	OUTROUTE	
0711	REF	1			04,2116	1 5155 1		TCF	EN00FJOB	
0712	REF	7	LAST	223	04,2117	4 0074 0	V37RET	CS	FLAGWR00	IS P20 OR P22 RUNNING?
0713	REF	2	LAST	200	04,2120	7 4745 1		MASK	RNDVZBIT	
0714	REF	46	LAST	243	04,2121	10 000 0		CCS	A	
0715					04,2122	1 2124 0		TCF	+2	NO. CHECK FOR P25.
0716	REF	1			04,2123	1 2131 1		TCF	2.7SPT	YES. DO 2.7SPOT
0717	REF	8	LAST	243	04,2124	4 0074 0		CS	FLAGWRD0	IS P25 RUNNING?
0718	REF	1			04,2125	7 4743 1		MASK	P25FLBIT	
0719	REF	47	LAST	243	04,2126	10 000 0		CCS	A	
0720	REF	1			04,2127	3 2364 1	2.0SPT	CA	OCT37667	
0721	REF	14	LAST	233	04,2130	6 4747 1	2.11SPT	AD	BIT5	
0722	REF	1			04,2131	6 2365 0	2.7SPT	AO	OCT40072	
0723	REF	1			04,2132	0 5357 0		TC	PHSCHNGA	
0724	REF	15	LAST	236	04,2133	3 4755 1	CANV37	CAF	ZERO	
0725					04,2134	0 0006 1		EXTEND		
0726	REF	2	LAST	230	04,2135	01 007 1		WRITE	SUPERBNK	
0727	REF	1			04,2136	3 2362 1		CAF	R00AD	
0728	REF	1			04,2137	54 374 0		TS	TEMPFLSH	
0729	REF	1			04,2140	0 5353 1		TC	PHASCHNG	
0730					04,2141	00014 1		OCT	14	

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0731	REF	3	LAST	222	04,2142	0 6036 1	ROD	TC	INTPRET	
0732					04,2143	77624 1		CALL		WAIT FOR INTEGRATION TO FINISH
0733	REF	1			04,2144	27412 0			INTSTALL	
0734					04,2145	77776 1	OUMMYAO	EXIT		
0735	REF	5	LAST	243	04,2146	0 5516 0		TC	DOWNFLAG	
0736	REF	1			04,2147	00124 0		AORES	3AX1 SFLG	RESET 3-AXIS FLAG
0737	REF	1			04,2150	3 4735 1		CAF	LRBYBIT	CLEAN UP THE R12 FLAGWORD.
0738	REF	1			04,2151	54 107 0		TS	FLGWRD11	
07382	REF	6	LAST	244	04,2152	0 5516 0		TC	DOWNFLAG	INSURE THAT THE R04FLAG IS CLEAR.
07384	REF	2	LAST	87	04,2153	00063 1		AORFS	R04FLAG	
0739	REF	7	LAST	244	04,2154	0 5516 0		TC	DOWNFLAG	ALLOW X-AXIS OVERRIDE.
0740	REF	2	LAST	239	04,2155	00311 1		AORES	XOVINFLG	
0741	REF	5	LAST	243	04,2156	10 775 0		CCS	MMNUMBER	IS THIS A POOH REQUEST
0742	REF	1			04,2157	1 2305 1		TCF	NOUVEAU	NO, PICK UP NEW PROGRAM
0743	REF	2	LAST	242	04,2160	0 4457 0	POOH	TC	RELDSP	RELEASE DISPLAY SYSTEM
0744	REF	1			04,2161	3 5017 1		CAF	PRI05	SET VARIABLE RESTART PRIORITY FOR
0745	REF	1			04,2162	55 056 1		TS	PHSPROT2	POO INTEGRATION.
0746	REF	1			04,2163	0 6011 1		TC	CLRAOM00	CLRAOM00 DOES AN INHINT.
0747	REF	2	LAST	242	04,2164	4 4753 0		CS	N000BIT	TURN OFF N000FLAG.
0748	REF	4	LAST	242	04,2165	7 0076 1		MASK	FLAGWR02	
0749	REF	5	LAST	244	04,2166	54 076 1		TS	FLAGWRD2	
0750	REF	2	LAST	238	04,2167	3 4756 1		CA	FIVE	SET RESTART FOR STATEINT1
0751	REF	14	LAST	239	04,2170	54 001 1		TS	L	
0752					04,2171	4 0000 0		COM		
0753	REF	2	LAST	229	04,2172	52 755 1		OXCH	-PHASE2	
0754	REF	1			04,2173	4 2366 1		CS	OCT700	TURN OFF P20,P25,IMU IN USE FLAG
0755	REF	9	LAST	243	04,2174	7 0074 0		MASK	FLAGWR00	
0756	REF	10	LAST	244	04,2175	54 074 0		TS	FLAGWRD0	RENDFLG
0757	REF	1			04,2176	3 4755 1		CAF	DNLAOP00	
0758	REF	6	LAST	231	04,2177	54 332 1	SEU00PO0	TS	DNLISTCOO	SET UP APPROPRIATE DOWNLIST CODE
0759	REF	4	LAST	231	04,2200	55 324 1		TS	AGSWORO	(CURRENT LIST WILL BE COMPLETED BEFORE
A0760										NEW ONE IS STARTED)
0761	REF	6	LAST	191	04,2201	0 4674 0		TC	IBNKCALL	
0762	REF	1			04,2202	75555 0		CAOR	ENGINOFI	
0763	REF	7	LAST	244	04,2203	0 4674 0		TC	IBNKCALL	INSURE ALLCOAST.
0764	REF	1			04,2204	40204 0		CADR	ALLCOAST	DOES A RESTOROB.

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0765	REF	1		04,2205	4 4775 1		CS	OCT120	TURN OFF TRACK, UPDATE FLAGS
0766	REF	2	LAST 226	04,2206	55'072 1		TS	EBANKTEM	
0767	REF	3	LAST 232	04,2207	7 0075 1		MASK	FLAGWRD1	
0768	REF	4	LAST 245	04,2210	54 075 1		TS	FLAGWRD1	
0769	REF	8	LAST 244	04,2211	0 4674 0		TC	IBNKCALL	KILL GROUPS 1,3,5,6
0770	REF	1		04,2212	12652 0		CADR	V37KLEAN	
0771	REF	6	LAST 244	04,2213	10 775 0		CCS	MMNUMBER	IS IT POOH
0772	REF	1		04,2214	1 2223 1		TCF	RENDVOO	NO
0773	REF	9	LAST 245	04,2215	0 4674 0	GOMOD	TC	IBNKCALL	REDUNDANT EXCEPT FOR GROUP 4
0774	REF	1		04,2216	12647 1		CADR	POOKLEAN	
0775	REF	7	LAST 245	04,2217	3 0775 1		CA	MMNUMBER	
0776	REF	3	LAST 232	04,2220	55'011 1		TS	MODREG	
0777	REF	5	LAST 242	04,2221	0 4635 0	GOGOPROG	TC	POSTJUMP	
0778	REF	1		04,2222	12771 0		CADR	GOPROG2	
0779	REF	4	LAST 245	04,2223	4 1011 1	PENDVOO	CS	MODREG	IS CURRENT PROGRAM 22
0780	REF	1		04,2224	6 2323 1		AD	OCT26	
0781				04,2225	0 0006 1		EXTEND		
0782	REF	1		04,2226	1 2245 1		BZF	RESET22	YES - CLEAR RENDEZVOUS FLAG
0783	REF	8	LAST 245	04,2227	4 0775 0		CS	MMNUMBER	IS NEW PROGRAM P22
0784	REF	2	LAST 245	04,2230	6 2323 1		AD	OCT26	
0785				04,2231	0 0006 1		EXTEND		
0786	REF	2	LAST 245	04,2232	1 2245 1		BZF	RESET22	
0787	REF	1		04,2233	6 7745 0		AD	NEG2	IS NEW PROGRAM = P20 OR P25
0788				04,2234	0 0006 1		EXTEND		
0789	REF	1		04,2235	1 2257 1		BZF	RENDNOO	YES
0790	REF	3	LAST 244	04,2236	6 4756 1		AD	FIVE	25
0791				04,2237	0 0006 1		EXTEND		
0792	REF	2	LAST 245	04,2240	1 2257 1		BZF	RENDNOO	YES
0793	REF	1		04,2241	3 2321 0		CA	OCT500	NO, IS EITHER P20 OR P25 RUNNING
0794	REF	11	LAST 244	04,2242	7 0074 0		MASK	FLAGWRD0	
0795	REF	48	LAST 243	04,2243	10 000 0		CCS	A	
0796	REF	1		04,2244	1 2254 1		TCF	POOFIZZ	YES, LEAVE GROUP 2 TO PICK UP P20 OR P25
0797	REF	2	LAST 244	04,2245	4 2366 1	RESFT22	CS	OCT700	CLEAR RENDEZVOUS,P25
0798	REF	12	LAST 245	04,2246	7 0074 0		MASK	FLAGWRD0	AND IMU IN USE FLAGS
0799	REF	13	LAST 245	04,2247	54 074 0		TS	FLAGWRD0	
0800	REF	2	LAST 244	04,2250	0 6011 1		TC	CLRADMOD	
0801				04,2251	0 0006 1	KILL2	EXTEND		NO, KILL 2
0802	REF	8	LAST 229	04,2252	3 4755 1		DCA	NEG0	

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0803	REF	3	LAST	244	04,2253	52 755 1	DXCH	-PHASE2	
0804	REF	1			04,2254	3 2361 1	POOFIZZ	CAF	V37QCAD
0805	REF	2	LAST	243	04,2255	54 374 0	TS	TEMPFLSH	RESTART POINT FOR V37XEQ
0806	REF	1			04,2256	1 2221 0	TCF	GOGOPROG	
0807	REF	5	LAST	245	04,2257	4 1011 1	RENDNOO	CS	MODREG
0808	REF	1			04,2260	6 6007 0	AD	OCT24	
0809					04,2261	0 0006 1	EXTEND		
0810	REF	1			04,2262	1 2251 1	BZF	KILL2	P20 OR P25 ON TOP OF P20 OR P25 -
0811	REF	4	LAST	245	04,2263	6 4756 1	AD	FIVE	
0812					04,2264	0 0006 1	EXTEND		
0813	REF	2	LAST	246	04,2265	1 2251 1	BZF	KILL2	
0814	REF	2	LAST	245	04,2266	3 2321 0	CA	OCT500	
0815	REF	14	LAST	245	04,2267	7 0074 0	MASK	FLAGWRD0	
0816	REF	9	LAST	245	04,2270	6 0775 1	AD	MMNUMBER	
0817					04,2271	4 0000 0	COM		
0818	REF	1			04,2272	6 2324 0	AD	P20REG	IS IT 20 AND IS RENDEZVOUS FLAG ON
0819					04,2273	0 0006 1	EXTEND		
0820	REF	1			04,2274	1 2301 0	BZF	STATQUO	YES
0821	REF	1			04,2275	6 2322 0	AD	OCT305	IS IT 25 AND IS P25 BIT ON
0822					04,2276	0 0006 1	EXTEND		
0823	REF	2	LAST	246	04,2277	1 2301 0	BZF	STATQUO	YES, LEAVE AS IS
0824	REF	3	LAST	246	04,2300	1 2251 1	TCF	KILL2	
0825	REF	5	LAST	245	04,2301	4 0075 1	STATQUO	CS	FLAGWRD1
0826	REF	2	LAST	245	04,2302	7 4775 1	MASK	OCT120	SET TRACKFLAG
0827	REF	6	LAST	246	04,2303	26 075 1	ADS	FLAGWRD1	UPDATE FLAG
0828	REF	1			04,2304	1 2215 1	TCF	GOMOD	
0829	REF	3	LAST	246	04,2305	3 2321 0	NOUVEAU	CAF	OCT500
0830	REF	15	LAST	246	04,2306	7 0074 0	MASK	FLAGWRD0	IS P20 OR P25 FLAG SET
0831	REF	49	LAST	245	04,2307	10 000 0	CCS	A	
0832					04,2310	1 2313 0	TCF	+3	YES
0833	REF	8	LAST	244	04,2311	0 5516 0	TC	DOWNFLAG	NO, RESET IMUINUSE FLAG
0834	REF	1			04,2312	00007 0	ADRES	IMUSE	
0835	REF	2	LAST	243	04,2313	50 774 0	INDEX	MINDEX	
0836	REF	1			04,2314	3 2475 0	CAF	DNLADMM1	OBTAIN APPROPRIATE DOWNLIST ADDRESS
0837					04,2315	0 0004 0	INHINT		
0838	REF	1			04,2316	1 2177 0	TCF	SEUDOPOD	
0839	REF	1			04,2317	0 4364 1	V37NONO	TC	FALTON
0840	REF	1			04,2320	1 2066 1	TCF	V37BAD	COME HERE IF MM REQUESTED DOESNT EXIST

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0841	REF	17	LAST	231	4750	OCT00010	EQUALS	8IT4	
0842					04,2321	00500	1	OCT500	500
0843					04,2322	00305	1	OCT305	305
0844					04,2323	00026	0	OCT26	26
0845					04,2324	00124	0	P20REG	124
0846					04,2325	0 0004	0	V37XEQ	INHINT
0847	REF	3	LAST	246	04,2326	50 774	0	INDEX	MINDEX
0848	REF	2	LAST	243	04,2327	3 2436	1	CAF	PREMM1
0849	REF	1			04,2330	55'060	1	TS	MMTEMP
0850	REF	1			04,2331	54 020	1	TS	CYR
0851	REF	2	LAST	247	04,2332	3 0020	0	CA	CYR
0852	REF	1			04,2333	7 7724	0	MASK	PRIO37
0853	REF	1			04,2334	55'062	0	TS	PHSPRDT4
0854	REF	1			04,2335	54 063	0	TS	NEWPRIO
0855	REF	2	LAST	247	04,2336	3 1060	0	CA	MMTEMP
0856					04,2337	0 0006	1	EXTEND	
0857	REF	18	LAST	228	04,2340	7 4744	0	MP	8ITR
0858	REF	1			04,2341	7 4757	1	MASK	LOW3
0859	REF	15	LAST	244	04,2342	54 001	1	TS	L
0860	REF	4	LAST	247	04,2343	50 774	0	INDEX	MINDEX
0861	REF	1			04,2344	3 2400	1	CAF	FCADRM1
0862	REF	1			04,2345	55'061	0	TS	BASETEMP
0863	REF	3	LAST	230	04,2346	7 4350	1	MASK	HIS
0864	REF	16	LAST	247	04,2347	26 001	1	ADS	L
0865	REF	2	LAST	247	04,2350	3 1061	1	CA	BASETEMP
0866	REF	1			04,2351	7 5012	0	MASK	LOW10
0867	REF	16	LAST	202	04,2352	6 4741	1	AD	BIT11
0868	REF	1			04,2353	0 5116	1	TC	SPVAC
0869	REF	3	LAST	247	04,2354	3 1060	0	V37XEQC	CA
0870	REF	2	LAST	243	04,2355	7 6073	1	CA	MMTEMP
0871	REF	1			04,2356	0 5314	1	MASK	LOW7
								TC	NEWMODEA
0872	REF	3	LAST	244	04,2357	0 4457	0	TC	RFLDSP
0873	REF	2	LAST	243	04,2360	0 5155	0	TC	ENDOFJOB
0874	REF	1			5660			NEG7	EQUALS OCT77770
0875	REF	1			1060			MMTEMP	EQUALS PHSPRDT3
0876	REF	1			1061			BASETEMP	EQUALS TBASF4
0877	REF	1			04,2361	10330	0	V37QCAD	CADR V37XEQ +3
0878	REF	1			04,2362	10145	0	ROQAD	CADR DUMMYAD
0879	REF	1			04,2363	10117	1	V37RETAD	CADR V37PET
0880					04,2364	37667	1	OCT37667	OCT 37667

BITS 7 AND 9
 OBTAIN PRIO, EBANK, AND MM
 SHIFT RIGHT TO BITS 14 - 10
 PRESET GROUP 4 RESTART PRIORITY
 STORE PRIO FOR SPVAC
 OBTAIN EBANK - BITS 8, 9, 10 OF MMTEMP.
 MAKE BBCON BY ADDING HIS OF FCADR
 OBTAIN GENADR PORTION OF 2CADR.
 UPON RETURN FROM FINDVAC PLACE THE
 NEW MM IN MODREG (THE LOW 7 BITS OF
 PHSPRDT1)
 RELEASE DISPLAY
 AND EXIT

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0881 04,2365 40072 0 OCT40072 OCT 40072
 0882 04,2366 00700 0 OCT700 OCT 700
 R0883
 0884 REF 1 04,2367 3 6244 0 SETUP71 CAF THREE
 0885 REF 18 LAST 237 04,2370 54 002 1 SETUP70 TS Q
 0886 04,2371 0 0006 1 EXTEND
 0887 REF 1 04,2372 3 2377 0 DCA P70CADR
 0888 REF 19 LAST 248 04,2373 6 0002 0 AD Q
 0889 04,2374 52 006 0 DTC8

 0890 04,2375 00106 0 DEC70 DEC 70
 0891 REF 3 LAST 162 E7,1516 EBANK= R
 0892 REF 1 04,2376 02166 1 P70CADR 2CADR P70
 0892 REF 1 04,2377 42067 0
 R0893 FOR VERB 37 TWO TABLES ARE MAINTAINED. EACH TABLE HAS AN ENTRY FOR EACH
 R0894 MAJOR MODE THAT CAN BE STARTED FROM THE KEYBOARD. THE ENTRIES ARE PUT
 R0895 INTO THE TABLE WITH THE ENTRY FOR THE HIGHEST MAJOR MODE COMING FIRST,

R0896 TO THE LOWEST MAJOR MODE WHICH IS THE LAST ENTRY IN EACH TABLE.

R0897 THE FCADRM TABLE CONTAINS THE FCADR OF THE STARTING JOB OF
 R0898 THE MAJOR MODE. FOR EXAMPLE,

A0899		FCADRM1	FCADR	P79	START OF P 79
A0900			FCADR	PR0G18	START OF P 18
A0901			FCADR	P01	START OF P 01

R0902 NOTE, THE FIRST ENTRY MUST BE LABELED FCADRM1.
 R0903 ----

0904	REF	1	04,2400	71524 1	FCADRM1	FCADR	P79
0905	REF	1	04,2401	71274 0		FCADR	P78
0906	REF	1	04,2402	26207 0		FCADR	P76
0907	REF	1	04,2403	72673 0		FCADR	P75
0908	REF	1	04,2404	72513 0		FCADR	P74
0909	REF	1	04,2405	72164 1		FCADR	P73
0910	REF	1	04,2406	72031 0		FCADR	P72
0911	REF	1	04,2407	62172 1		FCADR	LANDJUNK
0912	REF	1	04,2410	64772 1		FCADR	P63LM
0913	REF	1	04,2411	33317 1		FCADR	P57
0914	REF	1	04,2412	32050 0		FCADR	PR0G52
0915	REF	1	04,2413	31340 1		FCADR	P51
0916	REF	1	04,2414	75436 1		FCADR	P47LM
0917	REF	1	04,2415	75410 0		FCADR	P42LM
0918	REF	1	04,2416	75272 1		FCADR	P41LM
0919	REF	1	04,2417	75147 1		FCADR	P40LM
0920	REF	1	04,2420	71517 1		FCADR	P39
0921	REF	1	04,2421	71271 0		FCADR	P38
0922	REF	1	04,2422	72667 0		FCADR	P35
0923	REF	1	04,2423	72511 1		FCADR	P34

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0924	REF	1	04,2424	72162 1	FCADR	P33
0925	REF	1	04,2425	72027 1	FCADR	P32
0926	REF	1	04,2426	72414 0	FCADR	P31
0927	REF	1	04,2427	72000 1	FCADR	P30
0928	REF	1	04,2430	50427 0	FCADR	PROG25
0929	REF	1	04,2431	50022 1	FCADR	PROG22
0930	REF	1	04,2432	51402 0	FCADR	PROG21
0931	REF	1	04,2433	50022 1	FCADR	PROG20
0932	REF	1	04,2434	60006 1	FCADR	P12LM
0933	REF	1	04,2435	77641 1	FCADR	P06

R0934 THE PREMM TABLE CONTAINS THE E-BANK, MAJOR MODE, AND PRIORITY
R0935 INFORMATION, IT IS IN THE FOLLOWING FORM,

R0936 PPP PPE EEM MMM MMM

R0937 WHERE THE 7 M BITS CONTAIN THE MAJOR MODE NUMBER
R0938 3 E BITS CONTAIN THE E-BANK NUMBER
R0939 5 P BITS CONTAIN THE PRIORITY AT WHICH THE JOB IS
R0940 TO BE STARTED

R0941 FCR EXAMPLE,

A0942		PREMM1	OCT	67213	PRIORITY	33
A0943					E-BANK	5
A0944					MAJOR MODE	11
A0945			OCT	25437	PRIORITY	12
A0946					E-BANK	6
A0947					MAJOR MODE	31

R0948 NOTE, THE FIRST ENTRY MUST BE LABELED PREMM1

0949	04,2436	27717 0	PREMM1	OCT	27717	MM 79	EBANK 7	PRI0 13
0950	04,2437	27716 1		OCT	27716	MM 78	EBANK 7	PRI0 13
0951	04,2440	27714 0		OCT	27714	MM 76	EBANK 7	PRI0 13
0952	04,2441	27713 1		OCT	27713	MM 75	EBANK 7	PRI0 13
0953	04,2442	27712 0		OCT	27712	MM 74	EBANK 7	PRI0 13
0954	04,2443	27711 0		OCT	27711	MM 73	EBANK 7	PRI0 13
0955	04,2444	27710 1		OCT	27710	MM 72	EBANK 7	PRI0 13
0956	04,2445	27704 1		OCT	27704	MM 68	EBANK 7	PRI0 13
0957	04,2446	27677 1		OCT	27677	MM 63	EBANK 7	PRI0 13
0958	04,2447	27271 0		OCT	27271	MM 57	EBANK 5	PRI0 13
0959	04,2450	27264 1		OCT	27264	MM 52	EBANK 5	PRI0 13
0960	04,2451	27263 0		OCT	27263	MM 51	EBANK 5	PRI0 13
0961	04,2452	27657 0		OCT	27657	MM 47	EBANK 7	PRI0 13
0962	04,2453	27652 0		OCT	27652	MM 42	EBANK 7	PRI0 13
0963	04,2454	27651 0		OCT	27651	MM 41	EBANK 7	PRI0 13
0964	04,2455	27650 1		OCT	27650	MM 40	EBANK 7	PRI0 13
0965	04,2456	27647 1		OCT	27647	MM 39	EBANK 7	PRI0 13
0966	04,2457	27646 0		OCT	27646	MM 38	EBANK 7	PRI0 13
0967	04,2460	27643 0		OCT	27643	MM 35	EBANK 7	PRI0 13
0968	04,2461	27642 1		OCT	27642	MM 34	EBANK 7	PRI0 13

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0969	04,2462	27641 1	OCT	27641	MM 33	EBANK 7	PRI0 13
0970	04,2463	27640 0	DCT	27640	MM 32	EBANK 7	PRI0 13
0971	04,2464	27637 0	OCT	27637	MM 31	EBANK 7	PRI0 13
0972	04,2465	27636 1	OCT	27636	MM 30	EBANK 7	PRI0 13
0973	04,2466	27631 0	OCT	27631	MM 25	EBANK 7	PRI0 13
0974	04,2467	27626 0	OCT	27626	MM 22	EBANK 7	PRI0 13
0975	04,2470	27625 0	OCT	27625	MM 21	EBANK 7	PRI0 13
0976	04,2471	27624 1	OCT	27624	MM 20	EBANK 7	PRI0 13
0977	04,2472	27614 1	OCT	27614	MM 12	EBANK 7	PRI0 13
0978	04,2473	27006 1	OCT	27006	MM 06	EBANK 4	PRI0 13

R0979 NOTF, THE FOLLOWING CONSTANT IS THE NUMBER OF ENTRIES IN EACH OF
 R0980 ---- THE ABOVE LISTS--(IE, THE NUMBER OF MAJOR MODES (EXCEPT P00)
 R0981 THAT CAN BE CALLED FROM THE KEYBOARD MINUS ONE)

0982	04,2474	00035 1	NOV37MM	DEC	29	MM'S -1
0983	RFF 1	04,2475	00002 0	DNLADMM1	ADRES	RENDEZVU P79
0984	REF 2 LAST 250	04,2476	00002 0		ADRES	RENDEZVU P78
0985	RFF 3 LAST 250	04,2477	00002 0		ADRES	RENDEZVU
0986	REF 4 LAST 250	04,2500	00002 0		ADRES	RENDEZVU P75
0987	REF 5 LAST 250	04,2501	00002 0		ADRES	RENDEZVU P74
0988	RFF 6 LAST 250	04,2502	00002 0		ADRES	RENDEZVU P73
0989	RFF 7 LAST 250	04,2503	00002 0		ADRES	RENDEZVU P72
0990	REF 1	04,2504	00004 0		ADRES	DESAS CNT P68
0991	REF 2 LAST 250	04,2505	00004 0		ADRES	DESAS CNT P63
0992	REF 1	04,2506	00005 1		ADRES	LUNRSALN P57
0993	RFF 1	04,2507	00000 1		ADRES	COSTALIN P52
0994	REF 2 LAST 250	04,2510	00000 1		ADRES	COSTALIN P51
0995	RFF 1	04,2511	00003 1		ADRES	DRBMANUV P47
0996	RFF 2 LAST 250	04,2512	00003 1		ADRES	DRBMANUV P42
0997	REF 3 LAST 250	04,2513	00003 1		ADRES	DRBMANUV P41
0998	REF 4 LAST 250	04,2514	00003 1		ADRES	DRBMANUV P40
0999	REF 8 LAST 250	04,2515	00002 0		ADRES	RENDEZVU P39
1000	RFF 9 LAST 250	04,2516	00002 0		ADRES	RENDEZVU P38
1001	RFF 10 LAST 250	04,2517	00002 0		ADRES	RENDEZVU P35
1002	REF 11 LAST 250	04,2520	00002 0		ADRES	RENDEZVU P34
1003	REF 12 LAST 250	04,2521	00002 0		ADRES	RENDEZVU P33
1004	REF 13 LAST 250	04,2522	00002 0		ADRES	RENDEZVU P32
1005	REF 14 LAST 250	04,2523	00002 0		ADRES	RENDEZVU P31LM
1006	REF 15 LAST 250	04,2524	00002 0		ADRES	RENDEZVU P30
1007	REF 16 LAST 250	04,2525	00002 0		ADRES	RENDEZVU P25
1008	RFF 2 LAST 250	04,2526	00005 1		ADRES	LUNRSALN P22
1009	RFF 17 LAST 250	04,2527	00002 0		ADRES	RENDEZVU P21
1010	REF 18 LAST 250	04,2530	00002 0		ADRES	RENDEZVU P20
1011	REF 3 LAST 250	04,2531	00004 0		ADRES	DESAS CNT P12
1012	RFF 3 LAST 250	04,2532	00000 1		ADRES	COSTALIN P06
1013	REF 16 LAST 243	4755		DNLADP00 =	ZERO	
1014		0000		COSTALIN =	0	
1015		0001		AGSUPDAT =	1	
1016		0002		RFNDEZVU =	2	

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1017				0003	ORBMANUV =	3
1018				0004	DESASCNT =	4
1019				0005	LUNRSALN =	5
1020				13,2026	BANK	13
1021	REF	2	LAST	61	13,2000	SETLOC INTINIT
1022				13,2026	BANK	

1023	REF	2	LAST	61 TO	61:	2	2*	COUNT#	\$\$/INTIN
------	-----	---	------	-------	-----	---	----	--------	------------

1024	REF	2	LAST	126	E3,1554	EBANK=	RRECTCSM
------	-----	---	------	-----	---------	--------	----------

R1025 THIS ROUTINE DOES THE POO INTEGRATION

1026				13,2026	43014 0	STATEUP	SET	BOF	EXTRAPOLATE CM STATE VECTOR
1027	REF	1		13,2027	01474 1			VINTFLAG	
1028	REF	1		13,2030	04347 0			SURFFLAG	ALSO 6X6 W-MATRIX IF LM ON LUNAR
1029	REF	1		13,2031	26036 0			DOINT	SURFACE AND W-MATRIX VALID
1030				13,2032	43014 0		BOF	SET	FOR RENDEZVOUS NAVIGATION.
1031	REF	1		13,2033	02756 1			RENDWFLG	
1032	REF	2	LAST	251	13,2034	26036 0		DOINT	
1033	REF	1		13,2035	01476 0			DIMOFLAG	
1034				13,2036	45014 0	DOINT	CLEAR	CALL	
1035	REF	1		13,2037	01667 1			PRECIFLG	ENGAGES 4-TIME STEP LOGIC IN INTEGRATION
1036	REF	1		13,2040	27134 1			INTEGRV	WHEN MODREG = 0

1037				13,2041	71214 0		BON	DLJAD	
1038	REF	2	LAST	251	13,2042	04307 1		SURFFLAG	
1039	REF	1		13,2043	26063 0			NO-INT	
1040	REF	3	LAST	127	13,2044	01571 0		TETCSM	
1041	REF	3	LAST	222	13,2045	34041 0	STCALL	TDEC1	
1042	REF	2	LAST	244	13,2046	27412 0		INTSTALL	
1043				13,2047	45014 0		CLEAR	CALL	EXTRAPOLATE LM STATE VECTOR
1044	REF	2	LAST	251	13,2050	01674 0		VINTFLAG	
1045	REF	1		13,2051	26644 0			SETIFLGS	
1046				13,2052	77614 1		BOF		ALSO 9X9 W-MATRIX IF W IS VALID
1047	REF	2	LAST	251	13,2053	02756 1		RENDWFLG	
1048	REF	1		13,2054	26060 0			DOINT2	
1049				13,2055	43014 0		SET	SET	
1050	REF	2	LAST	251	13,2056	01476 0		DIMOFLAG	
1051	REF	1		13,2057	01475 0			D6OR9FLG	
1052				13,2060	45014 0	DOINT2	SET	CALL	
1053	REF	2	LAST	251	13,2061	01467 0		PRECIFLG	DISENGAGE 4 TIME STEP LOGIC IN INTEG.
1054	REF	2	LAST	251	13,2062	27134 1		INTEGRV	
1055				13,2063	77614 1		NO-INT	CLRGD	
1056	REF	3	LAST	223	13,2064	01236 1		NOJOFAG	
1057	REF	1		13,2065	26632 1			ENDINT	

R1058 THISVINT IS CALLED BY MIDTOAV1 AND2

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1059				13,2066	43414 1	THISVINT CLEAR	RVQ
1060	REF	3	LAST	251	13,2067	01674 0	VINTFLAG

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P0001 RESTART TABLES

R0002 -----

R0003 THERE ARE TWO FORMS OF RESTART TABLES FOR EACH GROUP. THEY ARE KNOWN AS THE EVEN RESTART TABLES AND THE ODD
 R0005 RESTART TABLES. THE ODD TABLES HAVE ONLY ONE ENTRY OF THREE LOCATIONS WHILE THE EVEN TABLES HAVE TWO ENTRIES
 R0007 EACH USING THREE LOCATIONS. THE INFORMATION AS TO WHETHER IT IS A JOB, WAITLIST, OR A LONGCALL IS GIVEN BY THE
 R0009 WAY THINGS ARE PUT INTO THE TABLES.

R0010 A JOB HAS ITS PRIORITY STORED IN PRODTAB OF THE CORRECT PHASE SPOT - A POSITIVE PRIORITY INDICATES A
 R0012 FINDVAC JOB, A NEGATIVE PRIORITY A NOVAC. THE 2CADR OF THE JOB IS STORED IN THE CADRTAB.
 R0014 FOR EXAMPLE,

A0015 5.7SPOT OCT 23000
 A0016 2CADR SOMEJOB

R0017 A RESTART OF GROUP 5 WITH PHASE SEVEN WOULD THEN CAUSE SOMEJOB TO BE RESTARTED AS A FINDVAC WITH PRIORITY 23.

A0019 5.5SPOT OCT -23000
 A0020 2CADR ANYJOB

R0021 HERE A RESTART OF GROUP 5 WITH PHASE 7 WOULD CAUSE ANYJOB TO BE RESTARTED AS A NOVAC WITH PRIORITY 23.
 R0023 A LONGCALL HAS ITS GENADR OF ITS 2CADR STORED NEGATIVELY AND ITS BBCON STORED POSITIVELY. IN ITS PRODTAB IS
 R0025 PLACED THE LOCATION OF A DP REGISTER THAT CONTAINS THE DELTA TIME THAT LONGCALL HAD BEEN ORIGINALLY STARTED
 R0027 WITH. EXAMPLE,

A0028 3.6SPOT GENADR DELTAT
 A0029 -GENADR LONGTASK
 A0030 BBCON LONGTASK

A0031 OCT 31000
 A0032 2CADR JOBAGAIN

R0033 THIS WOULD START UP LONGTASK AT THE APPROPRIATE TIME, OR IMMEDIATELY IF THE TIME HAD ALREADY PASSED. IT SHOULD
 R0035 BE NOTED THAT IF DELTAT IS IN A SWITCHED E BANK, THIS INFORMATION SHOULD BE IN THE BBCON OF THE 2CADR OF THE
 R0037 TASK. FROM ABOVE, WE SEE THAT THE SECOND PART OF THIS PHASE WOULD BE STARTED AS A JOB WITH A PRIORITY OF 31.

R0039 WAITLIST CALLS ARE IDENTIFIED BY THE FACT THAT THEIR 2CADR IS STORED NEGATIVELY. IF PRODTAB OF THE PHASE SPOT
 R0041 IS POSITIVE, THEN IT CONTAINS THE DELTA TIME, IF PRODTAB IS NEGATIVE THEN IT IS THE -GENADR OF AN FRASABLE
 R0043 LOCATION CONTAINING THE DELTA TIME, THAT IS, THE TIME IS STORED INDIRECTLY. IT SHOULD BE NOTED AS ABOVE, THAT
 R0045 IF THE TIME IS STORED INDIRECTLY, THE BBCON MUST CONTAIN THE NECESSARY E BANK INFORMATION IF APPLICABLE. WITH
 R0047 WAITLIST WE HAVE ONE FURTHER OPTION, IF -0 IS STORED IN PRODTAB, IT WILL CAUSE AN IMMEDIATE RESTART OF THE
 R0049 TASK. EXAMPLES,

A0050 OCT 77777
 A0051 -2CADR ATASK

THIS WILL CAUSE AN IMMEDIATE RESTART
 OF THE TASK :ATASK:

A0052 DEC 200
 A0053 -2CADR DUMMY

IF THE TIME OF THE 2 SECONDS SINCE DUMMY
 WAS PUT ON WAITLIST IS UP, IT WILL BEGIN
 IN 10 MS, OTHERWISE IT WILL BEGIN WHEN
 IT NORMALLY WOULD HAVE BEGUN.

A0054
 A0055

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A0056 -GENADR DTIME WHERE DTIME CONTAINS THE DELTA TIME
 A0057 -2CADR TASKTASK OTHERWISE THIS IS AS ABOVE

R0058 ***** NOW THE TABLES THEMSELVES *****

0059 01,2002 BANK 01
 0060 REF 1 01,2000 SETLOC RESTART
 0061 01,2002 BANK

0062 01,2000 PRDITAB EQUALS 12000 USED TO FIND THE PRIORITY OR DELTATIME
 0063 01,2001 CADRTAB EQUALS 12001 THIS AND THE NEXT RELATIVE LOC CONTAIN
 A0064 RESTART 2CADR

0065 REF 1 COUNT* \$\$/PSTAB TABLES IN BANK 1.
 0066 REF 1 01,2002 0 0010 0 SIZETAB TC 1.2SPOT -12006

0067 REF 1 01,2003 0 0020 0 TC 1.3SPOT -12004

0068 REF 1 01,2004 0 0010 0 TC 2.2SPOT -12006

0069 RFF 1 01,2005 0 0023 0 TC 2.3SPOT -12004

0070 REF 1 01,2006 0 0010 0 TC 3.2SPOT -12006

0071 RFF 1 01,2007 0 0053 1 TC 3.3SPOT -12004

0072 REF 1 01,2010 0 0054 0 TC 4.2SPOT -12006

0073 REF 1 01,2011 0 0064 0 TC 4.3SPOT -12004

0074 REF 1 01,2012 0 0137 1 TC 5.2SPOT -12006

0075 REF 1 01,2013 0 0155 0 TC 5.3SPOT -12004

0076 REF 1 01,2014 0 0010 0 TC 6.2SPOT -12006

0077 REF 1 01,2015 0 0166 0 TC 6.3SPOT -12004

0078 01,2016 21000 1 1.2SPOT OCT 21000

0079 REF 29 LAST 228 0074 EBANK= STATE

0080 RFF 3 LAST 247 01,2017 05155 0 2CADR ENDOFJOB

0080 01,2020 04060 0

0081 01,2021 00144 0 DEC 100

0082 REF 30 LAST 254 0074 EBANK= STATE

0083 REF 3 LAST 181 01,2022 05261 1 2CADR TASKOVER

0083 01,2023 04060 0

R0084 ANY MORE GROUP 1.EVEN RESTART VALUES SHOULD GO HERE

0085 REF 2 LAST 162 01,2024 76302 1 1.3SPOT -GFNADR SAVET-30

0086 REF 2 LAST 162 E7,1513 EBANK= DVCNTR

0087 REF 1 01,2025 75440 0 -2CADR ULLGTASK

0087 REF 1 01,2026 03710 1

R0088 ANY MORE GROUP 1.ODD RESTART VALUES SHOULD GO HERE

0089 REF 2 LAST 254 01,2016 2.2SPOT EQUALS 1.2SPOT

R0090 ANY MORE GROUP 2.EVEN RESTART VALUES SHOULD GO HERE

0091 REF 1 01,2027 02630 0 2.3SPOT GENADR 600SECS

0092 RFF 1 01,2030 75173 0 -GENADR STATEINT

0093 REF 3 LAST 251 E3,1554 EBANK= RRECTCSM

0094 REF 2 LAST 254 01,2031 26063 0 BBCON STATEINT

A DUMMY EXAMPLE TO BE REPLACED AS SOON

AS THERE IS A LEGITIMATE 1.2SPOT

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0095				01,2032	05000 1	2.5SPOT	OCT	05000
0096	REF	4	LAST 254	E3,1554			EBANK=	RRECTCSM
0097	REF	1		01,2033	02613 1		2CADR	STATINT1
0097	REF	1		01,2034	26063 0			
0098				01,2035	02734 0	2.7SPOT	DEC	1500
0099	REF	3	LAST 202	E7,1454			EBANK=	LOSCOUNT
0100	REF	1		01,2036	75502 1		-2CADR	P20LEMC1
0100	REF	1		01,2037	27710 1			
0101				01,2040	14000 1	2.11SPOT	OCT	14000
0102	REF	2	LAST 161	E7,1756			EBANK=	P21TIME
0103	REF	1		01,2041	02441 1		2CADR	P25LEM1
0103	REF	1		01,2042	50067 0			
0104				01,2043	10000 0	2.13SPOT	OCT	10000
0105	REF	4	LAST 255	E7,1454			EBANK=	LOSCOUNT
0106	REF	1		01,2044	02175 0		2CADR	RELINUS
0106	REF	1		01,2045	54067 1			
0107				01,2046	26000 0	2.15SPOT	OCT	26000
0108	REF	5	LAST 255	E7,1454			EBANK=	LOSCOUNT
0109	REF	1		01,2047	02677 0		2CADR	R22RSTR
0109	REF	1		01,2050	50067 0			
0110				01,2051	77777 0	2.17SPOT	OCT	77777
0111	REF	1		E7,1704			EBANK=	VGPPEV
0112	REF	1		01,2052	75447 1		-2CADR	RED02.17
0112	REF	1		01,2053	03710 1			
0113				01,2054	00031 0	2.21SPOT	DEC	25
0114	REF	3	LAST 254	E7,1513			EBANK=	DVCNTR
0115	REF	1		01,2055	75675 1		-2CADR	R10,R11
0115	REF	1		01,2056	35710 1			
R0116	ANY MORE GROUP 2.OCD RESTART VALUES SHOULD GO HERE.							
0117	REF	3	LAST 254	01,2016		3.2SPOT	EQUALS	1.2SPOT
R0118	ANY MORE GROUP 3.EVEN RESTART VALUES SHOULD GO HERE							
0119	REF	1		01,2057	76353 0	3.3SPOT	-GENADR	ZOOMTIME
0120	REF	4	LAST 255	E7,1513			EBANK=	DVCNTR
0121	REF	1		01,2060	75223 0		-2CADR	ZOOM
0121	REF	1		01,2061	03710 1			
R0122	ANY MORE GROUP 3.OCD RESTART VALUES SHOULD GO HERE							
0123				01,2062	04704 0	4.2SPOT	DEC	2500
0124	REF	3	LAST 215	E7,1451			EBANK=	TTOGO
0125	REF	1		01,2063	75434 0		-2CADR	TIG-5
0125	REF	1		01,2064	03710 1			
0126				01,2065	77777 0		OCT	77777
0127	REF	4	LAST 255	F7,1451			EBANK=	TTOGO
0128	REF	1		01,2066	75444 1		-2CADR	PED04.2
0128	REF	1		01,2067	03710 1			
R0129	ANY MORE GROUP 4.EVEN RESTART VALUES SHOULD GO HERE							

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0130				01,2070	25000 0	4.3SPOT	OCT	25000
0131	REF	5	LAST	255	E7,1513		EBANK=	DVCNTR
0132	REF	1			01,2071	03257 1	2CADR	GOABORT
0132	REF	1			01,2072	64067 1		
0133					01,2073	00062 0	4.5SPOT	DEC 50
0134	REF	5	LAST	255	E7,1451		EBANK=	TTOGO
0135	REF	1			01,2074	75237 0	-2CADR	JLLAGOFF
0135	REF	1			01,2075	03710 1		
0136					01,2076	00764 1	4.7SPOT	DEC 500
0137	REF	6	LAST	256	E7,1513		EBANK=	DVCNTR
0138	REF	1			01,2077	75410 0	-2CADR	TIG-0
0138	REF	1			01,2100	03710 1		
0139	REF	3	LAST	209	01,2101	76262 0	4.11SPOT	GENADR TGD +1
0140	REF	7	LAST	256	E7,1513		EBANK=	DVCNTR
0141	REF	1			01,2102	74235 0	-2CADR	FNGOFTSK
0141	REF	1			01,2103	03710 1		
0142					01,2104	12000 1	4.13SPOT	OCT 12000
0143	REF	2	LAST	154	E7,1460		EBANK=	TRKMKCNT
0144	REF	1			01,2105	03223 1	2CADR	POSTBURN
0144	REF	1			01,2106	74067 0		
0145					01,2107	00764 1	4.15SPOT	DEC 500
0146	REF	6	LAST	256	E7,1451		EBANK=	TTOGO
0147	REF	1			01,2110	75503 0	-2CADR	TIG-30
0147	REF	1			01,2111	03710 1		
0148					01,2112	77777 0	4.17SPOT	OCT 77777
0149	REF	8	LAST	256	E7,1513		EBANK=	DVCNTR
0150	REF	2	LAST	255	01,2113	75434 0	-2CADR	TIG-5
0150					01,2114	03710 1		
0151					01,2115	13000 0	4.21SPOT	OCT 13000
0152	REF	3	LAST	139	E5,1730		EBANK=	STAR
0153	REF	1			01,2116	02661 1	2CADR	R51.1 +1
0153	REF	1			01,2117	30065 1		
0154					01,2120	77777 0	4.23SPOT	OCT 77777
0155	REF	9	LAST	256	E7,1513		EBANK=	DVCNTR
0156	REF	1			01,2121	75366 0	-2CADR	IGNITION
0156	REF	1			01,2122	03710 1		
0157	REF	3	LAST	254	01,2123	01475 0	4.25SPOT	GENADR SAVE T-30
0158	REF	1			01,2124	75541 0	-GENADR	TIG-35
0159	REF	4	LAST	256	E7,1475		EBANK=	SAVE T-30
0160	REF	2	LAST	256	01,2125	74067 0	BBCON	TIG-35
0161					01,2126	52777 1	4.27SPOT	OCT 52777
0162	REF	10	LAST	256	E7,1513		EBANK=	DVCNTR
0163	REF	1			01,2127	02167 0	2CADR	P70A
0163	REF	1			01,2130	42067 0		
0164					01,2131	52777 1	4.31SPOT	OCT 52777
0165	REF	11	LAST	256	E7,1513		EBANK=	DVCNTR
0166	REF	1			01,2132	02172 1	2CADR	P71A
0166	REF	1			01,2133	42067 0		

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0167					01,2134	46777 1	4.33SPOT	OCT	46777
0168	REF	12	LAST	256	E7,1513			EBANK=	DVCNTR
0169	REF	2	LAST	239	01,2135	02024 0		2CADR	GOPOCFIX
0169					01,2136	10067 1			
0170					01,2137	46777 1	4.35SPOT	OCT	46777
0171	REF	13	LAST	257	E7,1513			EBANK=	DVCNTR
0172	REF	1			01,2140	05665 1		2CADR	GOPOODOO
0172	REF	1			01,2141	04067 1			
0173					01,2142	52777 1	4.37SPOT	OCT	52777
0174	REF	1			F7,1453			EBANK=	WHICH
0175	REF	1			01,2143	02574 0		2CADR	COMFAIL
0175	REF	1			01,2144	74067 0			
R0176	ANY	MCRE	4.0DD	RESTART	VALUES	SHOULD	GO	HERE.	
0177					01,2145	22000 1	5.2SPOT	OCT	22000
0178	REF	14	LAST	257	E7,1513			EBANK=	DVCNTR
0179	REF	1			01,2146	02421 1		2CADR	NORMLIZE
0179	REF	1			01,2147	66067 0			
0180					01,2150	00310 0		DFC	200
0181	REF	15	LAST	257	E7,1513			EBANK=	DVCNTR
0182	REF	1			01,2151	74177 0		-2CADR	REREADAC
0182	REF	1			01,2152	01710 0			
0183					01,2153	00310 0	5.4SPOT	DEC	200
0184	REF	16	LAST	257	E7,1513			EBANK=	DVCNTR
0185	REF	2	LAST	257	01,2154	74177 0		-2CADR	REPEADAC
0185					01,2155	01710 0			
0186					01,2156	20000 0		OCT	20000
0187	REF	17	LAST	257	E7,1513			EBANK=	DVCNTR
0188	REF	1			01,2157	02200 1		2CADR	SFRVICFR
0188	REF	1			01,2160	66067 0			
R0189	ANY	MORE	GROUP	5. EVEN	RESTART	VALUES	SHOULD	GO	HERE
0190					01,2161	00310 0	5.3SPOT	DEC	200
0191	REF	18	LAST	257	E7,1513			EBANK=	DVCNTR
0192	REF	3	LAST	257	01,2162	74177 0		-2CADR	REFADAC
0192					01,2163	01710 0			
0193					01,2164	77777 0	5.5SPOT	OCT	77777
0194	REF	19	LAST	257	E7,1513			EBANK=	DVCNTR
0195	REF	1			01,2165	74340 0		-2CADR	RED05.5
0195	REF	1			01,2166	01710 0			
0196					01,2167	77777 0	5.7SPOT	OCT	77777
0197	REF	20	LAST	257	E7,1513			EBANK=	DVCNTR
0198	REF	1			01,2170	74375 0		-2CADR	BIBIBIAS
0198	REF	1			01,2171	01710 0			
R0199	ANY	MCRE	GROUP	5.0DD	RESTART	VALUES	SHOULD	GO	HERE

L RESTART TABLES

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0200	REF	4	LAST	255	01,2016		6.2SPOT	EQUALS	1.2SPOT
0201					01,2172	00144 0	6.3SPOT	DEC	100
0202	REF	6	LAST	217	E7,1437			EBANK=	TIG
0203	REF	1			01,2173	75055 0		-2CADR	CLKTASK
0203	REF	1			01,2174	03710 1			

0204					01,2175	30000 1	6.5SPOT	OCT	30000
0205	REF	2	LAST	128	E3,1706			EBANK=	TEPHM
0206	REF	1			01,2176	03522 1		2CADR	TIMEDIDR
0206	REF	1			01,2177	10063 0			
0207					01,2200	17000 1	6.7SPOT	OCT	17000
0208	REF	2	LAST	255	E7,1704			EBANK=	VGPREV
0209	REF	1			01,2201	03350 1		2CADR	RED06.7
0209	REF	1			01,2202	74067 0			

PROTECT INCREMENTING OF TIME2, TIME1 BY
P27(UPDATE PROGRAM) VIA V70 OR V73.

L AOTMARK

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0001				12,2000			BANK 12		
0002	REF	1		07,2000			SETLOC AOTMARK1		
0003				07,2000			BANK		
0004	REF	2	LAST	160	F7,1547		EBANK= XYMARK		
0005	RFF	1					COUNT* \$\$/MARK		
0006				07,2000	0 0004 0	AOTMARK	INHINT		
0007	REF	2	LAST	237	07,2001 11'312 1		CCS MARKSTAT	SEE IF AOTMARK BUSY	
0008				07,2002	0 2004 1		TC +2	MARK SYSTEM BUSY-DO ALARM	
0009	REF	1		07,2003	0 2006 0		TC EXTVBCHK		
0010	RFF	1		07,2004	0 5652 0		TC POODCO		
0011				07,2005	00105 0		OCT 00105		
0013	RFF	2	LAST	184	07,2006 3 6241 0	EXTVBCHK	CAF SIX	SEE IF EXT. VERB WORKING	
0014	REF	2	LAST	237	07,2007 7 1044 1		MASK EXTVBACT		
0015	REF	50	LAST	246	07,2010 10 000 0		CCS A		
0016	RFF	1		07,2011	1 2044 1		TCF MKABORT	YES-ABORT	
0017	REF	22	LAST	199	07,2012 3 4752 0		CAF BIT2	NO-DISALLOW SOME EXTENDED VERB ACTION	
0018	REF	3	LAST	259	07,2013 27'044 1		ADS EXTVBACT	BIT2 RESET IN ENDMARK	
0019	REF	3	LAST	237	07,2014 10 400 1	MKVAC	CCS VAC1USE	LOOK FOR A VAC AREA-DO ABORT IF	
0020	REF	1		07,2015	1 2031 0		TCF MKVACFND	NONE AVAILABLE	
0021	RFF	2	LAST	236	07,2016 10 454 0		CCS VAC2USE		
0022	REF	2	LAST	259	07,2017 1 2031 0		TCF MKVACFND		
0023	RFF	2	LAST	236	07,2020 10 530 0		CCS VAC3USE		
0024	REF	3	LAST	259	07,2021 1 2031 0		TCF MKVACFND		
0025	REF	2	LAST	236	07,2022 10 604 1		CCS VAC4USE		
0026	REF	4	LAST	259	07,2023 1 2031 0		TCF MKVACFND		
0027	REF	2	LAST	236	07,2024 10 660 0		CCS VAC5USE		
0028	REF	5	LAST	259	07,2025 1 2031 0		TCF MKVACFND		
0029	REF	1		07,2026	52 134 0		DXCH BUF2		
00292	RFF	1		07,2027	0 5710 1		TC BAILCUT1	ALL VAC AREAS OCCUPIED - ABORT.	
0030				07,2030	01207 0		OCT 01207		
0031	REF	3	LAST	202	07,2031 6 4752 0	MKVACFND	AD TWO		
0032	REF	3	LAST	259	07,2032 55'312 1		TS MARKSTAT	STORE VAC ADR IN LOW 9 OF MARKSTAT	
0033	REF	17	LAST	250	07,2033 3 4755 1		CAF ZERO		
0034	REF	4	LAST	259	07,2034 51'312 0		INDEX MARKSTAT		
0035				07,2035	53'777 0		TS 0 -1	ZERO IN VACUSE REG TO SHOW VAC OCCUPIED	
0036	REF	2	LAST	196	07,2036 3 5025 0		CAF PRIC15		
0037	REF	2	LAST	226	07,2037 0 5105 0		TC FINDVAC	SET UP JOB FOR GETDAT	
0038	REF	3	LAST	259	E7,1547		EBANK= XYMARK		
0039	REF	1		07,2040	02060 0		2CADR GETDAT		
0039	REF	1		07,2041	16067 1				
0040				07,2042	0 0003 1		RELINT		
0041	REF	1		07,2043	1 4631 0		TCF SWRETURN		

L

ADTMARK

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0042	REF	2	LAST	255	07,2044	52 134 0	MKABORT	DXCH	BUF2	
00422	REF	2	LAST	259	07,2045	0 5710 1		TC	BAILCUT1	CONFLICT WITH EXTENDED VERB
0043					07,2046	01211 1		OCT	01211	
0044	REF	18	LAST	259	07,2047	3 4755 1	MKRELEAS	CAF	ZERO	
0045	REF	5	LAST	259	07,2050	57'312 0		XCH	MARKSTAT	SET MARKSTAT TO ZERO
0046	REF	1			07,2051	7 5004 1		MASK	LOW9	PICK UP VAC AREA ADR
0047	REF	51	LAST	259	07,2052	10 000 0		CCS	A	
0048	REF	52	LAST	260	07,2053	50 000 1		INDEX	A	
0049					07,2054	54 000 0		TS	0	SHOW MKVAC AREA AVAILABLE
0050	REF	9	LAST	242	07,2055	3 4753 1		CAF	ONE	
0051	REF	10	LAST	245	07,2056	0 4674 0		TC	IBNKCALL	
0052	REF	1			07,2057	17640 0		CADR	GOODEND	GO WAKE UP CALLING JOB

L	AOTMARK				USFR'S PAGE NO. 3 F7 S3									
0053	REF	6	LAST	260	07,2060	4 1312 1	GETDAT	CS	MARKSTAT	SET BIT12 TO DISCOURAGE MARKRUPT				
00531	REF	16	LAST	236	07,2061	7 4740 1		MASK	BIT12	BIT12 RESET AT GETMARK				
00532	REF	7	LAST	261	07,2062	27'312 1		ADS	MARKSTAT					
00533	RFF	1			07,2063	3 2330 0		CAF	VO1N71	DISPLAY DETENT AND STAR CODE				
0054	REF	9	LAST	240	07,2064	0 4616 1		TC	BANKCALL					
0055	REF	2	LAST	222	07,2065	20212 1		CADR	GOMARKF					
0056	REF	2	LAST	232	07,2066	0 6001 0		TC	GOTOPDOH	V34-TERMINATE				
0057	REF	1			07,2067	1 2071 1		TCF	DODAT	V33-PROCEED-USE THIS STAR FOR MARKS				
0058	REF	2	LAST	259	07,2070	1 2060 1	ENTERDAT	TCF	GETDAT	ENTER-REDISPLAY STAR CODE				
0069	REF	1			07,2071	3 7743 0	DODAT	CAF	HIGH9	PICK DETENT CODE FROM BITS7-9 OF AOTCODE				
0070	REF	2	LAST	211	07,2072	7 0735 1		MASK	AOTCODE	AND SEE IF CODE IS 1, 2 OR 3				
0071					07,2073	0 0006 1		EXTEND						
0072	REF	17	LAST	179	07,2074	7 4743 1		MP	BIT9					
0073	REF	4	LAST	259	07,2075	55'547 1		TS	XYMARK	STORE DETENT				
0074					07,2076	0 0006 1		EXTEND						
0075	RFF	3	LAST	261	07,2077	6 2060 0		BZMF	GETDAT	NO GOOD-MAKE REQUEST AGAIN				
0076	RFF	13	LAST	104	07,2100	7 4751 1		MASK	BIT3	SEE IF DETENT CODE 4 OR 5				
0077					07,2101	0 0006 1		EXTEND						
0078	RFF	1			07,2102	1 2123 1		BZF	CODE123	NOT 4 OR 5, MUST BE 1,2 OR 3				
00785	REF	1						COUNT*	\$\$/COAS					
0079	RFF	1			07,2103	3 2331 1	CODE4OR5	CAF	VO6N87*	CODE 4 OR 5, GET OPTIC AXIS CALIBRATIONS				
0080	REF	10	LAST	261	07,2104	0 4616 1		TC	BANKCALL	AZ AND EL OF SIGHTING DEVICE FROM ASTRO				
0081	REF	3	LAST	261	07,2105	20212 1		CADR	GOMARKF					
0082	REF	3	LAST	261	07,2106	0 6001 0		TC	GOTOPDOH	V34-TERMINATE				
0083					07,2107	1 2111 0		TCF	+2	PROCEED				
0084	RFE	1			07,2110	1 2103 0		TCF	CODE4OR5	ON ENTER, RECYCLE				
00841					07,2111	0 0006 1		EXTEND						
0085	REF	2	LAST	123	07,2112	3 1350 0		DCA	AZ	PICK UP AZ AND FL IN SP 2S COMP				
0086	REF	1			07,2113	50 120 1		INDEX	FIXLOC					
0087					07,2114	52 011 0		DXCH	80	STORE IN 80 AND 90 OF LOCAL VAC				
0091	REF	18	LAST	196	07,2115	3 4753 1		CAF	BIT1	IF CODE 4, REAR AOT POSITIONS USED				
0092	REF	5	LAST	261	07,2116	7 1547 1		MASK	XYMARK	SO CALC APPARENT ROTATION				
0093					07,2117	0 0006 1		EXTEND		IF CODE 5, BACKUP, ZERO ROTATION				
0094	REF	1			07,2120	1 2133 0		BZF	CODE4	REAR AOT DETENTS TO BE USED				
0095	REF	19	LAST	260	07,2121	3 4755 1		CAF	ZERO	BACKUP SYSTEM TO BE USED				
0096	REF	1			07,2122	1 2137 1		TCF	CODE5					
00965	REF	2	LAST	259 TO 261:	67	67*		COUNT*	\$\$/MARK					
0097	REF	6	LAST	261	07,2123	51'547 0	CODE123	INDEX	XYMARK	INDEX DET CODE 1,2 OR 3				
0098	REF	1			07,2124	3 1406 1		CA	AOTEL -1					
0099	REF	2	LAST	261	07,2125	50 120 1		INDEX	FIXLOC					

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0100				07,2126	54 011 0	TS	9D	STORE ELEVATION IN VAC+9D
0101	REF	7	LAST	261	07,2127	51'547 0	INDEX XYMARK	INDEX DET CODE 1,2 OR 3
0102	REF	2	LAST	169	07,2130	3 1403 1	CA AOTAZ -1	
0103	REF	3	LAST	261	07,2131	50 120 1	INDEX FIXLOC	
0104					07,2132	54 010 1	TS 8D	STORE AZIMUTH IN VAC+8D
0105	REF	3	LAST	262	07,2133	3 1405 1	CODE4 CA AOTAZ +1	COMPENSATION FOR APPARENT RATATION OF
0106					07,2134	0 0006 1	EXTEND	AOT FIELD OF VIEW IN LEFT AND RIGHT
0107	REF	4	LAST	262	07,2135	5 0120 1	INDEX FIXLOC	DETENTS IS STORED IN VAC +10D IN SP
0108					07,2136	20 010 1	MSU 8D	PRECISION ONES COMPLEMENT
0109	REF	5	LAST	262	07,2137	50 120 1	CODE5 INDEX FIXLOC	
0110					07,2140	54 012 0	TS 10D	POT ANGLE
0111	REF	4	LAST	244	07,2141	0 6036 1	TC INTPRET	COMPUTE X AND Y PLANE VECTORS

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P0112 THE OPTAXIS SUBROUTINE COMPUTES THE X AND Y MARK PLANE VEC'S AND
 R0113 AND ROTATES THEM THRU THE APPARENT FIELD OF VIEW ROTATION UNIQUE TO AOT
 R0114 OPTAXIS USES OANB TO COMPUTE THE OPTIC AXIS
 R0115 INPUT-AZIMUTH ANGLE IN SINGLE PREC AT CDU SCALE IN 8D OF JOB VAC
 R0116 ELEVATION ANGLE IN SINGLE PREC AT CDU SCALE IN 9D OF JOB VAC
 R0117 ROTATION ANGLE IN SINGLE PREC 1S COMP SCALED BY PI IN 10D OF VAC
 R0118 OUTPUT-OPTIC AXIS VEC IN NB COORDS IN SCAXIS
 R0119 X-MARK PLANE 1/4VEC IN NB COORDS AT 18D OF JOB VAC
 R0120 Y-MARK PLANE 1/4VEC IN NB COORDS AT 12D OF JOB VAC

0121		07,2142	77624 1	OPTAXIS	CALL	GO COMPUTE OA AND X AND Y PLANE VEC'S
0122	REF 1	07,2143	13370 1		OANB	
0123		07,2144	70535 0	SLOAD	SP1	LOAD APP ROTATION IN ONES COMP
0124		07,2145	00013 0		10D	RESCALE BY 2PI
0125		07,2146	73406 1	PUSH	SIN	1/2SIN(ROT) 0-1
0126		07,2147	71525 0	PDDL	COS	
0127		07,2150	74206 0	PUSH	VXSC	1/2COS(ROT) 2-3
0128		07,2151	00023 0		18D	
0129		07,2152	74325 0	PDDL	VXSC	1/4COS(ROT)UYP 4-9
0130		07,2153	00001 0		0	
0131		07,2154	00031 0		24D	1/4SIN(ROT)UXP
0132		07,2155	45445 0	BVSU	STADR	UP 4-9
0133		07,2156	63762 1	STODL	12D	YPNB=1/4(COS(ROT)UYP-SIN(ROT)UXP)
0134		07,2157	65361 0	VXSC	PDDL	UP 2-3 UP 0-1 FOR EXCHANGE
0135		07,2160	00031 0		24D	1/4COS(ROT)UXP PUSH 0-5
0137		07,2161	53361 0	VXSC	VAD	1/4SIN(ROT)UYP
0138		07,2162	00023 0		18D	UP 0-5
01381		07,2163	77626 0	STADR		
0139		07,2164	53754 1	STOVL	18D	XPNB=1/4(COS(ROT)UXP+SIN(ROT)UYP)
0140	REF 1	07,2165	22275 1		L06ZEROS	INITIALIZE AVE STAR VEC ACCUMULATOR
0141	REF 8 LAST 139	07,2166	02715 0	STORF	STARAD +6	
0142		07,2167	77776 1	EXIT		
0143	REF 1	07,2170	1 2202 1	TCF	GETMKS	

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R0144 THE DANB SUBROUTINE COMPUTES THE OPTIC AXIS OF THE SIGHTING INSTRUMENT
 R0145 FROM AZIMUTH AND ELEVATION INPUT FROM THE ASTRONAUT.
 R0146 INPUT- AZIMUTH ANGLE IN SINGLE PREC 2S COMP IN 8D OF JOB VAC
 R0147 ELEVATION ANGLE IN SINGLE PREC 2S COMP IN 9D OF VAC
 R0148 OUTPUT- OPTIC AXIS IN NB COORDS. IN SCAXIS
 R0149 X-PLANE 1/2VEC IN NB COORDS AT 24D OF VAC
 R0150 Y-PLANE 1/2VEC IN NB COORDS AT 18D OF VAC

01501			05,3370		BANK 05	
01502	REF	1	05,2000		SETLOC AOTMARK2	
01504			05,3370		BANK	
01506	REF	1			COUNT* \$\$/MARK	
0151			05,3370	44001 0	DANB SETPD	STQ
0152			05,3371	00001 0		0
0153	REF	2	05,3372	02736 1		GCTR STORE RETURN
0154			05,3373	47135 0	SLOAD	RTB
0155			05,3374	00012 1		9D PICK UP SP ELV
0156	REF	1	05,3375	21465 0		CDJLOGIC
0157			05,3376	71406 0	PUSH	CCS
0158			05,3377	73525 1	PDDL	SIN 1/2COS(ELV) PD 0-1
01581			05,3400	77626 0	STADR	
0159	REF	2	05,3401	60016 0	STODL	SCAXIS OAX=1/2SIN(ELV)
0160			05,3402	00011 1		8D PICK UP AZ SP
0161			05,3403	77634 0	RTB	
0162	REF	2	05,3404	21465 0		CDULOGIC
0163			05,3405	71406 0	PUSH	COS
0164			05,3406	00025 0	STORE	20D STORE UYP(Y) 20-21
0165			05,3407	73525 1	PDDL	SIN 1/2COS(AZ) PD 2-3
0166			05,3410	57406 1	PUSH	DCOMP PUSH 1/2SIN(AZ) 4-5
0167			05,3411	14027 1	STODL	22D STORE UYP(Z) 22-23
0168	REF	2	05,3412	22275 1		LOGZEROS
0169			05,3413	14023 0	STODL	18D STORE UYP(X) 18-19 UP 4-5
0170			05,3414	72405 0	DMP	SLI
0171			05,3415	00001 0		0
0172	REF	3	05,3416	17763 0	STODL	SCAXIS +2 OAY=1/2COS(ELV)SIN(AZ)
0173			05,3417	72405 0	DMP	SLI UP 2-3
0174			05,3420	77626 0	STADR	UP 0-1
0175	REF	4	05,3421	50012 1	STOVL	SCAXIS +4 OAZ=1/2COS(ELV)COS(AZ)
0176			05,3422	00023 0		18D LOAD UYP VEC
0177			05,3423	53435 0	VXV	UNIT
0178	REF	5	05,3424	03761 1		SCAXIS UXP VEC=UYP X OA
0179			05,3425	00031 0	STORF	24D STORE UXP
0180			05,3426	77650 1	GOTO	
0181	REF	3	05,3427	02736 1		GCTR

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PO182 SURFSTAR COMPUTES A STAR VECTOR IN SM COORDINATES FOR LUNAR
 RO183 SURFACE ALIGNMENT AND EXITS TO AVEIT TO AVERAGE STAR VECTORS.
 RO184 GIVEN X-MARK PLANE 1/4 VEC IN NB AT 18D OF LOCAL VAC
 RO185 Y-MARK PLANE 1/4 VEC IN NB AT 12D OF LOCAL VAC
 RO186 CURSOR SP 2COMP AT POSITION 1 OF INDEXED MARKVAC
 RO187 SPIRAL SP 2COMP AT POSITION 3 OF INDEXED MARKVAC
 RO188 CDUY,Z,X AT POSITIONS 0,2,4 OF INDEXED MARKVAC
 0189 15,2000 BANK 15
 0190 REF 1 15,2000 SETLOC P50S
 0191 15,2000 BANK
 0192 REF 1 COUNT* \$\$/R59

01921		15,2000	77773 1	SURFSTAR	VLOAD*	
01922		15,2001	00001 0		0,1	PUT X-MARK CDUS IN CDUSPOT FOR TRG*NBSM
01923	REF 4 LAST 117	15,2002	00767 1	STORE	CDUSPOT	
0193		15,2003	47133 0	SLOAD*	PTB	
0194		15,2004	00002 0		1,1	PICK UP YROT
0195	REF 3 LAST 264	15,2005	21465 0		CDULOGIC	
0196		15,2006	00031 0	STORE	24D	STORE CURSOR FOR SPIRAL COMP (REVS)
01961		15,2007	77654 0	BZE		
01962	REF 1	15,2010	16171 1		YZCHK	IF YROT ZERO-SEE IF SROT ZERO
0197		15,2011	71406 0	JUSTZY	PUSH COS	
0198		15,2012	73525 1	PDDL	SIN	1/2COS(YROT) 0-1
0199		15,2013	65361 0	VXSC	PDDL	UP 0-1 1/8SIN(YROT)UXP 0-5
0200		15,2014	00023 0		18D	
0201		15,2015	52361 1	VXSC	VSU	UP 0-5
02011		15,2016	00015 0		12D	UYP
0202		15,2017	47256 0	UNIT	VXV	
0203	REF 6 LAST 264	15,2020	03761 1		SCAXIS	
0204		15,2021	41456 0	UNIT	PUSH	
0205		15,2022	47133 0	SLOAD*	RTB	
0206		15,2023	00004 0		3,1	PICK UP SPIRAL
0207	REF 4 LAST 265	15,2024	21465 0		CDULOGIC	
0208		15,2025	00033 1	STORE	26D	STORE SPIRAL (REVS)
0209		15,2026	43225 0	DSU	DAD	
0210		15,2027	00031 0		24D	
0211	REF 1	15,2030	32047 0		ABOUTNF	
0212		15,2031	77605 1	DMP		
0213	REF 1	15,2032	32534 1		DP1/12	
0214		15,2033	00033 1	STORE	26D	SEP=(360 + SPIRAL - CURSOR)/12
0215		15,2034	74356 1	SIN	VXSC	UP 0-5
0216		15,2035	65372 1	VSL1	PDDL	1/2SIN(SEP)(UPP X OA) 0-5
0217		15,2036	00033 1		26D	
0218		15,2037	74346 0	COS	VXSC	
0219	REF 7 LAST 265	15,2040	03761 1		SCAXIS	
0220		15,2041	53372 1	VSL1	VAD	UP 0-5
0221		15,2042	45056 0	JUSTOA	UNIT	CALL
0222	REF 1	15,2043	47570 0		TRG*NBSM	
0224		15,2044	34031 1	STCALL	24D	STAR VEC IN SM
0225	REF 1	15,2045	16276 0		AVEIT	GO AVERAGE

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0226			15,2046	37777 1	ABOUTONE 2DEC	.99999999	
0226			15,2047	37775 0			
0227	REF	1	15,2533		DP1/12	EQUALS DEG30	.08333333
0228			07,2171		BANK	7	
0229	REF	2 LAST 259	07,2000		SETLOC	ACTMARK1	
0230			07,2171		BANK		
0231	REF	3 LAST 261 TO	264:	38 105*	COUNT*	\$/MARK	
02311			07,2171	53133 0	YZCHK	SLOAD* BZE	YROT ZERO AND IF SROT ZERO FORCE STAR
02312			07,2172	00004 0		3,1	ALONG OPTIC AXIS
02313	REF	1	07,2173	16177 1		YSZERO	
02314			07,2174	52145 0	DLOAD	GOTO	
02315			07,2175	00031 0		240	
02316	REF	1	07,2176	32011 0		JUSTZY	SROT NOT ZERO-CONTINUE NORMALLY
02317			07,2177	52175 0	YSZERO	GOTO	
02318	REF	8 LAST 265	07,2200	03761 1	VLOAD	SCAXIS	
02319	REF	1	07,2201	32042 0		JUSTCA	

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P0232 THE GETMKS ROUTINE INITIALIZES THE SIGHTING MARK PROCEDURE

0233	REF	20	LAST	261	07,2202	3 4755 1	GETMKS	CAF	ZERO	INITIALIZE MARK IO REGISTER AND MARK CNT
0234	REF	8	LAST	262	07,2203	55'547 1		TS	XYMARK	
0235	REF	2	LAST	160	07,2204	55'546 0		TS	MARKCNTR	
0236	REF	2	LAST	260	07,2205	3 5004 0		CAF	LOW9	ZERO BITS10 TO 15 RETAINING MKVAC ADR
0237	REF	8	LAST	261	07,2206	7 1312 1		MASK	MARK STAT	
0238	REF	9	LAST	267	07,2207	55'312 1		TS	MARKSTAT	
0241	REF	1			07,2210	3 2621 0		CAF	MKVB54*	DISPLAY VB54 INITIALLY
0242	REF	11	LAST	261	07,2211	0 4616 1	PASTIT	TC	BANKCALL	
0243	REF	1			07,2212	20223 0		CAOR	GOMARK4	
0244	REF	4	LAST	261	07,2213	0 6001 0		TC	GOTOPOOH	VB34 TERMINATE-THIS RELEASES MKVAC AREA
0245	REF	1			07,2214	1 2216 1		TCF	MARKCHFX	VB33-PROCEED, GOT MARKS, COMPUTE LOS
0246	REF	4	LAST	261	07,2215	1 2060 1		TCF	GETOAT	ENTER-RECYCLE TO V01N71
0251	REF	10	LAST	267	07,2216	4 1312 1	MARKCHEX	CS	MARK STAT	SET BIT12 TO DISCOURAGE MARKRUPT
0252	REF	17	LAST	261	07,2217	7 4740 1		MASK	BIT12	
0253	REF	11	LAST	267	07,2220	27'312 1		AOS	MARKSTAT	
0254	REF	3	LAST	267	07,2221	7 5004 1		MASK	LOW9	
0255	REF	9	LAST	267	07,2222	55'547 1		TS	XYMARK	JAM MARK VAC ADR IN XYMARK FOR AVESTAR
0256	REF	21	LAST	267	07,2223	3 4755 1		CAF	ZERO	
0257	REF	2	LAST	160	07,2224	55'550 1		TS	MKDEX	SET MKOEX ZERO FOR LOS VEC CNTR
0258	REF	12	LAST	267	07,2225	3 1312 0		CA	MARKSTAT	
0259	REF	1			07,2226	7 5015 1		MASK	PRI03	SEE IF LAST MK PAIR COMPLETE
0260	REF	17	LAST	247	07,2227	54 001 1		TS	L	
0261	REF	2	LAST	267	07,2230	3 5015 0		CAF	PRI03	BITS10 AND 11
0262					07,2231	0 0006 1		EXTEND		
0263	REF	8	LAST	231	07,2232	06 001 0		RXOR	LCHAN	
0264					07,2233	0 0006 1		EXTEND		
0265	REF	1			07,2234	1 2241 0		BZF	AVESTAR	LAST PAIR COMPLETE-GO COMPUTE LOS
0266	REF	3	LAST	267	07,2235	11'546 0	CNTCHK	CCS	MARKCNTR	NO PAIR SHOWING-SEE IF PAIR IN HOLD
0267					07,2236	1 2240 1		TCF	+2	PAIR BURIED-DECREMENT COUNTER
0268	REF	1			07,2237	1 2325 0		TCF	MKALARM	NO PAIR-ALARM
0269	REF	4	LAST	267	07,2240	55'546 0		TS	MARKCNTR	STORE DECREMENTED COUNTER
0270	REF	18	LAST	267	07,2241	3 4740 0	AVESTAR	CAF	BIT12	INITIALIZE MKDEX FOR STAR LOS COUNTER
0271	REF	3	LAST	267	07,2242	27'550 1		AOS	MKDEX	MKDEX WAS INITIALIZED ZERO IN MARKCHEX
0272	REF	5	LAST	267	07,2243	4 1546 0		CS	MARKCNTR	
0273					07,2244	0 0006 1		EXTEND		
0274	REF	3	LAST	259	07,2245	7 6241 1		MP	SIX	GET C(L) = - 6 MARKCNTR
0275	REF	10	LAST	267	07,2246	4 1547 1		CS	XYMARK	
0276	REF	18	LAST	267	07,2247	6 0001 0		AO	L	ADD - MARK VAC ADR SET IN MARKCHEX
0277	REF	6	LAST	262	07,2250	50 120 1		INOEX	FIXLOC	
0278	REF	1			07,2251	54 046 1		TS	X1	JAM - COU ADR OF X-MARK IN X1
0279	REF	7	LAST	267	07,2252	3 0120 1		CA	FIXLOC	SET PO POINTER TO ZERO
0280	REF	1			07,2253	54 166 1		TS	PUSHLOC	
0281	REF	5	LAST	262	07,2254	0 6036 1		TC	INTPRET	

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0282				07,2255	76614 0	BON	VLOAD*	
0283	REF	3	LAST	251	07,2256	04307 1	SURFFLAG	IF ON SURFACE COMPUTE VEC AT SURFSTAR
0284	REF	1			07,2257	32000 0	SURFSTAR	
0285					07,2260	00002 0	1,1	PUT Y-MARK CDUS IN CDUSPOT FOR TRG*NBSM
0286	REF	5	LAST	265	07,2261	24767 1	STOVL	CDUSPOT
0287					07,2262	00015 0	120	LOAD Y-PLANE VECTOR IN NB
0288					07,2263	77624 1	CALL	
0289	REF	2	LAST	265	07,2264	47570 0	PUSH	TRG*NBSM
0290					07,2265	76606 0	VLOAD*	CONVERT IT TO STABLE MEMBER
0291					07,2266	00001 0	0,1	PUT X-MARK CDUS IN CDUSPOT FOR TRG*NBSM
0292	REF	6	LAST	268	07,2267	24767 1	STOVL	CDUSPOT
0293					07,2270	00023 0	180	LOAD X-PLANE VECTOR IN NB
0294					07,2271	77624 1	CALL	
0295	REF	3	LAST	268	07,2272	47570 0	TRG*NBSM	CONVERT IT TO STABLE-MEMBER
0296					07,2273	53435 0	UNIT	UNIT(XPSM * YPSM)
0297					07,2274	77626 0	STADR	
0298					07,2275	77746 1	STORE	240
0301					07,2276	63335 1	AVEIT	
0302	REF	4	LAST	267	07,2277	03551 0	SLOAD	PDVL
0303					07,2300	00031 0	MKDEX	N(NUMBER OF VECs) IN 0-1
0304					07,2301	70322 0	240	LOAD CURRENT VECTOR
0305					07,2302	00001 0	VSR3	V/SC
0306					07,2303	14031 0	0	
0307					07,2304	00001 0	STODL	240
0308					07,2305	56225 1	0	VEC/N
0309	REF	1			07,2306	16623 1	DSU	DDV
0310					07,2307	53361 0	DPI/8	{N-1}/N
0311	REF	9	LAST	263	07,2310	02715 0	VXSC	VAD
0312					07,2311	00031 0	STARAD +6	ADD VEC TO PREVIOUSLY AVERAGED VECTOR
0313	REF	10	LAST	268	07,2312	02715 0	240	{N-1}/N AVESTVEC + VEC/N
0314	REF	4	LAST	211	07,2313	02767 0	STORE	STARAD +6
0315					07,2314	77776 1	STORF	STARS2
0316	REF	6	LAST	267	07,2315	11'546 0	EXIT	
0317	REF	2	LAST	267	07,2316	1 2240 1	CCS	MARKCNTR
0318	REF	5	LAST	246	07,2317	3 4756 1	TCF	AVESTAR -1
0319					07,2320	0 0004 0	CAF	FIVE
0320	REF	7	LAST	202	07,2321	0 5203 0	INHINT	NO MORE MARKS-TERMINATE AOTMARK
0321	REF	11	LAST	267	07,2322	02047 0	TC	WAITLIST
0322	REF	1			07,2323	16067 1	EBANK=	XYMARK
0322	REF	1					2CADR	MKRELEAS
0323	REF	1			07,2324	0 5472 0	TC	ENDMARK
0324	REF	11	LAST	242	07,2325	0 5567 0	MKALARM	
0325					07,2326	00111 0	TC	ALARM
0326	REF	2	LAST	263	07,2327	1 2202 1	OCT	111
							TCF	GETMKS
0327					07,2330	00307 0	V01N71	VN
0328					07,2331	01527 0	V06N87*	VN

NOT A PAIR TO PROCESS-DO GETMKS

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P0329 MARKRUPT IS ENTERED FROM INTERRUPT LEAD-INS AND PROCESSES CHANNEL 16
 R0330 CAUSED BY X,Y MARK OR MARK REJECT OR BY THE RATE OF DESCENT SWITCH

0331	REF	2	LAST	170	07,2332	54 016 1	MARKRUPT	TS	BANKRUPT	
0332	REF	1			07,2333	3 0033 1		CA	CDJY	STORE CDUS AND TIME NOW-THEN SEE IF
0333	REF	5	LAST	152	07,2334	54 063 0		TS	ITEMP3	WE NEED THEM
0334	REF	4	LAST	203	07,2335	3 0034 0		CA	CDUZ	
0335	REF	3	LAST	111	07,2336	54 064 1		TS	ITEMP4	
0336	REF	5	LAST	210	07,2337	3 0032 0		CA	CDUX	
0337	REF	2	LAST	111	07,2340	54 065 0		TS	ITEMP5	
0338					07,2341	0 0006 1		EXTFND		
0339	REF	7	LAST	219	07,2342	3 0025 0		DCA	TIME2	
0340	REF	4	LAST	152	07,2343	52 062 1		DXCH	ITEMP1	
0341	REF	20	LAST	248	07,2344	56 002 0		XCH	0	
0342	REF	2	LAST	170	07,2345	54 012 0		TS	QRUPT	
0343	REF	1			07,2346	3 2624 0		CAF	DCT34	SEE IF X OR Y MARK OR MKREJECT
0344					07,2347	0 0006 1		EXTEND		
0345	REF	2	LAST	233	07,2350	02 016 1		RAND	NAVKEYIN	
0346	REF	53	LAST	260	07,2351	10 000 0		CCS	A	
0347					07,2352	1 2354 0		TCF	+2	ITS A LIVE ONE-SEE IF ITS WANTED
0348	REF	1			07,2353	1 2404 1		TCF	SOMEKEY	ITS SOME OTHER KEY
0349	REF	19	LAST	267	07,2354	3 4740 0		CAF	BIT12	ARE WE ASKING FOR A MARK
0350	REF	13	LAST	267	07,2355	7 1312 1		MASK	MARKSTAT	
0351	REF	54	LAST	269	07,2356	10 000 0		CCS	A	
0352	REF	8	LAST	205	07,2357	0 5270 1		TC	RESUME	DONT WANT MARK OR MKREJECT-DO NOTHING
0353	REF	14	LAST	269	07,2360	11'312 1		CCS	MARKSTAT	ARE MARKS BEING ACCEPTED
0354	REF	1			07,2361	1 2365 1		TCF	FINDKEY	THEY ARE-WHICH ONE IS IT
0355	REF	12	LAST	268	07,2362	0 5567 0		TC	ALARM	MARKS NOT BEING ACCEPTED-DO ALARM
0356					07,2363	00112 0		DCT	112	
0357	REF	9	LAST	269	07,2364	0 5270 1		TC	RESUME	
0358	REF	15	LAST	243	07,2365	3 4747 1	FINDKEY	CAF	BIT5	SEE IF MARK REJECT
0359					07,2366	0 0006 1		EXTEND		
0360	REF	3	LAST	269	07,2367	02 016 1		RAND	NAVKEYIN	
0361	REF	55	LAST	269	07,2370	10 000 0		CCS	A	
0362	REF	1			07,2371	1 2461 1		TCF	MKREJ	ITS A MARK REJECT
0363	REF	18	LAST	247	07,2372	3 4750 1		CAF	BIT4	SEE IF Y MARK
0364					07,2373	0 0006 1		EXTFND		
0365	REF	4	LAST	269	07,2374	02 016 1		RAND	NAVKEYIN	
0366	REF	56	LAST	269	07,2375	10 000 0		CCS	A	
0367	REF	1			07,2376	1 2422 0		TCF	YMKRUPT	ITS A Y MARK
0368	REF	14	LAST	261	07,2377	3 4751 0		CAF	BIT3	SEE IF X MARK
0369					07,2400	0 0006 1		EXTEND		
0370	REF	5	LAST	269	07,2401	02 016 1		RAND	NAVKEYIN	

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0371	REF	57	LAST	269	07,2402	10 000 0		CCS	A	
0372	REF	1			07,2403	1 2416 1		TCF	XMKRUPT	ITS A X MARK
0373	REF	1			07,2404	3 4776 0	SOMEKEY	CAF	OCT140	NOT MARK OR MKREJECT-SEE IF DESCENT BITS
0374					07,2405	0 0006 1		EXTEND		
0375	REF	6	LAST	269	07,2406	02 016 1		RAND	NAVKEYIN	
0376					07,2407	0 0006 1		EXTEND		
0377					07,2410	1 2413 1		BZF	+3	IF NO BITS
0378	REF	6	LAST	245	07,2411	0 4635 0		TC	POSTJUMP	IF DESCENT BITS
0379	REF	1			07,2412	40115 0		CADR	DESCBITS	
0380	REF	13	LAST	269	07,2413	0 5567 0		TC	ALARM	NO INBITS IN CHANNEL 16
0381					07,2414	00113 1		OCT	113	
0382	REF	10	LAST	269	07,2415	0 5270 1		TC	RESUME	
0383	REF	22	LAST	267	07,2416	3 4755 1	XMKRUPT	CAF	ZERO	
0384	REF	13	LAST	183	07,2417	54 070 1		TS	RUPTREG1	SET X MARK STORE INDEX TO ZERO
0385	REF	17	LAST	235	07,2420	3 4742 1		CAF	BIT10	
0386					07,2421	1 2425 1		TCF	+4	
0387	REF	10	LAST	260	07,2422	3 4753 1	YMKRUPT	CAF	ONE	
0388	REF	14	LAST	270	07,2423	54 070 1		TS	RUPTREG1	SET Y MARK STORE INDEX TO ONE
0389	REF	17	LAST	247	07,2424	3 4741 1		CAF	BIT11	
0390	REF	12	LAST	268	07,2425	55 547 1		TS	XYMARK	SET MARK IDENTIFIATION
03901	REF	1			07,2426	0 2514 0		TC	MARKTYPE	SEE IF SURFACE MARK
03902	REF	1			07,2427	1 2521 1		TCF	SURFSTOR	SURFACE MARK-JUST STORE CDUS
0391	REF	25	LAST	231	07,2430	3 4736 1		CAF	BIT14	GOT A MARK-SEE IF MARK PAIR MADE
0392	REF	15	LAST	269	07,2431	7 1312 1		MASK	MARKSTAT	
0393					07,2432	0 0006 1		EXTEND		
0394	REF	1			07,2433	1 2444 0		BZF	VERIFYMK	NOT A PAIR, NORMAL PROCEDURE
0395	REF	7	LAST	268	07,2434	4 1546 0		CS	MARKCNTR	GOT A PAIR, SEE IF ANOTHER CAN BE MADE
0396	REF	3	LAST	227	07,2435	6 4751 0		AD	FOUR	IF SO, INCREMENT POINTER,CLEAR BITS10,11
0397					07,2436	0 0006 1		EXTEND		
0398	REF	1			07,2437	6 2454 0		BZMF	5MKALARM	HAVE FIVE MARK PAIRS-DONT ALLOW MARK
0399	REF	8	LAST	270	07,2440	25 546 1		INCR	MARKCNTP	OK FOR ANOTHER PAIR, INCR POINTER
0400	REF	1			07,2441	4 7710 1		CS	PRIQ23	CLEAR BITS10,11,14 FOR NEXT PAIR
0401	REF	16	LAST	270	07,2442	7 1312 1		MASK	MARKSTAT	
0402	REF	17	LAST	270	07,2443	55 312 1		TS	MARKSTAT	
0403	REF	13	LAST	270	07,2444	3 1547 0	VERIFYMK	CA	XYMARK	
0404	REF	18	LAST	270	07,2445	7 1312 1		MASK	MARKSTAT	
0405	REF	58	LAST	270	07,2446	10 000 0		CCS	A	
0406					07,2447	1 2451 1		TCF	+2	THIS MARK NOT DESIRED
0407	REF	1			07,2450	1 2526 0		TCF	VACSTOR	MARK DESIRED - STORE CDUS
0408	REF	14	LAST	270	07,2451	0 5567 0		TC	ALARM	
0409					07,2452	00114 0		OCT	114	
0410	REF	11	LAST	270	07,2453	0 5270 1		TC	RESUME	RESUME-DISPLAY UNCHANGED-WAIT FOR ACTION

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0411	REF	15	LAST	270	07,2454	0 5567 0
0412					07,2455	00107 1
04121	REF	2	LAST	270	07,2456	0 2514 0
04122	REF	1			07,2457	1 2627 1
0413	REF	12	LAST	270	07,2460	0 5270 1

5MKALARM	TC
	OCT
	TC
	TCF
	TC

ALARM
107
MARKTYPE
DSPV6N79
RESUME

ATTEMPTING TO MAKE MORE THAN 5 MK PAIRS
SEE IF SURFACE MARK
IT IS
DONT CHANGE DISPLAY-DO NOTHING

L ACTMARK

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0414	REF	3	LAST	271	07,2461	0 2514 0	MKREJ	TC	MARKTYPE	SEE IF SURFACE
04141	REF	1			07,2462	1 2507 0		TCF	SURFREFJ	SURFACE-JUST CHECK MARK COUNTER
04142	REF	3	LAST	267	07,2463	3 5015 0		CAF	PRI03	INFLIGHT-SEE IF MARKS MADE
0415	REF	19	LAST	270	07,2464	7 1312 1		MASK	MARKSTAT	
0416	REF	59	LAST	270	07,2465	10 000 0		CCS	A	
0417	REF	1			07,2466	1 2472 0		TCF	REJFCT	MARKS MADE-REJECT ONE
0418	REF	16	LAST	271	07,2467	0 5567 0	REJALM	TC	ALARM	NO MARK TO REJECT-BAD PROCEDURE-ALARM
0419					07,2470	00115 1		OCT	115	
0420	REF	13	LAST	271	07,2471	0 5270 1		TC	RESUME	DESIRED ACTION DISPLAYED
0421	REF	5	LAST	242	07,2472	4 4355 1	REJECT	CS	PRI030	ZERO BIT14, SHOW REJ., SEE IF MARK SINCE
0422	REF	20	LAST	272	07,2473	7 1312 1		MASK	MARKSTAT	LAST REJECT
0423	REF	18	LAST	234	07,2474	6 4737 0		AD	BIT13	
0424	REF	21	LAST	272	07,2475	57 1312 0		XCH	MARKSTAT	
0425	REF	19	LAST	272	07,2476	7 4737 1		MASK	BIT13	
0426	REF	60	LAST	272	07,2477	10 000 0		CCS	A	
0427	REF	1			07,2500	1 2505 1		TCF	REJECT2	ANOTHER REJECT SET BIT 10+11 TO ZERO
0428	REF	14	LAST	270	07,2501	4 1547 1		CS	XYMARK	MARK MADE SINCE REJECT-REJECT MARK IN 10
0429	REF	22	LAST	272	07,2502	7 1312 1	RENEWMK	MASK	MARKSTAT	
0430	REF	23	LAST	272	07,2503	55 1312 1		TS	MARKSTAT	
0431	REF	1			07,2504	1 2577 1		TCF	REMARK	GO REQUEST NEW MARK ACTION
0432	REF	4	LAST	272	07,2505	4 5015 1	REJECT2	CS	PRI03	ON SECOND REJECT-DISPLAY VB53 AGAIN
0433	REF	1			07,2506	1 2502 0		TCF	RENEWMK	
04331	REF	9	LAST	270	07,2507	11 546 0	SURFREFJ	CCS	MARKCNTR	IF MARK DECREMENT COUNTER
04332					07,2510	1 2512 1		TCF	+2	
04333	REF	1			07,2511	1 2467 1		TCF	REJALM	NO MARKS TO REJECT-ALARM
04334	REF	10	LAST	272	07,2512	55 546 0		TS	MARKCNTR	
04335	REF	14	LAST	272	07,2513	0 5270 1		TC	RESUME	

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R0434

R0435 MARKTYPE TESTS TO SEE IE LFM ON LUNAR SURFACE. IF IT IS RETURN TO LOC+1

0436	REF	1		07,2514	4 0104 0	MARKTYPE	CS	FLAGWRD8	SURFFLAG*****TEMPORARY*****
0437	REF	19	LAST	247	07,2515 7 4744 0		MASK	BIT8	
0438	REF	61	LAST	272	07,2516 10 000 0		CCS	A	
0439	REF	21	LAST	269	07,2517 24 002 0		INCR	Q	IF SURFACE MARK REUTNR TO LOC +1
0440	REF	22	LAST	273	07,2520 0 0002 0		TC	Q	IF INFLIGHT MARK RETURN TO LOC +2
04401	REF	23	LAST	270	07,2521 3 4755 1	SURFSTOR	CAF	ZERO	FOR SURFACE MARK ZERO MARK KIND INDEX
04402	REF	15	LAST	270	07,2522 54 070 1		TS	RUPTREG1	
04403	REF	24	LAST	272	07,2523 4 1312 1		CS	MARKSTAT	SET BITS10,11 TO SHOW SURFACE MARK
04404	REF	5	LAST	272	07,2524 7 5015 1		MASK	PRI03	FOR MARKCHEX
04405	REF	25	LAST	273	07,2525 27'312 1		ADS	MARKSTAT	
0441	REF	4	LAST	267	07,2526 3 5004 0	VACSTOR	CAF	LOW9	
0442	REF	26	LAST	273	07,2527 7 1312 1		MASK	MARKSTAT	STORE MARK VAC ADR IN RUPTREG2
0443	REF	6	LAST	186	07,2530 54 071 0		TS	RUPTREG2	
0444					07,2531 0 0006 1		EXTEND		
0445	REF	5	LAST	269	07,2532 3 0062 0		DCA	ITEMP1	PICK UP MARKTIME
0446	REF	1			07,2533 53'560 1		DXCH	TSIGHT	STORE LAST MARK TIME
0447	REF	11	LAST	272	07,2534 3 1546 1		CA	MARKCNTR	6 X MARKCNTR FOR STORE INDEX
0448					07,2535 0 0006 1		EXTEND		
0449	REF	4	LAST	267	07,2536 7 6241 1		MP	SIX	
0450	REF	19	LAST	267	07,2537 56 001 0		XCH	L	GET INDEX FROM LOW ORDER PART
0451	REF	7	LAST	273	07,2540 6 0071 1		AD	RUPTREG2	SET CDU STORE INDEX TO MARKVAC
04511	REF	16	LAST	273	07,2541 26 070 1		ADS	RUPTREG1	INCREMENT VAC PICKUP BY MARK FOR FLIGHT
0452	REF	5	LAST	268	07,2542 55'550 1		TS	MARKEX	STORE HERE IN CASE OF SURFACE MARK
0453	REF	6	LAST	269	07,2543 3 0063 1		CA	ITEMP3	
0454	REF	17	LAST	273	07,2544 50 070 0		INDEX	RUPTREG1	
0455					07,2545 54 000 0		TS	0	STORE CDUY
0456	REF	4	LAST	269	07,2546 3 0064 0		CA	ITEMP4	
0457	REF	18	LAST	273	07,2547 50 070 0		INDEX	RUPTREG1	
0458					07,2550 54 002 1		TS	2	STORE CDUZ
0459	REF	3	LAST	269	07,2551 3 0065 1		CA	ITEMP5	
0460	REF	19	LAST	273	07,2552 50 070 0		INDEX	RUPTREG1	
0461					07,2553 54 004 1		TS	4	STORE CDUX
04611	REF	4	LAST	272	07,2554 0 2514 0		TC	MARKTYPE	IF SURFACE MARK-JUST DO SURFJOB
04612	REF	1			07,2555 1 2604 0		TCF	SURFJOB	
0462	REF	20	LAST	272	07,2556 3 4737 0		CAF	BIT13	CLFAR BIT13 TO SHOW MARK MADE
0463	REF	15	LAST	272	07,2557 6 1547 0		AD	XYMARK	SET MARK ID IN MARKSTAT
0464					07,2560 4 0000 0		COM		
0465	REF	27	LAST	273	07,2561 7 1312 1		MASK	MARKSTAT	
0466	REF	16	LAST	273	07,2562 6 1547 0		AD	XYMARK	
0467	REF	28	LAST	273	07,2563 55'312 1		TS	MARKSTAT	
0468	REF	6	LAST	273	07,2564 7 5015 1		MASK	PRI03	SEE IF X, Y MARK MADE
0469	REF	20	LAST	273	07,2565 54 001 1		TS	L	

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0470	REF	7	LAST	273	07,2566	3 5015 0
0471					07,2567	0 0006 1
0472	REF	9	LAST	267	07,2570	06 001 0
0473	REF	62	LAST	273	07,2571	10 000 0
0474	REF	2	LAST	272	07,2572	1 2577 1
0475	REF	29	LAST	273	07,2573	4 1312 1
0476	REF	26	LAST	270	07,2574	7 4736 0
0477	REF	30	LAST	274	07,2575	27'312 1
0478	REF	3	LAST	274	07,2576	1 2577 1

CA	PRIO3
EXTEND	
RXOR	LCHAN
CCS	A
TCF	REMARK
CS	MARKSTAT
MASK	BIT14
ADS	MARKSTAT
TCF	REMARK

NOT PAIR YET, DISPLAY MARK ACTION
MARK PAIR COMPLETE-SET BIT14

GO DISPLAY V54

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0481	REF	8	LAST	274	07,2577	3 5015 0	REMARK	CAF	PRI03	BITS 10 AND 11
0482	REF	31	LAST	274	07,2600	7 1312 1		MASK	MARKSTAT	
0483					07,2601	0 0006 1		EXTEND		
0484	REF	29	LAST	242	07,2602	7 4746 1		MP	BIT6	SHIFT MARK IDS TO BE 0 TO 3 FOR INDEX STORE VERB INDEX
0485	REF	6	LAST	273	07,2603	55'550 1		TS	MKDEX	
0486	RFF	3	LAST	259	07,2604	3 5025 0	SURFJOB	CAF	PRI015	
0487	REF	3	LAST	207	07,2605	0 5072 1		TC	NOVAC	ENTER JOB TO CHANGE DISPLAY TO REQUEST NEXT ACTION
0488	REF	17	LAST	273	E7,1547			EBANK=	XYMARK	
0489	REF	1			07,2606	02611 0		2CADR	CHANGEVB	
0489	REF	1			07,2607	16067 1				
0490	REF	15	LAST	272	07,2610	0 5270 1		TC	RESUME	
0491	REF	5	LAST	273	07,2611	0 2514 0	CHANGEVB	TC	MARKTYPE	
0492	REF	2	LAST	271	07,2612	1 2627 1		TCF	DSPV6N79	SURFACE-DISPLAY V 06 N 79 INFLIGHT-PICK UP MARK VB INDEX
0493	REF	7	LAST	275	07,2613	51'550 0		INDEX	MKDEX	
0494	REF	1			07,2614	3 2616 1		CAF	MKVB54	
04941	REF	1			07,2615	0 2211 1		TC	PASTIT	PASTE UP NEXT MK VERB DISPLAY

R0496 THE FOUR MKVB5 ARE INDEXED-THEIR ORDER CANNOT BE CHANGED

0497		07,2616	15507 1	MKVB54	VN	5471	MAKE X OR Y MARK
0498		07,2617	15307 1	MKVB53	VN	5371	MAKE Y MARK
0499		07,2620	15107 0	MKVB52	VN	5271	MAKE X MARK
0500		07,2621	15507 1	MKVB54*	VN	5471	MAKE X OR Y MARK
0501		07,2622	04000 0	DP1/8	2DEC	.125	
0501		07,2623	00000 1				
0502		07,2624	00034 0	OCT34	OCT	34	
0503		07,2625	01507 1	V06N71	VN	671	
05031		07,2626	01517 0	V06N79*	VN	679	

L AOTMARK

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P0504 RCUTINE TO REQUEST CURSOR AND SPIRAL MEASUREMENTS

COUNT* \$\$/R59

0505 REF 1

0506	REF	1		07,2627	3 2626 1	DSPV6N79	CAF	V06N79*	CURSOR-SPIRAL DISPLAY
0507	REF	12	LAST	267	07,2630	0 4616 1	TC	BANKCALL	
0508	REF	4	LAST	261	07,2631	20212 1	CADR	GOMARKE	

0509	REF	5	LAST	267	07,2632	1 6001 1	TCF	GOTOPOOH	V34-TERMINATE
0510	REF	1			07,2633	1 2641 1	TCF	SURFEND	V33-PROCEED, END MARKING
0511	REF	30	LAST	275	07,2634	3 4746 0	CAF	BIT6	IF V32(OCT40) IN MPAC DO RECYCLE
05111	REF	32	LAST	243	07,2635	7 0154 0	MASK	MPAC	OTHERWISE IT IS LOAD VB ENTER SO
05112	REF	63	LAST	274	07,2636	10 000 0	CCS	A	RE-DISPLAY V06N79
05113	REF	1			07,2637	1 2645 0	TCF	SURFAGAN	VB32-RECYCLE
05114	REF	3	LAST	275	07,2640	1 2627 1	TCF	DSPV6N79	ENTER

0512	REF	27	LAST	274	07,2641	4 4736 0	SURFEND	CS	BIT14	SET BIT14 TO SHOW MARK END
0513	REF	32	LAST	275	07,2642	7 1312 1	MASK	MARKSTAT		
05131	REF	28	LAST	276	07,2643	6 4736 1	AD	BIT14		
0514	REF	33	LAST	276	07,2644	55'312 1	TS	MARKSTAT		

0515	REF	1			07,2645	3 1045 1	SURFAGAN	CA	CURSOR	
0516	REF	8	LAST	275	07,2646	51'550 0	INDEX	MKDEX	HOLDS VAC AREA POINTER FOR SURF MARKING	
0517					07,2647	54 001 1	TS	1	STORE CURSOR SP 2COMP	
0518	REF	1			07,2650	3 1046 1	CA	SPIRAL		
0519	REF	9	LAST	276	07,2651	51'550 0	INDEX	MKDEX		
0520					07,2652	54 003 0	TS	3	STORE SPIRAL	

0521	REF	34	LAST	276	07,2653	4 1312 1	CS	MARKSTAT	IF BIT 14 SET-END MARKING
0522	REF	29	LAST	276	07,2654	7 4736 0	MASK	BIT14	
0523					07,2655	0 0006 1	EXTEND		
0524	REF	2	LAST	267	07,2656	1 2216 1	BZF	MARKCHEX	
0525	REF	12	LAST	273	07,2657	3 1546 1	CA	MARKCNTR	THIS IS RECYCLE-SEE IF 5 MARKS ALREADY
0526	REF	11	LAST	270	07,2660	6 4753 1	AD	ONE	
0527					07,2661	4 0000 0	COM		
0528	REF	6	LAST	268	07,2662	6 4756 1	AD	FIVF	
0529					07,2663	0 0006 1	EXTEND		
0530	REF	2	LAST	270	07,2664	6 2454 0	BZMF	5MKALARM	CANT RECYCLE-TO MANY MARKS-ALARM
0531	REF	13	LAST	276	07,2665	25'546 1	INCR	MARKCNTR	OF FOR RECYCLF-INCR COUNTER
0532	REF	3	LAST	268	07,2666	1 2205 0	TCF	GETMKS +3	GO DISPLAY MARK VB

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0001				07,2667				BANK	7		
0002	REF	1		43,2000				SETLOC	EXTVERBS		
0003				43,2000				BANK			
0004	REF	3	LAST	211	E5,1737			FBANK=	OGC		
0005	RFF	1						COUNT*	\$/FXTVB		
R0006	FAN-OUT										
0007	RFF	33	LAST	276	43,2000	50 154 1	GOEXTVB	INDEX	MPAC	VERB-40 IS IN MPAC	
0008	REF	1			43,2001	0 2002 1		TC	LST2FAN	FAN AS BEFORE.	
0009	REF	1			43,2002	0 2130 1	LST2FAN	TC	VBZFRO	VB40 ZERO (USED WITH NOUN 20 OR 72 ONLY)	
0010	REF	1			43,2003	0 2171 1		TC	VBCOARK	VB41 COARSE ALIGN (USED WITH NOUN 20 OR 72 ONLY)	
A0011											
0012	REF	1			43,2004	0 2340 1		TC	IMUFINCK	VB42 FINE ALIGN IMU	
0013	RFF	1			43,2005	0 2717 1		TC	IMUATTCK	VB43 LOAD IMU ATTITUDE ERROR METERS.	
0014	REF	1			43,2006	0 2302 1		TC	RRDESEND	VB44 TERMINATE CONTINUOUS DESIGNATE	
0015	REF	1			43,2007	0 2120 0		TC	ALM/END	VB45 SPARE	
0016	REF	2	LAST	277	43,2010	0 2120 0		TC	ALM/END	VB46 SPARE	
0017	RFF	1			43,2011	0 2377 0		TC	V47TXACT	VB47 AGS INITIALIZATION	
0018	REF	1			43,2012	0 3143 1		TC	DAPDISP	VB48 LOAD A/P DATA	
0019	RFF	1			43,2013	1 3025 1		TCF	CREWMANU	VB49 START AUTOMATIC ATTITUDE MANEUVER	
0020	REF	1			43,2014	0 2371 0		TC	GOLOADLV	VB50 PLEASE PERFORM	
0021	RFF	3	LAST	277	43,2015	0 2120 0		TC	ALM/FND	VB51 SPARE	
0022	RFF	2	LAST	277	43,2016	0 2371 0		TC	GOLOADLV	VB52 PLEASE MARK X - RETICLE.	
0023	REF	3	LAST	277	43,2017	0 2371 0		TC	GOLOADLV	VB53 PLEASE MARK Y - RETICLE.	
0024	REF	4	LAST	277	43,2020	0 2371 0		TC	GOLOADLV	VB54 PLEASE MARK X OR Y - RETICLE	
0025	REF	1			43,2021	0 2411 1		TC	ALINTIME	VB55 ALIGN TIME	
0026	REF	1			43,2022	0 3034 0		TC	TRMIRACK	VB56 TERMINATE TRACKING - P20 + P25	
0027	REF	1			43,2023	0 2322 0		TC	LRON	VB57 PERMIT LANDING RADAR UPDATES	
0028	REF	1			43,2024	0 2325 1		TC	LR0FF	VB58 INHIBIT LANDING RADAR UPDATES	
0029	REF	4	LAST	277	43,2025	0 2120 0		TC	ALM/END	VB59 SPARE	
0030	REF	1			43,2026	0 2151 0		TC	LRPOS2K	VB60 COMMAND LR TO POSITION 2.	
0031	REF	1			43,2027	0 2163 1		TC	DAPATTFR	VB61 DISPLAY DAP ATTITUDE ERROR	
0032	RFF	1			43,2030	0 2166 1		TC	TOTATTER	VB62 DISPLAY TOTAL ATTITUDE ERROR	
0033	RFF	1			43,2031	0 2424 1		TC	R04	VB63 SAMPLE RADAR ONCE PER SECOND	
0034	REF	1			43,2032	0 2710 0		TC	VB64	VB64 CALCULATE, DISPLAY S-BAND ANT ANGLES	
0035	RFF	1			43,2033	0 3227 0		TC	SNUFFOUT	VB65 DISABLE U,V JETS DURING DPS BURNS.	
0036	REF	1			43,2034	0 3150 0		TC	ATTACHED	VB66 ATTACHED MOVE THIS TO OTHER STATE	
0037	REF	1			43,2035	0 3221 0		TC	V67	VB67 W MATRIX MONITOR	
0038	REF	1			43,2036	0 2330 0		TC	P64NOW	VB68 START P64 IMMEDIATELY.	
0039	REF	1			43,2037	0 2037 1	VERB69	TC	VERB69	VB69 FORCE A HARDWARE RESTART	
0040	REF	1			43,2040	0 3732 1		TC	V70UPDAT	VB70 UPDATE LIFTOFF TIME.	
0041	REF	1			43,2041	0 3734 1		TC	V71UPDAT	VB71 UNIVERSAL UPDATE - BLOCK ADDRESS.	
0042	REF	1			43,2042	0 3736 0		TC	V72UPDAT	VB72 UNIVERSAL UPDATE - SINGLE ADDRESS.	
0043	REF	1			43,2043	0 3740 1		TC	V73UPDAT	VB73 UPDATE AGC TIME (OCTAL).	
0044	REF	1			43,2044	0 3053 1		TC	DNEDUMP	VB74 INITIALIZE DOWN-TELEMETRY PROGRAM FOR ERASABLE DUMP.	
A0045											
0046	REF	1			43,2045	0 3232 1		TC	OUTSNUFF	VB75 ENABLE U,V JETS DURING DPS BURNS.	

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0047	REF	1		43,2046	0 3011 1	TC	MINIMP	VB76	MINIMUM IMPULSE MODE
0048	REF	1		43,2047	0 3016 0	TC	NDMINIMP	VB77	RATE COMMAND MODE
0049	REF	1		43,2050	0 2414 1	TC	R77	VB78	START LR SPURIOUS RETURN TEST
0050	REF	1		43,2051	0 2627 0	TC	R77END	VB79	TERMINATE LR SPURIOUS RETURN TEST
0051	REF	1		43,2052	0 3057 0	TC	LEMVEC	VB80	UPDATE LEM STATE VECTOR
0052	REF	1		43,2053	0 3062 0	TC	CSMVEC	VB81	UPDATE CSM STATE VECTOR
0053	REF	1		43,2054	0 2756 1	TC	V82PERF	VB82	REQUEST ORBIT PARAM DISPLAY (R30)
0054	REF	1		43,2055	0 2766 1	TC	V83PERF	VB83	REQUEST REND PARAM DISPLAY (R31)
0055	REF	5	LAST 277	43,2056	0 2120 0	TC	ALM/END	VB84	SPARE
0056	REE	1		43,2057	0 3235 0	TC	VERB85	VB85	DISPLAY RR LOS AZ AND ELEV
0057	REF	6	LAST 278	43,2060	0 2120 0	TC	ALM/END	VB86	SPARE
0058	REF	7	LAST 278	43,2061	0 2120 0	TC	ALM/END	VB87	SPARE
0059	REF	8	LAST 278	43,2062	0 2120 0	TC	ALM/END	VB88	SPARE
0060	REF	1		43,2063	0 2774 1	TC	V89PERF	VB89	ALIGN XORZ LEM AXIS ALONG LOS (R63)
0061	REF	1		43,2064	0 3003 1	TC	V90PERF	VB90	OUT OF PLANE RENDEZVOUS DISPLAY
0062	REF	1		43,2065	0 3106 0	TC	GOSHOSUM	VB91	DISPLAY BANK SUM.
0063	REF	1		43,2066	0 3072 1	TC	SYSTEST	VB92	OPERATE IMU PERFORMANCE TEST.
0064	REF	1		43,2067	0 3101 1	TC	WMATRXNG	VB93	CLEAR RENDWFLG
0065	REF	9	LAST 278	43,2070	0 2120 0	TC	ALM/END	VB94	SPARE
0066	REF	1		43,2071	0 3067 0	TC	UPDATOFF	VB95	NO STATE VECTOR UPDATE ALLOWED
0067	REF	1		43,2072	0 3214 0	TC	VERB96	VB96	INTERRUPT INTEGRATION AND GO TO P00
0068	REF	5	LAST 277	43,2073	0 2371 0	TC	GOLOADLV	VB97	PLEASE VERIFY ENGINE FAILURE
0069	REF	10	LAST 278	43,2074	0 2120 0	TC	ALM/END	VB98	SPARE
0070	REF	6	LAST 278	43,2075	0 2371 0	TC	GOLOADLV	VB99	PLEASE ENABLE ENGINE

R0071 END OF EXTENDED VERB FAN

0072	REE	4	LAST 259	43,2076	11'044 1	TESTXACT	CCS	EXTVBACT	ARE EXTENDED VERBS BUSY
0073	REF	11	LAST 278	43,2077	0 2120 0		TC	ALM/END	YES, TURN ON OPERATOR LIGHT
0074	REE	2	LAST 237	43,2100	3 0100 0		CA	FLAGWRD4	ARE PRIORITY DISPLAYS USING DSKY
0075	REF	1		43,2101	7 2127 0		MASK	OC24100	
00751	REF	64	LAST 276	43,2102	10 000 0		CCS	A	
00752	REF	12	LAST 278	43,2103	0 2120 0		TC	ALM/END	YES
0076	REF	2	LAST 246	43,2104	3 6007 0		CAF	OCT24	SET BITS 3 AND 5
0077	REE	5	LAST 278	43,2105	55'044 1	SETXTACT	TS	EXTVBACT	NO. SET ELAG TO SHOW EXT VERR DISPLAY
A0078									SYSTEM BUSY
0079	REE	23	LAST 273	43,2106	3 0002 0		CA	Q	
0080	REF	34	LAST 277	43,2107	54 155 1		TS	MPAC +1	
0081	REF	4	LAST 259	43,2110	4 4752 1		CS	TWO	BLANK EVERYTHING EXCEPT MM AND VERR
0082	REF	1		43,2111	0 4154 0		TC	NVSUB	
0083				43,2112	0 2113 0		TC	+1	
0084	REE	35	LAST 278	43,2113	0 0155 0		TC	MPAC +1	
0085	REF	2	LAST 246	43,2114	0 4364 1	XACTALM	TC	FALTON	TURN ON OPERATOR ERROR LIGHT.
0086	REE	6	LAST 223	43,2115	0 5472 0		TC	ENDEXT	RELEASE MARK AND EXT. VERR DISPLAY SYS.
0087	REF	7	LAST 278	5472		TERMFXTV	EQUALS	ENDEXT	

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0088	REF	8	LAST	278	5472	ENDEXTVB	EQUALS	ENDEXT		
0089	REF	24	LAST	273	43,2116	3 4755 1	XACTO	CAF	ZERO	RELEASE MARK AND EXT. VERB DISPLAY SYS.
0090	REF	1			43,2117	0 2105 1		TC	SETXTACT	
0091	REF	3	LAST	278	43,2120	0 4364 1	ALM/END	TC	FALTON	TURN ON OPERATOR ERROR LIGHT
0092	REF	7	LAST	270	43,2121	0 4635 0	GOPIN	TC	POSTJUMP	
0093	REF	2	LAST	242	43,2122	20723 0		CADR	PINBRNCH	
0094	REF	6	LAST	246	43,2123	3 1011 0	CHKPOOH	CA	MODREG	CHECK FOR POO OR POO-.
0095					43,2124	0 0006 1		EXTEND		
0096	REF	1			43,2125	1 6741 1		BZF	TCQ	
0097	REF	13	LAST	278	43,2126	0 2120 0		TC	ALM/FND	
00971					43,2127	24100 0	OC24100	OCT	24100	

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0132	REF	2	LAST	280	43,2151	0	2652	1	LRPOS2K	TC	RDRUSECK	COMMAND LR TO POSITION 2
01322	REF	17	LAST	280	43,2152	0	4616	1		TC	BANKCALL	
0133	REF	1			43,2153		53471	0		CADR	LRPOS2	
0134	REF	18	LAST	280	43,2154	0	4616	1		TC	BANKCALL	
01341	REF	2	LAST	280	43,2155		17667	0		CADR	RADSTALL	
01342	REF	1			43,2156	0	2160	1		TC	LRP2ALM	
01343	REF	3	LAST	280	43,2157	0	2121	1		TC	GOPIN	
01345	REF	17	LAST	272	43,2160	0	5567	0	LRP2ALM	TC	ALARM	
01346					43,2161		00523	0		OCT	523	
01347	REF	4	LAST	280	43,2162	0	2121	1		TC	GOPIN	

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R0135 V61 VERB 61, DISPLAY DAP ATTITUDE ERRORS ON FDAI ATTITUDE ERROR NEEDLES.

0137	REF	9	LAST	246	43,2163	0 5516 0	DAPATTER	TC	DOWNFLAG
0138	REF	1			43,2164	00013 0		ADRES	NEEDLFLG
0139	REF	5	LAST	280	43,2165	0 2121 1		TC	GOPIN

R0140 V62 VERB 62, DISPLAY TOTAL ATTITUDE ERRORS ON FDAI ATTITUDE ERROR NEEDLES.

0142	REF	1			43,2166	0 5504 0	TOTATTER	TC	UPFLAG
0143	REF	2	LAST	281	43,2167	00013 0		ADRES	NEEDLFLG
0144	REF	6	LAST	281	43,2170	0 2121 1		TC	GOPIN

R0145

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R0146      VBCOARK      VERB 41      DESCRIPTION
R0147      COARSE ALIGN IMU OR RADAR
R0148      1. REQUIRE NOUN 20 OR NOUN 72 OR TURN ON OPERATOR ERROR.
R0149      2. REQUIRE EXT VERB DISPLAY SYS AVAILABLE OR TURN ON OPERATOR ERROR LIGHT AND GO TO PINBRNCH.
R0151      CASE 1      NOUN 20      (ICDU ANGLES)
R0152      3. SET EXT VERB DISPLAY ACTIVE FLAG.
R0153      4. DISPLAY FLASHING V25,N22 (LOAD NEW ICPU ANGLES).
R0154      RESPONSES
R0155      A. TERMINATE
R0156      1. RELEASE EXT VERB DISPLAY SYSTEM
R0157      B. PROCEED
R0158      1. COARSE ALIGN TO THE EXISTING THETAD'S (ICORK2).
R0168      C. ENTER
R0169      1. COARSE ALIGN TO THE LOADED THETAD'S (ICORK2).
R0170      ICORK2
R0171      1. RE-DISPLAY VERB 41.
R0172      2. EXECUTE IMUCOARS (IMU COARSE ALIGN).
R0173      3. EXECUTE IMUSTALL (ALLOW TIME FOR DATA TRANSFER).
R0174      4. RELEASE EXT VERB DISPLAY SYSTEM.
R0175      CASE 2      NOUN 72      (RCPU ANGLES)
R01755     EXIT WITH OP ERROR IF SOMEONE IS USING EITHER RADAR.
R0176      5. DISPLAY FLASHING V24,N73 (LOAD NEW RR TRUNION ANGLE AND NEW SHAFT ANGLE).
R0178      RESPONSES
R0179      A. TERMINATE
R0180      1. RELEASE EXT VERB DISPLAY SYS.
R0181      B. PROCEED OR ENTER
R0182      1. EXECUTE AURLOKON (ASK OPERATOR FOR LOCK-ON REQUIREMENTS).
R0184      2. RE-DISPLAY VERB 41.
R0185      3. SCHEDULE RRDESK2 WITH PRIORITY 20.
R0186      4. RELEASE EXT VERB DISPLAY SYS.

R0187      AURLOKON

R0188      1. FLASH V04 N12 R1 = 00006 R2 = 00002
R0189      RESPONSES
R0190      A. TERMINATE
R0194      B. PROCEED
R0195      1. RESET LOCK-ON SWITCH
R01951     2. SET CONTINUOUS DESIGNATE FLAG
R01952     3. DISABLE R25
R0196      C. V22 E 1 E, R1 = 00001, PROCEED
R0197      1. SET LOCK-ON SWITCH
R0198      REF 2 LAST 280 43,2171 0 2174 1 VBCOARK TC OP/INERT
R0199      REF 1 43,2172 0 2205 1 TC IMUCOARK RETURN HERE IF NOUN = ICPU(20)
R0200      REF 1 43,2173 0 2227 1 TC RRDESKBK RETURN HERE IF NOUN = RCPU(72)
R0201      RETURNS TO L+1 IF IMU OR L+2 IF RR.

R0202      REF 3 LAST 278 43,2174 4 6007 1 OP/INERT CS OCT24
R0203      REF 2 LAST 237 43,2175 6 1002 1 AD NOUNREG
R0204      43,2176 0 0006 1 EXTEND

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0205	REF	2	LAST	279	43,2177	1 6741 1	BZF	TCQ	IF = 20.
0207	REF	1			43,2200	6 2204 0	AD	RRIMUDIF	-52
0208					43,2201	0 0006 1	EXTEND		
0209	REF	2	LAST	172	43,2202	1 6736 1	BZF	Q+1	
0210	REF	14	LAST	279	43,2203	0 2120 0	TC	ALM/END	ILLEGAL.
0211					43,2204	77713 1	RRIMUDIF	DEC	THE IMU
0213	REF	2	LAST	280	43,2205	0 2405 1	IMUCOARK	TC	CKMODCAD
0214	REF	1			43,2206	0 2076 1	TC	TESTXACT	COARSE ALIGN FROM KEYBOARD.
0215	REF	1			43,2207	3 2225 0	CAF	VNLODCDU	CALL FOR THETAD LOAD
0216	REF	19	LAST	280	43,2210	0 4616 1	TC	BANKCALL	
0217	REF	1			43,2211	20212 1	CADR	GOXDSPF	
0218	REF	1			43,2212	0 5472 0	TC	TERMEXTV	
0219					43,2213	1 2214 0	TCF	+1	
0220	REF	1			43,2214	3 2226 0	ICORK?	CAF	IMUCCARV
0221	REF	20	LAST	283	43,2215	0 4616 1	TC	BANKCALL	RE-DISPLAY COARSE ALIGN VERB.
0222	REF	2	LAST	222	43,2216	20473 0	CADR	EXDSPRET	
0223	REF	21	LAST	283	43,2217	0 4616 1	TC	BANKCALL	CALL MODE SWITCHING PROG
0224	REF	1			43,2220	16753 1	CADR	IMUCOARS	
0225	REF	22	LAST	283	43,2221	0 4616 1	TC	BANKCALL	STALL
0226	REF	3	LAST	280	43,2222	17671 1	CADR	IMUSTALL	
0227	REF	1			43,2223	0 5472 0	TC	ENDEXTVB	
0228	REF	2	LAST	283	43,2224	0 5472 0	TC	ENDEXTVB	
0229					43,2225	06226 1	VNLODCDU	VN	2522
0230					43,2226	12200 0	IMUCOARV	VN	4100

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P0231 DESIGNATE TO DESIRED GIMBAL ANGLES.

0232	REF	3	LAST	280	43,2227	0 2652 1	RRDESNBK	TC	RDRUSECK
0234	REF	2	LAST	283	43,2230	0 2076 1		TC	TESTXACT
0235	REF	3	LAST	243	43,2231	3 4745 0		CA	RNDVZBIT
0236	REF	16	LAST	246	43,2232	7 0074 0		MASK	FLAGWRDO
0237	REF	65	LAST	278	43,2233	10 000 0		CCS	A
0238	REF	1			43,2234	1 2114 0		TCF	XACTALM
0239	REF	1			43,2235	4 2321 1		CS	OCT41000
0240					43,2236	0 0004 0		INHINT	
0241	REF	18	LAST	235	43,2237	7 0110 0		MASK	RADMODES
0242	REF	19	LAST	284	43,2240	54 110 0		TS	RADMODES
0243	REF	1			43,2241	3 2260 1		CAF	VNLDRCDU
0244	REF	23	LAST	283	43,2242	0 4616 1		TC	BANKCALL
0245	REF	2	LAST	283	43,2243	20212 1		CADR	GCXDSPF
0246	REF	2	LAST	283	43,2244	0 5472 0		TC	TERMEXTV
0247					43,2245	1 2241 0		TCF	-4
0248	REF	24	LAST	284	43,2246	0 4616 1		TC	BANKCALL
0249	REF	1			43,2247	46000 0		CADR	AURLCKON
0250	REF	1			43,2250	3 2226 0		CAF	OPTCOARV
0251	REF	25	LAST	284	43,2251	0 4616 1		TC	BANKCALL
0252	REF	3	LAST	283	43,2252	20473 0		CADR	EXDSPRET
0253	REF	1			43,2253	3 4736 1		CAF	PRI020
0254	REF	3	LAST	259	43,2254	0 5105 0		TC	FINDVAC
0255	REF	6	LAST	255	E7,1454			EBANK=	LOSCCOUNT
0256	REF	1			43,2255	02261 0		2CADR	RRDESK2
0256	REF	1			43,2256	66107 1			
0257	REF	3	LAST	284	43,2257	1 5472 1		TCF	TERMEXTV
0258					43,2260	06111 0		VNLDRCDU	VN 2473
0259	REF	2	LAST	283	43,2226			OPTCOARV	EQUALS IMUCOARV
0260	REF	26	LAST	284	43,2261	0 4616 1		RRDESK2	TC BANKCALL
0261	REF	1			43,2262	52475 0		CADR	RRDESNB
0262					43,2263	0 2264 0		TC	+1
02621	REF	9	LAST	236	43,2264	3 0167 1		CA	PRIORITY
02622	REF	5	LAST	273	43,2265	7 5004 1		MASK	LOW9
02623	REF	66	LAST	284	43,2266	10 000 0		CCS	A
02624	REF	67	LAST	284	43,2267	50 000 1		INDEX	A
02625	REF	68	LAST	284	43,2270	54 000 0		TS	A
02626					43,2271	4 0000 0		COM	
02627	REF	10	LAST	284	43,2272	26 167 0		ADS	PRIORITY
0263	REF	27	LAST	284	43,2273	0 4616 1		TC	BANKCALL
0264	REF	3	LAST	280	43,2274	17667 0		CADR	RADSTALL

IS P20 RUNNING?

OPERATOR ERROR IF IN P20
 TERMINATE PRESENT DESIGNATION
 RELINT DONE IN GOXDSPF

ASK FOR GIMBAL ANGLES.

V33

ASK OP FOR LOCK ON REQUIREMENTS.

RE-DISPLAY OUR OWN VERB

FREES DISPLAY.

DIFFERENT NOUNS.

DUMMY NEEDED SINCE DESRETRN DOES INCR

RELEASE THIS JOBS VAC AREA.
 INSURE ENDOFJOB DOES A NOVAC END (BZMF).

WAIT FOR COMPLETION OF DESIGNATE

L EXTENDED VERBS

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0265 43,2275 0 2277 1
 0266 REF 4 LAST 254 43,2276 0 5155 0
 0267 REF 18 LAST 280 43,2277 0 5567 0
 0268 43,2300 00503 1
 0269 REF 5 LAST 285 43,2301 0 5155 0

TC +2
 TC ENDOFJOB
 TC ALARM
 OCT 503
 TC ENDOFJOB

BADEND-NO LOCKON OR OUT OF LIMITS
 GOODEND-LOCKON ACHIEVED
 TURN ON ALARM LIGHT -503 DESIGNATE FAIL

0270 REF 20 LAST 284 43,2302 10 110 0
 0271 REF 7 LAST 281 43,2303 1 2121 0
 0272 REF 8 LAST 285 43,2304 1 2121 0
 0273 43,2305 1 2306 1
 0274 REF 2 LAST 284 43,2306 4 2321 1
 0275 43,2307 0 0004 0
 0276 REF 21 LAST 285 43,2310 7 0110 0
 0277 REF 22 LAST 285 43,2311 54 110 0
 02771 REF 3 LAST 245 43,2312 0 6011 1
 02773 REF 1 43,2313 3 4777 1
 02774 REF 28 LAST 284 43,2314 0 4616 1
 02775 REF 3 LAST 223 43,2315 01735 1
 0278 REF 10 LAST 281 43,2316 0 5516 0
 0279 REF 1 43,2317 00126 1
 0280 REF 9 LAST 285 43,2320 1 2121 0
 0281 43,2321 41000 1

RPDESEND CCS RADMODES
 TCF GOPIN
 TCF GOPIN
 TCF +1
 CS OCT41000
 INHINT
 MASK RADMODES
 TS RADMODES
 TC CLRADMOD
 CAF 1SEC
 TC BANKCALL
 CADR DELAYJOB
 TC DOWNFLAG
 ADRES NORRMON
 TCF GOPIN
 OCT 41000

TERMINATE CONTINUOUS DESIGNATE ONLY

BEGDES GOFS TO ENDRADAR
 RELINT DONE IN DOWNFLAG

ENABLE R25 GIMBAL MONITOR

CONTINUOUS DESIGNATE - DESIGNATE

L EXTENDED VERBS

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02812				23,2000			BANK	23			
02814	REF	1		23,2000			SETLOC	EXTVB1			
02816				23,2000			BANK				
02818	REF	1					COUNT*	\$\$/EXTVB			
0282	REF	1		23,2000	0 4645 1	AURLKON	TC	MAKECADR			
0283	REF	2	LAST	119	23,2001	55'113 1	TS	DESRET			
0284	REF	5	LAST	278	23,2002	3 4752 0	CAF	TWO			
0285	REF	1			23,2003	55'052 0	TS	OPTIONX +1			
0286	REF	5	LAST	273	23,2004	3 6241 0	CAF	SIX		OPTION CODE FOR V04N12	
02862	REF	2	LAST	286	23,2005	55'051 0	TS	OPTIONX			
02864	REF	1			23,2006	3 2037 1	-5	CAF	V04N1272		
02866	REF	29	LAST	285	23,2007	0 4616 1	TC	BANKCALL		R2 00001 LOCK-ON	
02868	REF	1			23,2010	20231 0	CADR	GDMARKFR			
02869	REF	9	LAST	279	23,2011	1 5472 1	TCF	ENDEXT		V34	
0287					23,2012	1 2017 1	TCF	+5		V33	
0288					23,2013	1 2006 1	TCF	-5		V32	
0289	REF	15	LAST	269	23,2014	3 4751 0	CAF	BIT3			
0290	REF	1			23,2015	0 5464 1	TC	BLANKET			
0291	REF	6	LAST	285	23,2016	0 5155 0	TC	ENDCFJOB			
0292	REF	3	LAST	286	23,2017	3 1052 1	+5	CA	OPTIONX +1		
0293	REF	23	LAST	259	23,2020	7 4752 1	MASK	BIT2			
0294	REF	69	LAST	284	23,2021	10 000 0	CCS	A			
0295	REF	1			23,2022	1 2026 0	TCF	NOLOKON			
0296	REF	2	LAST	281	23,2023	0 5504 0	TC	UPFLAG			
0297	REF	1			23,2024	00012 1	ADRES	LOKONSW			
0298	REF	1			23,2025	1 2034 0	TCF	AURLKON1			
0299	REF	11	LAST	285	23,2026	0 5516 0	NOLOKON	TC	DOWNFLAG		
02991	REF	2	LAST	286	23,2027	00012 1	ADRES	LOKONSW		IF NO LOCK-ON, SET BIT15 OF RADMODES TO	
02992	REF	3	LAST	286	23,2030	0 5504 0	TC	UPFLAG		INDICATE THAT CONTINUOUS DESIGNATION IS	
02993	REF	1			23,2031	00264 1	ADRES	CDSEFLAG		WANTED (TO BE TERMINATED BY V44.)	
0302	REF	4	LAST	286	23,2032	0 5504 0	TC	JPFLAG		SET NO RR ANGLE MONITOR FLAG.	
0303	REF	2	LAST	295	23,2033	00126 1	ADRES	NORRMON		(DISABLE R25 RR GIMBAL MONITOR IN T4RUPT	
0304					23,2034	0 0003 1	AURLKON1	RELINT			
0305	REF	3	LAST	286	23,2035	3 1113 0	CA	DESRET			
0306	REF	1			23,2036	1 4640 0	TCF	BANK JUMP			
03064					23,2037	01014 0	V04N1272	VN	412		
03065					23,2040	77757 1	-LOKONFG	OCT	-20		
03066					43,2322		BANK	43			
03067	REF	2	LAST	277	43,2000		SETLOC	EXTVERBS			
03068					43,2322		BANK				
03069	REF	2	LAST	277 TO 286:	210 210*		COUNT*	\$\$/EXTVB			
0307	REF	5	LAST	286	43,2322	0 5504 0	LRON	TC	JPFLAG	PERMIT INCORPORATION OF LR DATA	V57

L EXTENDED VERBS

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0308	REF	1		43,2323	00254 1		ADRES	LRINH		
0309	REF	10	LAST	285	43,2324	1 2121 0	TCF	GOPIN		
0310	REF	12	LAST	286	43,2325	0 5516 0	LROFF	TC	DOWNFLAG	INHIBIT INCORPORATION OF LR DATA
0311	REF	2	LAST	287	43,2326	00254 1		ADRES	LRINH	V58
0312	REF	11	LAST	287	43,2327	1 2121 0		TCF	GOPIN	

R03121 THIS EXTENDED VERB CAUSES P63 TO SWITCH INTO P64.

03122	REF	1		E7,1425			EBANK=	TENDBRAK		
03123	REF	1		43,2330	0 5321 1	P64NOW	TC	CHECKMM	ARE WE CURRENTLY IN P63?	
03124				43,2331	00077 1		DEC	63		
03125	REF	15	LAST	283	43,2332	1 2120 1	TCF	ALM/END	NO	LIGHT OPERATOR ERROR LIGHT.
03126	REF	1		43,2333	3 5016 0		CAF	EBANK7		
03127	REF	5	LAST	235	43,2334	54 003 0	TS	EBANK		
03128	REF	4	LAST	234	43,2335	3 4733 1	CAF	POSMAX		
03129	REF	2	LAST	287	43,2336	55*425 1	TS	TENDBRAK		
031295	REF	12	LAST	287	43,2337	1 2121 0	TCF	GOPIN		
031297	REF	4	LAST	277	E5,1737		EBANK=	OGC		

L EXTENDED VER8S

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P0313 IMUFINEK VERB 42 DESCRIPTION
 R0314 FINE ALIGN IMU
 R0315 1. REQUIRE EXT VER8 DISPLAY AVAILABLE AND SET BUSY FLAG OR TURN ON OPER ERROR AND GO TO PINBRNCH.
 R0317 2. DISPLAY FLASHING V25,N93....LOAD DELTA GYRD ANGLES....
 R0318 RESPONSES
 R0319 A. TERMINATE
 R0320 1. RELEASE EXT VERB DISPLAY SYSTEM.
 R0321 8. PROCEED OR ENTER
 R0322 1. RE-DISPLAY VERB 42
 R0323 2. EXECUTE IMUFINE (IMU FIVE ALIGN MODE SWITCHING).
 R0324 3. EXECUTE IMUSTALL (ALLOW FOR DATA TRANSFER)
 R0325 A. FAILED
 R0326 1. RELEASE EXT VERB DISPLAY SYSTEM.
 R0327 B. GOOD
 R0328 1. EXECUTE IMUPULSE (TORQUE IRIGS).
 R0329 2. EXECUTE IMUSTALL AND RELEASE EXT VERB DISPLAY SYSTEM.

0331	REF	3	LAST	283	43,2340	0	2405	1	IMUFINEK	TC	CKMODCAD	
0332	REF	3	LAST	284	43,2341	0	2076	1		TC	TESTXACT	FINE ALIGN WITH GYRO TORQUING.
0333	REF	1			43,2342	3	2367	1		CAF	VNLODGYR	CALL FOR LOAD OF GYRO COMMANDS
0334	REF	30	LAST	286	43,2343	0	4616	1		TC	BANKCALL	
0335	REF	3	LAST	284	43,2344	20212		1		CADR	GOXDSPF	
0336	REF	4	LAST	284	43,2345	0	5472	0		TC	TERMEXTV	
0337					43,2346	0	2347	0		TC	+1	PROCEED WITHOUT A LOAD
0338	REF	1			43,2347	3	2370	1		CAF	IMUFINEV	RE-DISPLAY OUR OWN VERB
0339	REF	31	LAST	288	43,2350	0	4616	1		TC	BANKCALL	
0340	REF	4	LAST	284	43,2351	20473		0		CADR	EXDSPRET	
0341	REF	32	LAST	288	43,2352	0	4616	1		TC	BANKCALL	CALL MODE SWITCH PROG
0342	REF	1			43,2353	17163		0		CADR	IMUFINE	
0343	REF	33	LAST	288	43,2354	0	4616	1		TC	BANKCALL	HIBERNATION
0344	REF	4	LAST	283	43,2355	17671		1		CADR	IMUSTALL	
0345	REF	3	LAST	283	43,2356	0	5472	0		TC	ENDEXTVB	
0346	REF	1			43,2357	3	2366	0	FINEK2	CAF	LGYROBIN	PINBALL LEFT COMMANDS IN OGC REGISTERS
0347	REF	34	LAST	288	43,2360	0	4616	1		TC	BANKCALL	
0348	REF	1			43,2361	17276		1		CADR	IMUPULSE	
0349	REF	35	LAST	288	43,2362	0	4616	1		TC	BANKCALL	WAIT FOR PULSES TO GET OUT.
0350	REF	5	LAST	288	43,2363	17671		1		CADR	IMUSTALL	
0351	REF	4	LAST	288	43,2364	0	5472	0		TC	ENDEXTVB	
0352	REF	5	LAST	288	43,2365	0	5472	0		TC	ENDEXTVB	
0353	REF	5	LAST	287	43,2366	02737		0	LGYROBIN	ECADR	OGC	
0354					43,2367	06335		1	VNLODGYR	VN	2593	
0355					43,2370	12400		0	IMUFINEV	VN	4200	
R0356									GCLOADLV	VERB 50	DESCRIPTION	
R0357											AND OTHER PLEASE	

L EXTENDED VERBS

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R0358 DO SOMETHING VERBS
 R0359 PLEASE PERFORM, MARK, CALIBRATE, ETC.
 R0360 1. PRESSING ENTER ON DSKY INDICATES REQUESTED ACTION HAS BEEN PERFORMED, AND THE PROGRAM DOES THE
 R0362 SAME RECALL AS A COMPLETED LOAD.
 R0363 2. THE EXECUTION OF A VERB 33 (PROCEED WITHOUT DATA) INDICATES THE REQUESTED ACTION IS NOT DESIRED.

0365 REF 1 40,2000 SBANK= PINSUPER FOR LOADLV1 AND SHOWSUM CADR'S.
 0366 REF 1 43,2371 0 4433 1 GOLOADLV TC FLASHOFF
 0367 REF 1 43,2372 3 4201 0 CAF PINSUPBT
 0368 43,2373 0 0006 1 EXTEND
 0369 REF 3 LAST 243 43,2374 01 007 1 WRITF SUPERBNK
 0370 REF 8 LAST 279 43,2375 0 4635 0 TC POSTJUMP
 0371 REF 1 43,2376 62001 1 CADR LOADLV1
 R0372 VERB 47 - AGS INITIALIZATION - R47.

R0373 SEE LOG SECTION AGS INITIALIZATION FOR OTHER PERTINENT REMARKS.

0374 REF 4 LAST 288 43,2377 0 2076 1 V47TXACT TC TESTXACT NO OTHER EXTVERB.
 0375 REF 1 43,2400 3 4740 0 CAF PRIC4
 0376 REF 4 LAST 284 43,2401 0 5105 0 TC FINDVAC
 0377 REF 14 LAST 223 E4,1604 EBANK= AGSBUFF
 0378 REF 1 43,2402 02015 1 2CADR AGSINIT
 0378 REF 1 43,2403 64064 1
 0379 REF 7 LAST 286 43,2404 0 5155 0 TC ENDOFJOB
 0380 REF 4 LAST 122 43,2405 3 1304 1 CKMODCAD CA MODECADR
 0381 43,2406 0 0006 1 EXTEND
 0382 REF 3 LAST 283 43,2407 1 6741 1 BZF TCQ
 0383 REF 16 LAST 287 43,2410 0 2120 0 TC ALM/END SOMEBODY IS USING MODECADR SO EXIT

L EXTENDED VERBS

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				ALINTIME		VERB 55		DESCRIPTION			
P0384											
R0385									REQUIRE P00 OR P00-.		
R0386									1. SET EXT VERB DISPLAY BUSY FLAG.		
R0387									2. DISPLAY FLASHING V25,N24 (LOAD DELTA TIME FOR AGC CLOCK.		
R0388									3. REQUIRE EXECUTION OF VERB 23.		
R0389									4. ADD DELTA TIME, RECEIVED FROM INPUT REGISTER, TO THE COMPUTER TIME.		
R0391									5. RELEASE EXT VERB DISPLAY SYSTEM		
0393	REF	5	LAST	289	43,2411	0 2076	1	ALINTIME	TC	TESTXACT	
03931	REF	9	LAST	289	43,2412	0 4635	0		TC	POSTJUMP	NO ROOM IN 43
03932	REF	1			43,2413	64002	1		CADR	R33	
03933					42,2002				BANK	42	
03934	REF	2	LAST	61	42,2000				SETLOC	SBAND	
03935					42,2002				BANK		
03936	REF	1							COUNT*	\$\$/R33	
03937	REF	1			42,2002	3 5021	1	R33	CAF	PRIC7	
03938	REF	1			42,2003	0 5146	1		TC	PRIOCHNG	
0394	REF	1			42,2004	3 2034	1		CAF	VNLODDT	
0395	REF	36	LAST	288	42,2005	0 4616	1		TC	BANKCALL	
0396	REF	4	LAST	288	42,2006	20212	1		CADR	GXXDSPF	
0397	REF	10	LAST	286	42,2007	0 5472	0		TC	ENDEXT	TERMINATE
0398	REF	11	LAST	290	42,2010	0 5472	0		TC	ENDEXT	PROCEED
0399	REF	1			42,2011	4 2033	1		CS	DEC23	DATA IN OR RESEQUENCE(UNLIKELY)
0400	REF	36	LAST	278	42,2012	6 0154	1		AD	MPAC	RECALL LEFT VERB IN MPAC
0401					42,2013	0 0006	1		EXTEND		
0402	REF	1			42,2014	1 2016	0		BZF	UPDATIME	GO AHEAD WITH UPDATE ONLY IF RECALL
0403	REF	12	LAST	290	42,2015	0 5472	0		TC	ENDEXT	WITH V23 (DATA IN).
0404					42,2016	0 0004	0		UPDATIME	INHINT	DELTA TIME IS IN DSPTM1, +1.
0405	REF	25	LAST	279	42,2017	3 4755	1		CAF	ZERO	
0406	REF	37	LAST	290	42,2020	54 156	1		TS	MPAC +2	NEEDED FOR TP AGREE
0407	REF	21	LAST	273	42,2021	54 001	1		TS	L	ZERO T1 + 2 WHILE ALIGNING.
0408	REF	8	LAST	269	42,2022	52 025	1		DXCH	TIME2	
0409	REF	38	LAST	290	42,2023	52 155	1		DXCH	MPAC	
0410	REF	2	LAST	118	42,2024	53'052	0		DXCH	DSPTM2 +1	INCREMENT
0411	REF	39	LAST	290	42,2025	20 155	1		DAS	MPAC	
0412	REF	1			42,2026	0 7256	1		TC	TPAGPEE	FORCE SIGN AGREEMENT.
0413	REF	40	LAST	290	42,2027	52 155	1		DXCH	MPAC	NEW CLOCK.
0414	REF	9	LAST	290	42,2030	20 025	1		DAS	TIME2	
0415					42,2031	0 0003	1		RELINT		
0416	REF	13	LAST	290	42,2032	0 5472	0		UPDTMEND	TC	ENDEXT
0417					42,2033	00027	1	DEC23	DEC	23	V 23
0418					42,2034	06230	0	VNLODDT	VN	2524	V25N24 FOR LOAD DELTA TIME

L EXTENDED VFRBS

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P0419 SFT UP FOR RADAR SAMPLING.

04191					42,2035				BANK 42
04192	RFF	3	LAST	286	43,2000				SFTLOC FXTVFRBS
04193					43,2414				BANK

0420	RFF	1			E4,1604				EBANK= RSTACK
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0421	REF	1							COUNT* \$\$/R0477
------	-----	---	--	--	--	--	--	--	-------------------

04211	REF	4	LAST	284	43,2414	0 2652	1	R77	TC RDRUSECK	TRY TO AVOID THE 1210.
042111	RFF	5	LAST	235	43,2415	3 0077	1		CA FLAGWRD3	IS R04 RUNNING?

042112	RFF	1			43,2416	7 4743	1		MASK R04FLBIT
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042113	RFF	70	LAST	286	43,2417	10 000	0		CCS A
--------	-----	----	------	-----	---------	--------	---	--	-------

042114	REF	17	LAST	289	43,2420	0 2120	0		TC ALM/END	YES.
--------	-----	----	------	-----	---------	--------	---	--	------------	------

04214	REF	6	LAST	286	43,2421	0 5504	0		TC UPFLAG
-------	-----	---	------	-----	---------	--------	---	--	-----------

04215	REF	1			43,2422	00117	0		ADRES R77FLAG
-------	-----	---	--	--	---------	-------	---	--	---------------

04216	RFF	1			43,2423	1 2430	0		TCF R04Z
-------	-----	---	--	--	---------	--------	---	--	----------

0422	RFF	5	LAST	291	43,2424	0 2652	1	R04	TC RDRUSECK	TRY TO AVOID THE 1210.
------	-----	---	------	-----	---------	--------	---	-----	-------------	------------------------

0423	REF	6	LAST	290	43,2425	0 2076	1		TC TESTXACT
------	-----	---	------	-----	---------	--------	---	--	-------------

0424	RFF	7	LAST	291	43,2426	0 5504	0		TC UPFLAG
------	-----	---	------	-----	---------	--------	---	--	-----------

0425	REF	3	LAST	244	43,2427	00063	1		ADRES R04FLAG	SET R04FLAG FOR ALARMS
------	-----	---	------	-----	---------	-------	---	--	---------------	------------------------

0426	RFF	1			43,2430	3 4741	1	R04Z	CAF EBANK4
------	-----	---	--	--	---------	--------	---	------	------------

0427	RFF	6	LAST	287	43,2431	54 003	0		TS FBANK
------	-----	---	------	-----	---------	--------	---	--	----------

0428	RFF	1			43,2432	3 2650	0		CAF ISFC+1	SAMPLE ONCE PER SECOND
------	-----	---	--	--	---------	--------	---	--	------------	------------------------

0429	RFF	1			43,2433	55'761	1		TS RSAMPDT
------	-----	---	--	--	---------	--------	---	--	------------

0430	REF	26	LAST	290	43,2434	3 4755	1		CAF ZFRO
------	-----	----	------	-----	---------	--------	---	--	----------

0431	RFF	2	LAST	135	43,2435	55'760	0		TS RTSTLOC
------	-----	---	------	-----	---------	--------	---	--	------------

0432	RFF	1			43,2436	55'762	1		TS RFAILCNT	ZFRO BAD SAMPLE COUNTER
------	-----	---	--	--	---------	--------	---	--	-------------	-------------------------

0433					43,2437	0 0004	0		INHINT
------	--	--	--	--	---------	--------	---	--	--------

0434	RFF	1			43,2440	4 2651	0		CS LRPOSCAL	INITIALIZE
------	-----	---	--	--	---------	--------	---	--	-------------	------------

0435	RFF	23	LAST	285	43,2441	7 0110	0		MASK RADMCDFS	BIT9 LR RANGE LOW SCALF =0
------	-----	----	------	-----	---------	--------	---	--	---------------	----------------------------

0436	RFF	24	LAST	291	43,2442	54 110	0		TS RADMCDFS	BIT6 LR POS 1 =0
------	-----	----	------	-----	---------	--------	---	--	-------------	------------------

0437	RFF	2	LAST	291	43,2443	3 2651	1		CAF LRPOSCAL	BIT3 RR RANGE LOW SCALF =0
------	-----	---	------	-----	---------	--------	---	--	--------------	----------------------------

0438					43,2444	0 0006	1		FXTEND
------	--	--	--	--	---------	--------	---	--	--------

0439	REF	4	LAST	234	43,2445	02 033	0		RAND CHAN33
------	-----	---	------	-----	---------	--------	---	--	-------------

0440	RFF	25	LAST	291	43,2446	26 110	0		ADS RADMCDFS
------	-----	----	------	-----	---------	--------	---	--	--------------

0441					43,2447	0 0003	1		RELINT
------	--	--	--	--	---------	--------	---	--	--------

04411	RFF	6	LAST	291	43,2450	4 0077	0		CS FLAGWRD3	CHECK R04FLAG R04 =1 R77 =0
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04412	RFF	2	LAST	291	43,2451	7 4743	1		MASK R04FLBIT
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04413	RFF	71	LAST	291	43,2452	10 000	0		CCS A
-------	-----	----	------	-----	---------	--------	---	--	-------

04414	REF	1			43,2453	1 2605	1		TCF R04K
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0442	REF	12	LAST	276	43,2454	3 4753	1		CAF ONE	INDICATES RENDEZVOUS DESIRED
------	-----	----	------	-----	---------	--------	---	--	---------	------------------------------

0443	RFF	4	LAST	286	43,2455	55'052	0		TS OPTIONX +1
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0444	RFF	16	LAST	286	43,2456	3 4751	0	R04A	CAF BIT3	OPTION CODE FOR V04N12
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04442	REF	5	LAST	291	43,2457	55'051 0	TS	OPTIONX		
04444	REF	1			43,2460	3 2645 1	CAF	V04N12X		
0445	REF	37	LAST	290	43,2461	0 4616 1	TC	BANKCALL	R2	00001 RENDEZVOUS RADAR
0446	REF	2	LAST	286	43,2462	20231 0	CADR	GOMARKFR		00002 LANDING RADAR
0447	REF	1			43,2463	1 2613 0	TCF	R04END	V34	
0448					43,2464	1 2471 0	TCF	+5	V33	
0449	REF	1			43,2465	1 2460 0	TCF	R04A +2	R2	
04491	REF	17	LAST	291	43,2466	3 4751 0	CAF	BIT3		
04492	REF	2	LAST	286	43,2467	0 5464 1	TC	BLANKET		
04493	REF	8	LAST	289	43,2470	0 5155 0	TC	ENDOFJOB		
0450	REF	6	LAST	292	43,2471	3 1052 1	CA	OPTIONX +1	SAVE DESIRED OPTION	RR =1 LR =2
0451	REF	2	LAST	135	43,2472	55'755 0	TS	RTSTDEX		
0452	REF	6	LAST	286	43,2473	3 6241 0	R04X CAF	SIX	RR OR LR DESIRED	
0453	REF	3	LAST	292	43,2474	7 1755 0	MASK	RTSTDEX		
0454	REF	72	LAST	291	43,2475	10 000 0	CCS	A		
0455	REF	1			43,2476	1 2607 0	TCF	R04L	LANDING RADAR	
0456	REF	1			43,2477	55'757 1	TS	RTSTBASE	FOR RR BASE = 0, MAX = 1	
0457	REF	24	LAST	286	43,2500	3 4752 0	R04B CAF	BIT2	IS RR AUTO MODE DISCRETE PRESENT	
0458					43,2501	0 0006 1	EXTEND			
0459	REF	5	LAST	291	43,2502	02 033 0	RAND	CHAN33		
0460					43,2503	0 0006 1	EXTEND			
0461	REF	1			43,2504	1 2515 0	BZF	R04C	YES	
0462	REF	1			43,2505	3 2647 0	CAF	201R04	REQUEST SELECTION OF RR AUTO MODE	
04621	REF	2	LAST	118	43,2506	55'045 0	TS	DSPTM1		
04622	REF	1			43,2507	3 2646 1	CAF	V50N25X		
0463	REF	38	LAST	292	43,2510	0 4616 1	TC	BANKCALL		
0464	REF	2	LAST	267	43,2511	20223 0	CADR	GOMARK4		
0465	REF	2	LAST	292	43,2512	1 2613 0	TCF	R04END	V34	
0466	REF	1			43,2513	1 2500 1	TCF	R04B	V33	
0467					43,2514	1 2505 1	TCF	-7	E	
0468	REF	30	LAST	276	43,2515	3 4736 1	R04C CAF	BIT14	ENABLE RR AUTO TRACKER	
0469					43,2516	0 0006 1	EXTEND			
0470	REF	17	LAST	235	43,2517	05 012 1	WOR	CHAN12		
0471	REF	6	LAST	286	43,2520	3 4752 0	CAF	TWO		
0472	REF	1			43,2521	55'756 0	TS	RTSTMAX	FOR SEQUENTIAL STORAGE	
0473	REF	8	LAST	268	43,2522	0 5203 0	TC	WAITLIST		
0474	REF	2	LAST	291	43,2523	02003 0	EBANK=	RSTACK		
0475	REF	1			43,2524	52104 0	2CADR	RADSAMP		
0475	REF	1			43,2525	0 0003 1	RELINT			
04761	REF	7	LAST	291	43,2526	4 0077 0	CS	FLAGWRD3	CHECK R04FLAG	R04 =1 R77 =0
04762	REF	3	LAST	291	43,2527	7 4743 1	MASK	R04FLBIT		

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04763	REF	73	LAST	292	43,2530	10 000 0		CCS	A	
04764	REF	13	LAST	287	43,2531	1 2121 0		TCF	GOPIN	R77
0477	REF	7	LAST	292	43,2532	3 6241 0		CAF	SIX	RR OR LR
0478	RFF	4	LAST	292	43,2533	7 1755 0		MASK	RTSTDEX	
0479	REF	74	LAST	293	43,2534	10 000 0		CCS	A	
0480	REF	1			43,2535	1 2552 0		TCF	R04LR	LR
0481	REF	1			43,2536	3 2641 0	R04RR	CAF	V16N72	DISPLAY RR CDU ANGLES (1/SEC)
0482	REF	39	LAST	292	43,2537	0 4616 1		TC	BANKCALL	R1 + XXX.XX DEG TRUNNION
0483	REF	5	LAST	276	43,2540	20212 1		CADR	GOMARKF	R2 + XXX.XX DEG SHAFT
0484	REF	3	LAST	292	43,2541	1 2613 0		TCF	R04END	V34 R3 BLANK
0485					43,2542	1 2544 1		TCF	+2	V33
0486	REF	1			43,2543	1 2536 1		TCF	R04RR	V32
0487	REF	1			43,2544	3 2642 0		CAF	V16N78	DISPLAY RR RANGE AND RANGE RATE (1/SEC)
0488	REF	40	LAST	293	43,2545	0 4616 1		TC	BANKCALL	R1 +- XXX.XX NM RANGE
0489	REF	6	LAST	293	43,2546	20212 1		CADR	GOMARKF	R2 +- XXXXX. FPS RANGE RATE
0490	REF	4	LAST	293	43,2547	1 2613 0		TCF	R04END	V34 R3 BLANK
0491	REF	1			43,2550	1 2566 1		TCF	R04Y	V33
0492	REF	2	LAST	293	43,2551	1 2536 1		TCF	R04RR	V32
0493	REF	1			43,2552	3 2643 1	R04LR	CAF	V16N66	DISPLAY LR RANGE AND POSITION (1/SEC)
0494	REF	41	LAST	293	43,2553	0 4616 1		TC	BANKCALL	R1 +- XXXXX. FT LR RANGE
0495	REF	7	LAST	293	43,2554	20212 1		CADR	GOMARKF	R2 + 0000X. POS. NO.
0496	REF	5	LAST	293	43,2555	1 2613 0		TCF	R04END	V34 R3 BLANK
0497					43,2556	1 2560 1		TCF	+2	V33
0498	REF	2	LAST	293	43,2557	1 2552 0		TCF	R04LR	V32
0499	REF	1			43,2560	3 2644 0		CAF	V16N67	DISPLAY LR VELX, VELY, VELZ (1/SEC)
0500	REF	42	LAST	293	43,2561	0 4616 1		TC	BANKCALL	R1 +- XXXXX. FPS LR V(X)
0501	REF	8	LAST	293	43,2562	20212 1		CADR	GOMARKF	R2 +- XXXXX. FPS LR V(Y)
0502	REF	6	LAST	293	43,2563	1 2613 0		TCF	R04END	V34 R3 +- XXXXX. FPS LR V(Z)
0503	REF	2	LAST	293	43,2564	1 2566 1		TCF	R04Y	V33
0504	REF	3	LAST	293	43,2565	1 2552 0		TCF	R04LR	V32
0505	REF	27	LAST	291	43,2566	3 4755 1	R04Y	CAF	ZERO	TO TERMINATE SAMPLING
0506	REF	2	LAST	291	43,2567	55'761 1		TS	RSAMPDT	
0507	REF	1			43,2570	3 5000 1		CAF	2 SECS	WAIT FOR LAST RADARUPT
0508	REF	43	LAST	293	43,2571	0 4616 1		TC	BANKCALL	
0509	REF	4	LAST	285	43,2572	01735 1		CADR	DELAYJOB	
0510	REF	2	LAST	291	43,2573	3 2650 0		CAF	1SFC+1	SAMPLE ONCE PER SECOND
0511	REF	3	LAST	293	43,2574	55'761 1		TS	RSAMPDT	
0512	REF	28	LAST	293	43,2575	3 4755 1		CAF	ZERO	FOR STORING RESULTS
0513	REF	3	LAST	291	43,2576	55'760 0		TS	RTSTLOC	
0514	REF	8	LAST	293	43,2577	3 6241 0		CAF	SIX	
0515	REF	5	LAST	292	43,2600	7 1755 0		MASK	RTSTDEX	
0516	REF	75	LAST	292	43,2601	10 000 0		CCS	A	
0517	REF	13	LAST	291	43,2602	4 4753 0		CS	ONF	WAS LR
0518	REF	7	LAST	292	43,2603	6 4752 0		AD	TWO	WAS RR

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0519	REF	1		43,2604	1 2472 0		TCF	R04X -1	
05191	REF	1		43,2605	3 4766 1	R04K	CAF	250MS+1	SAMPLE 4 LR COMPONENTS PER SECOND.
05192	REF	4	LAST	293	43,2606	55'761 1	TS	RSAMPDT	
0520	REF	8	LAST	293	43,2607	3 4752 0	R04L	CAF	TWO
0521	REF	2	LAST	292	43,2610	55'757 1	TS	RTSTBASE	FOR LR BASE = 2, MAX = 3
0522	REF	9	LAST	293	43,2611	3 6241 0	CAF	SIX	
0523	REF	2	LAST	292	43,2612	1 2521 1	TCF	R04C +4	
0524	REF	29	LAST	293	43,2613	3 4755 1	R04END	CAF	ZERO
0525	REF	5	LAST	294	43,2614	55'761 1	TS	RSAMPDT	ZERO RSAMPDT
0526	REF	20	LAST	273	43,2615	3 4744 1	CAF	BIT8	TO TERMINATE SAMPLING
0527	REF	44	LAST	293	43,2616	0 4616 1	TC	BANKCALL	WAIT 1.28 SECONDS FOR POSSIBLE
0528	REF	5	LAST	293	43,2617	01735 1	CADR	DELAYJOB	PENDING RUPT.
0529				43,2620	0 0004 0		INHINT		
0530	REF	31	LAST	292	43,2621	4 4736 0	CS	BIT14	DISABLE RR AUTO TRACKER
0531				43,2622	0 0006 1		EXTEND		
0532	REF	18	LAST	292	43,2623	03 012 1	WAND	CHAN12	
0533	REF	13	LAST	287	43,2624	0 5516 0	TC	DOWNFLAG	
0534	REF	4	LAST	291	43,2625	00063 1	ADRES	R04FLAG	SIGNAL END OF R04.
0535	REF	14	LAST	290	43,2626	0 5472 0	TC	ENDEXT	
05351	REF	2	LAST	291	43,2627	3 4741 1	R77END	CAF	EBANK4
05352	REF	7	LAST	291	43,2630	54 003 0	TS	EBANK	TO TERMINATE SAMPLING
05353	REF	30	LAST	294	43,2631	3 4755 1	CAF	ZERO	
05354	REF	6	LAST	294	43,2632	55'761 1	TS	RSAMPDT	
05355	REF	31	LAST	276	43,2633	3 4746 0	CAF	BIT6	WAIT 320 MS FOR POSSIBLE
05356	REF	45	LAST	294	43,2634	0 4616 1	TC	BANKCALL	PENDING RUPT.
05357	REF	6	LAST	294	43,2635	01735 1	CADR	DELAYJOB	
05358	REF	14	LAST	294	43,2636	0 5516 0	TC	DOWNFLAG	
053591	REF	2	LAST	291	43,2637	00117 0	ADRES	R77FLAG	
053592	REF	14	LAST	293	43,2640	1 2121 0	TCF	GOPIN	
0536				43,2641	04110 0	V16N72	VN	1672	
0537				43,2642	04116 0	V16N78	VN	1678	
0538				43,2643	04102 0	V16N66	VN	1666	
0539				43,2644	04103 1	V16N67	VN	1667	
05395				43,2645	01014 0	V04N12X	VN	412	
05396				43,2646	14431 1	V50N25X	VN	5025	
0540				43,2647	00201 1	201R04	OCT	00201	
0541				43,2650	00145 1	1SEC+1	DEC	101	
0542	REF	1		4766		250MS+1	EQUALS	CALLCODE	
0543				43,2651	00444 0	LRPOSCAL	OCT	444	

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054301	RFF	8	LAST	292	43,2652	4 0077 0	RDRUSECK	CS	FLAGWRD3	IS R29 ON?
054302	RFF	2	LAST	235	43,2653	7 4741 0		MASK	NR29FBIT	
054303	RFF	76	LAST	293	43,2654	10 000 0		CCS	A	
054304	REF	18	LAST	291	43,2655	0 2120 0		TC	ALM/END	YES
054305	REF	8	LAST	235	43,2656	3 0101 1		CA	FLAGWRD5	IS R77 RUNNING?
054306	REF	1			43,2657	7 4741 0		MASK	R77FLBIT	
054307	RFF	77	LAST	295	43,2660	10 000 0		CCS	A	
054308	RFF	19	LAST	295	43,2661	0 2120 0		TC	ALM/END	YES.
05431	RFF	3	LAST	243	43,2662	4 0103 1		CS	FLAGWRD7	IS SERVICER RUNNING AND HENCE POSSIBLY
054315	REF	2	LAST	243	43,2663	7 4746 1		MASK	V37FLBIT	R12 USING THE LR?
05432	RFF	78	LAST	295	43,2664	10 000 0		CCS	A	
054325	REF	1			43,2665	1 2672 1		TCF	CHECKRR	NO
05433	REF	2	LAST	244	43,2666	4 0107 0		CS	FLGWRD11	YES, IS R12 DN?
054335	REF	2	LAST	244	43,2667	7 4735 0		MASK	LRBYBIT	
05434	RFF	79	LAST	295	43,2670	10 000 0		CCS	A	
054345	REF	20	LAST	295	43,2671	0 2120 0		TC	ALM/END	YES
05435	RFF	7	LAST	246	43,2672	4 0075 1	CHECKRR	CS	FLAGWRD1	IS THE TRACK FLAG SET AND HENCE POSSIBLY
054355	RFF	1			43,2673	7 4747 0		MASK	TRACKBIT	P20 USING THE RR?
05436	REF	80	LAST	295	43,2674	10 000 0		CCS	A	
054365	REF	1			43,2675	1 2702 1		TCF	CHECKP22	NO, CHECK FOR P22.
054366	RFF	17	LAST	284	43,2676	3 0074 1	CKRNDBIT	CA	FLAGWRD0	YES, BUT IS IT P25?
054367	REF	4	LAST	284	43,2677	7 4745 1		MASK	RNDVZBIT	
054368	REF	81	LAST	295	43,2700	10 000 0		CCS	A	
054369	REF	21	LAST	295	43,2701	0 2120 0		TC	ALM/END	
054372	REF	7	LAST	279	43,2702	4 1011 1	CHECKP22	CS	MODREG	
054373	RFF	1			43,2703	6 2707 0		AD	DEC22	
054374					43,2704	0 0006 1		FXTEND		
054375	REF	22	LAST	295	43,2705	1 2120 1		BZF	ALM/END	
054376	REF	24	LAST	278	43,2706	0 0002 0		TC	Q	
054377					43,2707	00026 0	DEC22	DEC	22	
0544	REF	3	LAST	286 TD	290:	58 268*		COUNT*	\$/FXTVB	
0545	REF	1			43,2710	0 2123 0	VB64	TC	CHKPOOH	DEMAND PROGRAM 00.
0546	REF	7	LAST	291	43,2711	0 2076 1		TC	TESTXACT	IF DISPLAY SYS. NOT BUSY,MAKE IT BUSY.
0547	REF	2	LAST	289	43,2712	3 4740 0		CAF	PRIC4	
0548	REF	5	LAST	289	43,2713	0 5105 0		TC	FINDVAC	
0549	REF	3	LAST	134	E4,1604			EBANK=	ALPHASB	
0550	REF	1			43,2714	03602 0		2CADR	SBANDANT	CALC.,DISPLAY S-BAND ANTENNA ANGLES.
0550	REF	1			43,2715	64104 0				
0551	REF	9	LAST	292	43,2716	0 5155 0		TC	ENDOFJOB	

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0559	REF	2	LAST	295	43,2717	0	2123	0	IMUATCK	TC	CHKPOOH	VB 76 -	LOAD IMU ATT.	ERROR METERS
0560	REF	3	LAST	195	43,2720	3	4763	1	CAF	BITS4&5		SEE IF COARSE ALIGN	ENABLE AND ZERO IMU	
0561					43,2721	0	0006	1	EXTEND			COUS BITS ARE ON		
0562	REF	19	LAST	294	43,2722	02	012	0	RAND	CHAN12				
0563	REF	82	LAST	295	43,2723	10	000	0	CCS	A				
0564	REF	23	LAST	295	43,2724	1	2120	1	TCF	ALM/END		NOT ALLOWED IF IMU COARSE OR IMU ZERO ON		
0565	REF	1			43,2725	3	4355	0	CAF	BIT13-14		BOTH BITS 13 AND 14 MUST BE 1		
0566					43,2726	0	0006	1	EXTEND			INDICATING THE MODE SELECTED IS OFF.		
0567	REF	1			43,2727	06	031	0	RXOR	CHAN31				
0568	REF	2	LAST	296	43,2730	7	4355	1	MASK	BIT13-14				
0569					43,2731	0	0006	1	EXTEND					
0570					43,2732	1	2734	1	BZF	+2		NEEDLES IS OFF.		
0571	REF	24	LAST	296	43,2733	1	2120	1	TCF	ALM/END		EXIT. NEEDLES IS ON.		
0572	REF	8	LAST	295	43,2734	0	2076	1	TC	TESTXACT				
0573	REF	2	LAST	283	43,2735	3	2225	0	CAF	VNLODCDU				
0574	REF	46	LAST	294	43,2736	0	4616	1	TC	BANKCALL				
0575	REF	5	LAST	290	43,2737		20212	1	CADR	GOXDSPF				
0576	REF	15	LAST	294	43,2740	0	5472	0	TC	ENDEXT		V34		
0577					43,2741	0	2742	1	TC	+1				
0578	REF	1			43,2742	3	2755	1	CAF	V43K		REDISPLAY OUR VERB.		
0579	REF	47	LAST	296	43,2743	0	4616	1	TC	BANKCALL				
0580	REF	5	LAST	288	43,2744		20473	0	CADR	EXDSPRET				
0581	REF	32	LAST	294	43,2745	3	4746	0	CAF	BIT6				
0582					43,2746	0	0006	1	EXTEND					
0583	REF	20	LAST	296	43,2747	05	012	1	WOR	CHAN12		ENABLE ERROR COUNTERS.		
0584	REF	9	LAST	294	43,2750	3	4752	0	CAF	TWO				
0585	REF	9	LAST	292	43,2751	0	5203	0	TC	WAITLIST		PUT OUT COMMANDS IN .32 SECONDS.		
0586	REF	4	LAST	115	0321				EBANK=	THETAD				
0587	REF	1			43,2752		02035	0	2CADR	ATTCK2				
0587	REF	1			43,2753		64100	1						
0588	REF	16	LAST	296	43,2754	1	5472	1	TCF	ENDEXT				
0589					42,2035				BANK	42				
0590	REF	1			42,2000				SETLOC	PINBALL3		SOMETHING IN B42.		
0591					42,2035				BANK					
0592	REF	1							COUNT*	\$\$/EXTVB				

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0593 REE 10 LAST 296 42,2035 3 4752 0 ATTCK2 CAF TWO PUT OUT COMMANDS.
0594 REF 25 LAST 295 42,2036 54 002 1 +1 TS Q CDU WILL LIMIT EXCESS DATA.
0595 REF 83 LAST 296 42,2037 50 000 1 INDEX A
0596 REF 5 LAST 296 42,2040 3 0321 1 CA THETAD
0597 42,2041 0 0006 1 EXTEND
0598 REF 1 42,2042 7 2053 1 MP ATTSCALE
0599 REF 26 LAST 297 42,2043 50 002 0 INDEX Q
0600 REF 2 LAST 189 42,2044 56 050 1 XCH CDUXCMD
0601 REE 27 LAST 297 42,2045 10 002 1 CCS Q
0602 REF 2 LAST 296 42,2046 1 2036 1 TCE ATTCK2 +1

0603 REF 1 42,2047 3 7737 0 CAF 13,14,15
0604 42,2050 0 0006 1 EXTEND
0605 REF 6 LAST 235 42,2051 05 014 1 WOR CHAN14
0606 REF 4 LAST 254 42,2052 1 5261 0 TCF TASKOVER LEAVE ERROR COUNTERS ENABLED.

06061 42,2053 03146 1 ATTSCALE DEC 0.1

0607 07,2667 BANK 7
0608 REF 4 LAST 291 43,2000 SETLOC EXTVERBS
0609 43,2755 BANK

0610 REF 4 LAST 295 TO 296: 37 305* COUNT* $$/EXTVB

0611 43,2755 12600 1 V43K VN 4300
R0613 V82PERF VERB 82 DESCRIPTION
R0614 REQUEST ORBIT PARAMETERS DISPLAY (R30)
R0615 1. IF AVERAGE G IS DEF:
R0616 FLASH DISPLAY V04N06. R2 INDICATES WHICH SHIP'S STATE VECTOR IS
R0617 TO BE UPDATED. INITIAL CHOICE IS THIS SHIP (R2=1). ASTRONAUT
R0618 CAN CHANGE TO OTHER SHIP BY V22EXF, WHERE X NOT EQ 1.
R0619 SELECTED STATE VECTOR UPDATED BY THISPREC (OTHPREC).
R0620 CALLS SR30.1 (WHICH CALLS TEECONMU + TFERP/RA) TO CALCULATE
R0621 RPER (PERIGEE RADIUS), RAPO (APOGEE RADIUS), HPER (PERIGEE
R0622 HEIGHT ABOVE LAUNCH PAD OR LUNAR LANDING SITE), HAPO (APOGEE
R0623 HEIGHT AS ABOVE), TPER (TIME TO PERIGEE), TEF (TIME TO
R0624 INTERSECT 300 KFT ABOVE PAD OR 35KFT ABOVE LANDING SITE).
R0625 FLASH MONITOR V16N44 (HAPO, HPER, TFE).TFE IS -59M59S IF IT WAS
R0626 NOT COMPUTABLE, OTHERWISE IT INCREMENTS ONCE PER SECOND.
R0627 ASTRONAUT HAS OPTION TO MONITOR TPER BY KEYING IN N 32 E.
R0628 DISPLAY IS IN HMS, IS NEGATIVE (AS WAS TFE), AND INCREMENTS
R0629 ONCE PER SECOND ONLY IF TFE DISPLAY WAS -59M59S.

R0630 2. IF AVERAGE G IS ON:
R0631 CALLS SR30.1 APPROX EVERY TWO SECS. STATE VECTOR IS ALWAYS
R0632 FOR THIS VEHICLE. V82 DOES NOT DISTURB STATE VECTOR. RESULTS
R0633 OF SR30.1 ARE RAPO, RPER, HAPO, HPER, TPER, TFE.
R0634 FLASH MONITOR V16N44 (HAPO, HPER, TFE).
R0635 IF MODE IS P11, THEN CALL DELRSPL SO ASTRONAUT CAN MONITOR
R0636 RESULTS BY N50E. SPLASH COMPUTATION DONE ONCE PER TWO SECS.

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0637	REF	9	LAST	296	43,2756	0 2076 1	V82PERF	TC	TESTXACT	
0638	REF	2	LAST	290	43,2757	3 5021 1		CAF	PRI07	LESS THAN LAMBERT. R30,VB2
0639	REF	2	LAST	290	43,2760	0 5146 1		TC	PRI0CHNG	
0640					43,2761	0 0006 1		EXTEND		
0641	REF	1			43,2762	3 2765 1		DCA	VB2CON	
0642	REF	1			43,2763	0 5165 0		TC	SUPDXCHZ	V82CALL IN DIFF SUPERBANK FROM V82PERF
0643	REF	2	LAST	133	E4,1722			EBANK=	HAP0	
0644	REF	1			43,2764	03242 0	VB2CON	2CADR	VB2CALL	
0644	REF	1			43,2765	44104 1				

R0645 VB83PERF VERB B3 DESCRIPTION
 R0646 REQUEST RENDEZVOUS PARAMETER DISPLAY (R311)
 R0647 1. SET EXT VERB DISPLAY BUSY FLAG.
 R0648 2. SCHEDULE R31CALL WITH PRIORITY 5.
 R0649 A. DISPLAY
 R0650 R1 RANGE
 R0651 R2 RANGE RATE
 R0652 R3 THETA

0653	REF	10	LAST	298	43,2766	0 2076 1	V83PERF	TC	TESTXACT
0654	REF	25	LAST	292	43,2767	3 4752 0		CAF	BIT2
0655	REF	10	LAST	296	43,2770	0 5203 0		TC	WAITLIST
0656	REF	1			E7,1607			EBANK=	TSTRT
0657	REF	1			43,2771	03113 1		2CADR	R31CALL
0657	REF	1			43,2772	76067 1			
0658	REF	10	LAST	295	43,2773	0 5155 0		TC	ENDOFJOB

R0659 VERB 89 DESCRIPTION RENDEZVOUS FINAL ATTITUDE ROUTINE (R63)

R0660 CALLED BY VERB 89 ENTER DURING P00. PRI0 10 USED. CALCULATES AND
 R0661 DISPLAYS FINAL F0A1 BALL ANGLES TO POINT LM +X OR +Z AXIS AT CSM.

R0662 1. KEY IN V 89 E ONLY IF IN PROG 00. IF NOT IN P00, OPERATOR ERROR AND
 R0663 EXIT R63, OTHERWISE CONTINUE.

R0664 2. IF IN P00, DO IMU STATUS CHECK ROUTINE (R02BOTH). IF IMU ON AND ITS
 R0665 ORIENTATION KNOWN TO LGC, CONTINUE.

R0666 3. FLASH DISPLAY V 04 N 06. R2 INDICATES WHICH SPACECRAFT AXIS IS TO
 R0667 BE POINTED AT CSM. INITIAL CHOICE IS PREFERRED (+Z) AXIS (R2=1).
 R0668 ASTRONAUT CAN CHANGE TO (+X) AXIS (R2 NOT = 1) BY V 22 E 2 E. CONTINUE
 R0669 AFTER KEYING IN PROCEED.

R0670 4. BOTH VEHICLE STATE VECTORS UPDATED BY CONIC EQS.

R0671 5. HALF MAGNITUDE UNIT LOS VECTOR (IN STABLE MEMBER COORDINATES) AND

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R0672 HALF MAGNITUDE UNIT SPACECRAFT AXIS VECTOR (IN BODY COORDINATES)
 R0673 PREPARED FOR VECPOINT.

R0674 6. GIMBAL ANGLES FROM VECPOINT TRANSFORMED INTO F0A1 BALL ANGLES BY
 R0675 BALLANGS. FLASH DISPLAY V 06 N 18 AND AWAIT RESPONSE.

R0676 7. RECYCLE - RETURN TO STEP 4.
 R0677 TERMINATE - EXIT R63.
 R0678 PROCEED - RESET 3AXISFLG AND CALL R60LEM FOR ATTITUDE MANEUVER.

0679	REF	3	LAST	296	43,2774	0 2123 0	V89PERF	TC	CHKPOOH
0680	REF	11	LAST	298	43,2775	0 2076 1		TC	TESTXACT
0681	REF	1			43,2776	3 4737 0		CAF	PRI010
0682	REF	6	LAST	295	43,2777	0 5105 0		TC	FINDVAC
0683	REF	3	LAST	134	E4,1612			EBANK=	RONE
0684	REF	1			43,3000	02000 0		2CADR	V89CALL
0684	REF	1			43,3001	54104 0			
0685	REF	11	LAST	298	43,3002	0 5155 0		TC	ENDOFJOB

R0686 V90PERF VERB 90 DESCRIPTION
 R0687 REQUEST RENDEZVOUS OUT-OF-PLANE DISPLAY (R36)
 R0688 1. SET EXT VERB DISPLAY BUSY FLAG.
 R0689 2. SCHEDULE R36 CALL WITH PRIORITY 10
 R0690 A. DISPLAY
 R0691 TIME OF EVENT - HOURS , MINUTES , SECONDS
 R0692 Y OUT-OF-PLANE POSITION - NAUTICAL MILES
 R0693 YDOT OUT-OF-PLANE VELOCITY - FEET/SECOND
 R0694 PSI ANGLE BTW LINE OF SIGHT AND FORWARD
 R0695 DIRECTION VECTOR IN HORIZONTAL PLANE - DEGREES

0696	REF	12	LAST	299	43,3003	0 2076 1	V90PERF	TC	TESTXACT	
0697	REF	3	LAST	298	43,3004	3 5021 1		CAF	PRI07	R36,V90
0698	REF	7	LAST	299	43,3005	0 5105 0		TC	FINDVAC	
0699	REF	2	LAST	134	E4,1612			EBANK=	RPASS36	
0700	REF	1			43,3006	02613 1		2CADR	R36	
0700	REF	1			43,3007	10104 0				
0701	REF	12	LAST	299	43,3010	1 5155 1		TCF	ENDOFJOB	

R0702 MINIMP VERB 76 DESCRIPTION
 R0703 MINIMUM IMPULSE MODE
 R0704 1. SET MINIMUM IMPULSE RHC MODE FLAG TO 1.

0705					43,3011	0 0004 0	MINIMP	INHINT		
0706	REF	4	LAST	234	43,3012	4 0111 1		CS	DAPBCOLS	
0707	REF	1			43,3013	7 4735 0		MASK	PULSES	PULSES = 1 INDICATES MIN IMP MODE
0708	REF	5	LAST	299	43,3014	26 111 1		ADS	DAPBCOLS	
0709	REF	15	LAST	294	43,3015	1 2121 0		TCF	GOPIN	RETURN VIA PINBRNCH

R0710 NCMINIMP VERB 77 DESCRIPTION
 R0711 RATE COMMAND MODE

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R0712 1. SET MINIMUM IMPULSE RHC MODE FLAG TO 0. (ZERO INDICATES NOT MINIMUM IMPULSE MODE.).
R0714 2. MOVE CDUX,CDUY,CDUZ INTO CDUXD,CDUYD,CDUZD.

0718					43,3016	0 0004 0	NOMINIMP	INHINT		
0719	REF	2	LAST	299	43,3017	4 4735 0	CS	PULSES		
0720	REF	6	LAST	299	43,3020	7 0111 1	MASK	DAPBOOLS		
0721	REF	7	LAST	300	43,3021	54 111 1	TS	DAPBOOLS	PULSES = 0 NOT IN MINIMUM IMPULSE MODE	
0722	REF	11	LAST	260	43,3022	0 4674 0	TC	IBNKCALL		
0723	REF	1			43,3023	40153 1	CADR	ZATTEROP		
0724	REF	16	LAST	299	43,3024	0 2121 1	TC	GOPIN		

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R0738 CREWMANU VERB 49 DESCRIPTION
 R0739 START AUTOMATIC ATTITUDE MANEUVER
 R0740 1. REQUIRE PROGRAM 00 ACTIVE.
 R0741 2. SET EXT VERB DISPLAY BUSY FLAG.
 R0742 3. SCHEDULE R62DISP WITH PRIORITY 10.
 R0743 4. RELEASE EXT VERB DISPLAY.

R0744 R62DISP
 R0745 1. DISPLAY FLASHING V06,N22.
 R0746 RESPONSES
 R0747 A. TERMINATE
 R0748 1. GO TO GOTOP00H.
 R0749 B. PROCEED
 R0750 1. SET 3AXISFLG TO INDICATE MANEUVER IS SPECIFIED BY 3 AXIS.
 R0752 2. EXECUTE R60LEM (ATTITUDE MANEUVER).
 R0753 C. ENTER
 R0754 1. REPEAT FLASHING V06,N22.

0755	REF	4	LAST	299	43,3025	0 2123 0	CREWMANU TC	CHKPOOH	DEMAND POO
0756	REF	13	LAST	299	43,3026	0 2076 1	TC	TESTXACT	
0757	REF	2	LAST	299	43,3027	3 4737 0	CAF	PRIQ10	
0758	REF	8	LAST	299	43,3030	0 5105 0	TC	FINDVAC	
0759	REF	2	LAST	150	E6,1674		EBANK=	RCDU	
0760	REF	1			43,3031	02065 0	2CADR	R62DISP	
0760	REF	1			43,3032	46106 1			
0761	REF	13	LAST	299	43,3033	0 5155 0	TC	ENDOFJOB	

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P0762 TRMTRACK VERB 56 DESCRIPTION
 R0763 TERMINATE TRACKING (P20 AND P25).
 R0764 1. KNOCK DOWN RENDEZVOUS, TRACK, AND UPDATE FLAGS.
 R0765 2. REQUIRE P20 OR P25 NOT RUNNING ALONE OR GO TO GOTOPOOH (REQUEST PROGRAM 00).
 R0767 3. SCHEDULE V56TOVAC WITH PRIORITY 30.

R0768 V56TOVAC
 R0769 1. EXECUTE INSTALL (IF INTEGRATION IS RUNNING, STALL UNTIL IT IS FINISHED.).
 R0771 2. ZERO GROUP 2 TO HALT P20.
 R0772 3. TRANSFER CONTROL TO GOPROG2 (SOFTWARE RESTART).

0773 REF 1 43,3034 3 3052 0 TRMTRACK CA BITS9+7 IS REND OR P25 FLAG ON
 0774 REF 1B LAST 295 43,3035 7 0074 0 MASK FLAGWRD0
 0775 43,3036 0 0006 1 EXTEND
 0776 REF 17 LAST 300 43,3037 1 2121 0 BZF GOPIN NO

0777 REF 15 LAST 294 43,3040 0 5516 0 TC DOWNFLAG
 0778 REF 1 43,3041 00010 0 ADRES RNDVZFLG

0779 REF 16 LAST 302 43,3042 0 5516 0 TC DOWNFLAG
 0780 REF 1 43,3043 00006 1 ADRES P25FLAG

0781 REF 2 LAST 295 43,3044 3 4747 1 CA TRACKBIT IS TRACK FLAG ON?
 0782 REF 8 LAST 295 43,3045 7 0075 1 MASK FLAGWRD1
 0783 43,3046 0 0006 1 EXTEND
 0784 REF 1B LAST 302 43,3047 1 2121 0 BZF GOPIN

07841 REF 10 LAST 290 43,3050 0 4635 0 TC POSTJUMP
 07842 REF 1 43,3051 64054 1 CADR TRMTRAK1

078425 43,3052 00500 1 BITS9+7 OCT 500

07843 REF 3 LAST 290 42,2000 SETLOC SBAND BANK 42
 07844 42,2054 BANK

07845 REF 2 LAST 296 TO 297: 15 15* COUNT* \$\$/EXTVB

0785 REF 17 LAST 302 42,2054 0 5516 0 TRMTRAK1 TC DOWNFLAG
 0786 REF 1 42,2055 00027 1 ADRES UPDATFLG UPDATE FLAG DOWN
 0787 REF 1B LAST 302 42,2056 0 5516 0 TC DOWNFLAG
 0788 REF 1 42,2057 00031 0 ADRES TRACKFLG TRACK FLAG DOWN
 0789 REF 19 LAST 302 42,2060 0 5516 0 TC DOWNFLAG
 0790 REF 2 LAST 246 42,2061 00007 0 ADRES IMUSE

0791 REF 6 LAST 267 42,2062 0 6036 1 TC INTPRET
 0792 42,2063 77624 1 CALL
 0793 REF 3 LAST 251 42,2064 27412 0 INTSTALL DONT INTERRUPT INTEGRATION
 0794 42,2065 77776 1 EXIT

0795 REF 2 LAST 243 42,2066 0 5353 1 TC PHASCHNG

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0796					42,2067	00002 0	OCT	2	KILL GROUP 2 TO HALT P20 ACTIVITY
0797					42,2070	0 0004 0	INHINT		
0798	REF	12	LAST	300	42,2071	0 4674 0	TC	IBNKCALL	ZERO THE COMMANDED RATES TO STOP
0799	REF	1			42,2072	40165 1	CADR	STOPRATE	MANEUVER
0800	REF	13	LAST	303	42,2073	0 4674 0	TC	IBNKCALL	
0801	REF	1			42,2074	40123 0	CADR	RESTORDB	
0802	REF	4	LAST	285	42,2075	0 6011 1	TC	CLRADMOD	CLEAR BITS 10 + 15 OF RADMODES.
0804	REF	32	LAST	294	42,2076	4 4736 0	CS	BIT14	DISABLE LOCKON
0805					42,2077	0 0006 1	EXTEND		
0806	REF	21	LAST	296	42,2100	03 012 1	WAND	CHAN12	
0807	REF	11	LAST	302	42,2101	0 4635 0	TC	POSTJUMP	
0808	REF	2	LAST	245	42,2102	12771 0	CADR	GOPROG2	CAUSE RESTART.

R0810 DNEDUMP VERB 74 DESCRIPTION
 R0811 INITIALIZE DOWN-TELEMETRY PROGRAM FOR ERASABLE MEMORY DUMP.
 R0812 1. SET EXT VERB DISPLAY BUSY FLAG.
 R0813 2. REPLACE CURRENT DOWNLIST WITH ERASABLE MEMORY.
 R0814 3. RELEASE EXT VERB DISPLAY.

08145	REF	5	LAST	297	43,2000		SETLOC	EXTVERBS	
08146					43,3053		BANK		
08147	REF	5	LAST	297 TO 302:	62	367*	COUNT*	\$/EXTVB	
0815					0400		EBANK=	400	
0816	REF	1			43,3053	3 3056 1	DNEDUMP	CAF	LDNDUMPI
0817	REF	3	LAST	234	43,3054	54 335 0	TS	DNMTGOTO	
0818	REF	19	LAST	302	43,3055	0 2121 1	TC	GOPIN	
0819	REF	2	LAST	277	43,3053		V74	EQUALS	DNEDUMP
0820	REF	1			43,3056	03631 0	LDNDUMPI	REMADR	DNDUMPI

R0821 LEMVEC VERB 80 DESCRIPTION
 R0822 UPDATE LEM STATE VECTOR
 R0823 RESET VEHUPFLG TO 0

0825	REF	20	LAST	302	43,3057	0 5516 0	LEMVEC	TC	DOWNFLAG	
0826	REF	1			43,3060	00026 0	ADRES	VEHUPFLG	VB 80 - VEHUPFLG DOWN INDICATES LEM	
0827	REF	1			43,3061	0 3064 0	TC	NOUPDOWN		
R0828					CSMVEC	VERB 81	DESCRIPTION			
R0829					UPDATE	CSM STATE VECTOR				
R0830					SET	VEHUPFLG TO 1				
0832	REF	8	LAST	291	43,3062	0 5504 0	CSMVEC	TC	UPFLAG	

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0833	REF	2	LAST	303	43,3063	00026 0	ADRES	VEHUPFLG	VB 81 - VEHUPFLG UP INDICATES CSM
0834	REF	21	LAST	303	43,3064	0 5516 0	NOUPDOWN	TC	DOWNFLAG
0835	REF	1			43,3065	00030 1	ADRES	NOUPFLAG	
0836	REF	20	LAST	303	43,3066	1 2121 0	TCF	GOPIN	
R0842					UPDATOFF	VERB95		DESCRIPTION	
R0843					INHIBIT	STATE VECTOR	UPDATES BY	INCRP	
R0844					SET	NOUPFLAG	TO	1	
0845	REF	9	LAST	303	43,3067	0 5504 0	UPDATOFF	TC	UPFLAG
0846	REF	2	LAST	304	43,3070	00030 1	ADRES	NOUPFLAG	VB 95 SET NOUPFLAG
0847	REF	21	LAST	304	43,3071	0 2121 1	TC	GOPIN	

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PO848 SYSTEST VERB 92 DESCRIPTION

RO849 OPERATE IMU PERFORMANCE TEST.

RO850 1. REQUIRE PROGRAM 00 OR TURN ON OPERATOR ERROR.

RO851 2. SET EXT VERB BUSY FLAG.

0852 REF 2 LAST 142 E5,1417 EBANK= QPLACE

0853 REF 5 LAST 301 43,3072 0 2123 0 SYSTEST TC CHKPOOH DEMAND POO

0854 REF 14 LAST 301 43,3073 0 2076 1 TC TESTXACT

0855 REF 1 43,3074 3 7707 0 CAF PRI022

0856 REF 9 LAST 301 43,3075 0 5105 0 TC FINDVAC

0857 REF 3 LAST 305 E5,1417 EBANK= QPLACE

0858 REF 1 37,2000 SBANK= IMUSUPER

0859 REF 1 43,3076 02002 1 2CADR REDO

0859 REF 1 43,3077 76065 0

0860 REF 14 LAST 301 43,3100 0 5155 0 TC ENDOFJOB

RO861 VERB 93 CLEAR RENDWFLG, CAUSES W-MATRIX TO BE RE-INITIALIZED.

0862 43,3101 0 0004 0 WMATRXNG INHINT

0863 REF 1 43,3102 4 4753 0 CS RENDWBIT

0864 REF 9 LAST 295 43,3103 7 0101 0 MASK FLAGWRD5

0865 REF 10 LAST 305 43,3104 54 101 0 TS FLAGWRD5

0866 REF 22 LAST 304 43,3105 0 2121 1 TC GOPIN

0867 REF 1 43,3106 GOSHSUM EQUALS SHOWSUM

0868 REF 6 LAST 305 43,3106 0 2123 0 SHOWSUM TC CHKPOOH *

0869 REF 15 LAST 305 43,3107 0 2076 1 TC TESTXACT *

0870 REF 4 LAST 299 43,3110 3 5021 1 CAF PRI07 ALLOW OTHER CHARINS.

0871 REF 3 LAST 298 43,3111 0 5146 1 TC PRI0CHNG

0872 REF 1 43,3112 3 4753 1 CAF S+1 *

0873 REF 2 LAST 124 43,3113 55'376 0 TS SKEEP6 * SHOWSUM OPTION

0874 REF 1 43,3114 3 4755 1 CAF S+ZERO *

0875 REF 3 LAST 227 43,3115 55'362 0 TS SMODE * TURN OFF SELF-CHECK

0876 REF 1 43,3116 3 3253 0 CA SELFADRS *

0877 REF 3 LAST 237 43,3117 55'361 0 TS SELFRET *

0878 REF 1 43,3120 0 3530 1 TC STSHOSUM * ENTER ROPECHK

0879 REF 2 LAST 124 43,3121 23'372 0 SDISPLAY LXCH SKEEP2 *

0880 REF 2 LAST 124 43,3122 23'373 1 LXCH SKFEP3 * BUGGER WORD FOR DISPLAY

0881 REF 1 43,3123 3 3252 1 NOKILL CA ADPS1 *

0882 REF 41 LAST 290 43,3124 54 156 1 TS MPAC +2 *

0883 REF 1 43,3125 3 3136 0 CA VNCON * 0501

0884 REF 48 LAST 296 43,3126 0 4616 1 TC BANKCALL *

0885 REF 6 LAST 296 43,3127 20212 1 CADR GOXDSPF *

0886 43,3130 0 3133 0 TC +3 *

0887 REF 1 43,3131 0 3641 1 TC NXTRNK *

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0888	REF	1		43,3132	0 3123 1		TC	NOKILL	*
0889	REF	2	LAST 305	43,3133	3 3253 0		CA	SELFADRS	
0890	REF	2	LAST 124	43,3134	55 371 1		TS	SKEEP1	
0891	REF	17	LAST 296	43,3135	0 5472 0		TC	ENDEXT	*
0892				43,3136	01201 0	VNCON	VN	501	*
0893	REF	3	LAST 305	43,3137	3 1376 1	ENDSUMS	CA	SKEEP6	*
0894				43,3140	0 0006 1		EXTEND		*
0895	REF	2	LAST 237	43,3141	1 3344 0		BZF	SELFCHK	* ROPECHK, START SELFCHK AGAIN.
0896	REF	2	LAST 305	43,3142	0 3530 1		TC	STSHOSUM	* START SHOWSUM AGAIN.

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POB97	REF	16	LAST	305	43,3143	0 2076 1	DAPDISP	TC	TESTXACT	
RO898	REF	5	LAST	305	43,3144	3 5021 1		CAF	PRI07	R03
RO899	REF	4	LAST	305	43,3145	0 5146 1		TC	PRI0CHNG	
RO900	REF	12	LAST	303	43,3146	0 4635 0		TC	POSTJUMP	
RO901	REF	1			43,3147	40004 1		CADR	DAPDATA1	
0902	REF	1			34,2000			BANK	34	
0903	REF	1			20,2000			SETLOC	LOADDAP	
0904	REF	1			20,2004			BANK		
0910	REF	1						COUNT*	\$/R03	
0911	REF	2	LAST	225	30,2000			SBANK=	LOWSUPER	FOR SUBSEQUENT LOW 2CADR'S.
0912	REF	1			20,2004	3 2114 1	DAPDATA1	CAF	BOOLSMSK	SET DISPLAY ACCORDING TO DAPBOOLS BITS.
0913	REF	8	LAST	300	20,2005	7 0111 1		MASK	DAPBOOLS	LM
0914	REF	1			20,2006	55'343 0		TS	DAPDATR1	LM
0927	REF	6	LAST	231	20,2007	4 0106 1		CS	FLGWPDI0	SET BIT 14 TO BE COMPLEMENT OF APSFLAG.
0928	REF	2	LAST	228	20,2010	7 4737 1		MASK	APSFEBIT	
0929	REF	84	LAST	297	20,2011	10 000 0		CCS	A	
0930	REF	33	LAST	303	20,2012	3 4736 1		CAF	BIT14	
0931	REF	2	LAST	307	20,2013	27'343 0		ADS	DAPDATR1	
0932	REF	3	LAST	307	20,2014	31'343 1	CHKDATA1	CAE	DAPDATR1	IF BITS 13 AND 14 ARE BOTH ZERO, FORCE
0933	REF	3	LAST	296	20,2015	7 4355 1		MASK	BIT13-14	A ONE INTO BIT 13.
0934					20,2016	0 0006 1		EXTEND		
0935	REF	1			20,2017	1 2034 0		BZF	FORCEONE	
0936	REF	4	LAST	307	20,2020	31'343 1		CAE	DAPDATR1	ENSURE THAT NO ILLFGAL BITS SET BY CREW.
0937	REF	1			20,2021	7 2113 1	MSKDATR1	MASK	DSPLYMSK	
0938	REF	5	LAST	307	20,2022	55'343 0		TS	DAPDATR1	
0939	REF	1			20,2023	3 2112 1		CAF	VOIN46	LM
0940	REF	49	LAST	305	20,2024	0 4616 1		TC	BANKCALL	
0941	REF	1			20,2025	20231 0		CADR	GOXDSPFR	
0942	REF	18	LAST	306	20,2026	1 5472 1		TCF	ENDEXT	V34E TERMINATE
0943	REF	1			20,2027	1 2037 0		TCF	DPDAT1	V33E PROCEED
0944	REF	1			20,2030	1 2014 1		TCF	CHKDATA1	E NEW DATA CHECK AND REDISPLAY
0945	REF	1			20,2031	3 6241 0		CAF	REVCNT	BITS 2 & 3: BLANKS R2 & R3.
0946	REF	3	LAST	292	20,2032	0 5464 1		TC	BLANKET	
0947	REF	15	LAST	305	20,2033	1 5155 1		TCF	ENDOFJOB	
0948	REF	21	LAST	273	20,2034	3 4737 0	FORCEONE	CAF	BIT13	
0949	REF	6	LAST	307	20,2035	27'343 0		ADS	DAPDATPI	
0950	REF	1			20,2036	1 2021 1		TCF	MSKDATR1	
0951					20,2037	0 0004 0	DPDAT1	INHINT		INHINT FOR SETTING OF FLAG BITS AND MASS
0952	REF	3	LAST	307	20,2040	4 4737 1		CS	APSFEBIT	ON BASIS OF DISPLAYED DAPDATR1.
0953	REF	7	LAST	307	20,2041	7 0106 1		MASK	FLGWPDI0	
0954	REF	22	LAST	290	20,2042	54 001 1		TS	L	SET APSFLAG TO BE COMPLEMENT OF BIT 14.

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0955	REF	7	LAST	307	20,2043	4 1343 0	CS	DAPDATRI	
0956	REF	34	LAST	307	20,2044	7 4736 0	MASK	BIT14	
0957	REF	85	LAST	307	20,2045	10 000 0	CCS	A	
0958	REF	4	LAST	307	20,2046	3 4737 0	CAF	APSFLBIT	
0959	REF	23	LAST	307	20,2047	6 0001 0	AD	L	
0960	REF	8	LAST	307	20,2050	54 106 1	TS	FLGWRD10	
0961	REF	8	LAST	308	20,2051	4 1343 0	CS	DAPDATRI	SET BITS OF DAPBOOLS ON BASIS OF DISPLAY
0962	REF	4	LAST	307	20,2052	7 4355 1	MASK	BIT13-14	MASK OUT CSMDOCKD (BIT 13) UNLESS BOTH
0963	REF	86	LAST	308	20,2053	10 000 0	CCS	A	13 AND 14 ARE SET.
0964	REF	1			20,2054	4 4737 1	CS	CSMDCKD	
0965	REF	2	LAST	307	20,2055	6 2114 1	AD	BODLSMSK	
0966	REF	9	LAST	308	20,2056	7 1343 0	MASK	DAPDATRI	
0967	REF	24	LAST	308	20,2057	54 001 1	TS	L	
0968	REF	3	LAST	308	20,2060	4 2114 0	CS	BOOLSMSK	
0969	REF	9	LAST	307	20,2061	7 0111 1	MASK	DAPBOOLS	
0970	REF	25	LAST	308	20,2062	6 0001 0	AD	L	
0971	REF	10	LAST	308	20,2063	54 111 1	TS	DAPBOOLS	
0972	REF	2	LAST	308	20,2064	7 4737 1	MASK	CSMDCKD	LOAD MASS IN ACCORDANCE WITH CSMDOCKD.
0973	REF	87	LAST	308	20,2065	10 000 0	CCS	A	MASS IS USUALLY ALREADY OKAY, SO DO
0974	REF	1			20,2066	31'332 1	CAE	CSMMASS	NOT TOUCH ITS LOW-ORDER PART.
0975	REF	7	LAST	219	20,2067	6 1331 1	AD	LEMMASS	
0976	REF	3	LAST	121	20,2070	55'244 0	TS	MASS	
0977	REF	11	LAST	308	20,2071	30 111 0	CAE	DAPBOOLS	
0978	RFF	1			20,2072	7 4741 0	MASK	ACC4CR2X	2 OR 4 JET X-TRANSLATION
0979					20,2073	0 0006 1	EXTEND		(BIT ACC4OR2X = 1 FOR 4 JETS)
0980					20,2074	1 2101 1	BZF	+5	
0981	REF	19	LAST	232	20,2075	4 4735 0	CS	BIT15	
0982	REF	9	LAST	302	20,2076	7 0075 1	MASK	FLAGWRD1	CLEAR NJTSFLAG TO 0 FOR 4 JETS
0983	REF	10	LAST	308	20,2077	54 075 1	TS	FLAGWRD1	
0984					20,2100	1 2104 1	TCF	+4	
0985	REF	11	LAST	308	20,2101	4 0075 1	CS	FLAGWRD1	SET NJTSFLAG TO 1 FOR 2 JETS
0986	REF	20	LAST	308	20,2102	7 4735 0	MASK	BIT15	
0987	REF	12	LAST	308	20,2103	26 075 1	ADS	FLAGWRD1	
0988	REF	12	LAST	308	20,2104	3 0111 0	CA	DAPBOOLS	SELECT DESIRED KALCMANU AUTOMATIC
0989	REF	2	LAST	248	20,2105	7 6244 1	MASK	THREE	MANEUVER RATE
0990					20,2106	6 0000 1	DOUBLE		RATEINDX HAS TO BE 0,2,4,6 SINCE RATES
0991	REF	2	LAST	227	20,2107	55'325 0	TS	RATEINDX	ARE DP
0992	REF	13	LAST	307	20,2110	0 4635 0	TC	POSTJUMP	
0993	REF	1			20,2111	02203 1	CADR	STIKLOAD	
0995					20,2112	00256 0	V01N46	VN	0146
0996					20,2113	33113 1	DSPLYMSK	OCT	33113
0997					20,2114	13113 0	BOOLSMSK	OCT	13113
0998					01,2203			BANK	01
0999	REF	2	LAST	58	01,2000			SETLOC	LOADDAP1
1000					01,2203			BANK	
1001	REF	2	LAST	58 TO	58:	2	2*	COUNT*	\$\$/R03
1002	REF	3	LAST	234	01,2203	3 5015 0	STIKLOAD	CAF	EBANK6

L EXTENDED VERBS

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1003	REF	8	LAST	294	01,2204	54 003 0	TS	EBANK	
1004	RFF	2	LAST	227	E6,1442		EBANK=	STIKSENS	
1005	REF	1			01,2205	3 4745 0	CA	RHCSCALE	SET STICK SENSITIVITY TO CORRESPOND TO A
1006	REF	13	LAST	308	01,2206	7 0111 1	MASK	DAPBOOLS	MAXIMUM COMMANDED RATE (AT 42 COUNTS) OF
1007	REF	88	LAST	308	01,2207	10 000 0	CCS	A	20 D/S(NORMAL) OR 4 D/S(FINE), SCALED
1008	REF	1			01,2210	3 2334 1	CA	NORMAL	AT 45 D/S.
1009	RFF	1			01,2211	6 2335 0	AD	FINE	
1010	REF	3	LAST	309	01,2212	55'442 0	TS	STIKSENS	
1011	RFF	1			01,2213	3 2337 1	CA	-0.6 D/S	
1012	REF	3	LAST	227	01,2214	55'474 0	TS	-RATEDB	LM-ONLY BREAKOUT LEVEL IS .6 D/S.
1013	REF	3	LAST	308	01,2215	3 4737 0	CA	CSMDOCKD	IF CSM-DOCKED, DIVIDE STICK SENSITIVITY
1014	REF	14	LAST	309	01,2216	7 0111 1	MASK	DAPBOOLS	BY 10. NORMAL SCALING IS THEN 2 D/S AND
1015					01,2217	0 0006 1	EXTEND		FINE SCALING IS 0.4 D/S
1016					01,2220	1 2227 0	BZF	+7	BRANCH IF CSM IS NOT DOCKED.
1017	RFF	4	LAST	309	01,2221	3 1442 1	CA	STIKSENS	
1018					01,2222	0 0006 1	EXTEND		
1019	REF	1			01,2223	7 2336 1	MP	1/10	
1020	REF	5	LAST	309	01,2224	55'442 0	TS	STIKSENS	
1021	REF	1			01,2225	3 2340 1	CA	-0.3 D/S	CSM-DOCKED BREAKOUT LEVEL IS .3 D/S.
1022	REF	4	LAST	309	01,2226	55'474 0	TS	-RATEDB	
1023					01,2227	0 0003 1	RELINT		PROCEED TO NOUN 47, MASS LOAD,
1024	REF	1			01,2230	3 2331 1	DAPDATA2	CAF	V0647
1025	REF	50	LAST	307	01,2231	0 4616 1	TC	BANKCALL	
1026	RFF	2	LAST	307	01,2232	20231 0	CADR	GOXDSPFR	
1027	REF	1			01,2233	1 2241 0	TCF	ENDRO3	V34E TERMINATE. FIRST SET DB, DO 1/ACCS
1028	RFF	1			01,2234	1 2245 1	TCF	DAPDATA2	V33E PROCEED
1029	REF	1			01,2235	1 2230 0	TCF	DAPDATA2	LOAD NEW DATA AND RECYCLE
1030	REF	18	LAST	292	01,2236	3 4751 0	CAF	BIT3	BLANKS R3
1031	RFF	4	LAST	307	01,2237	0 5464 1	TC	BLANKET	LM
1032	REF	16	LAST	307	01,2240	1 5155 1	TCF	ENDOFJOB	
1033					01,2241	0 0004 0	ENDRO3	INHINT	
1034	RFF	14	LAST	303	01,2242	0 4674 0	TC	IBNKCALL	
1035	RFF	2	LAST	303	01,2243	40123 0	CADR	RFSTORDB	
1036	REF	19	LAST	307	01,2244	1 5472 1	TCF	ENDEXT	DOFS RELINT
1037	RFF	9	LAST	308	01,2245	4 0106 1	DAPDATA2	CS	FL3WRD10
1038	REF	5	LAST	308	01,2246	7 4737 1	MASK	APSFBLBIT	DETERMINE STAGE FROM APSFLAG
1039	REF	89	LAST	309	01,2247	10 000 0	CCS	A	
1040	REF	1			01,2250	3 2000 0	CA	MINLMD	
1041	REF	1			01,2251	6 2001 1	AD	MINMINLM	
1042	REF	8	LAST	308	01,2252	6 1331 1	AD	LEMMASS	LEMMASS MUST BE GREATER THAN EMPTY LEM
1043					01,2253	0 0006 1	EXTEND		
1044	REF	2	LAST	309	01,2254	6 2230 1	BZMF	DAPDATA2	ASK FOR NEW MASSES
1045	REF	15	LAST	309	01,2255	30 111 0	CAE	DAPBOOLS	
1046	REF	4	LAST	309	01,2256	7 4737 1	MASK	CSMDOCKD	
1047					01,2257	0 0006 1	EXTEND		
1048	REF	1			01,2260	1 2266 0	BZF	LEMALONE	SKIP TEST ON CSMMASS IF NOT DOCKED.
1049	REF	1			01,2261	4 4741 0	CS	MINCSM	TEST CSM MASS
1050	REF	2	LAST	308	01,2262	6 1332 1	AD	CSMASS	CSMASS MUST BE GREATER THAN EMPTY CSM

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1051					01,2263	0 0006	1		EXTEND		
1052	REF	3	LAST	309	01,2264	6 2230	1		BZMF	DAPDATA2	ASK FOR NEW MASSES
1053	REF	3	LAST	309	01,2265	31'332	1		CAE	CSMMASS	DOCKED: MASS = CSMMASS + LEMMASS
1054	REF	9	LAST	309	01,2266	6 1331	1	LEMALONE	AD	LEMASS	LEM ALONE: MASS = LEMMASS
1055					01,2267	22 007	0		ZL		
1056	REF	4	LAST	308	01,2270	53'245	1		DXCH	MASS	
1057					01,2271	0 0004	0		INHINT		
1058	REF	15	LAST	309	01,2272	0 4674	0		TC	IBNKCALL	SET DEADBANK AND COMPUTE MOMENTS OF
1059	REF	3	LAST	309	01,2273	40123	0		CADR	RESTORDB	INERTIA.
1060					01,2274	0 0003	1		RELINT		PROCEED TO NOUN 48 (OR END).
1061	REF	10	LAST	309	01,2275	4 0106	1	DAPDATA3	CS	FLGWRD10	
1062	REF	6	LAST	309	01,2276	7 4737	1		MASK	APSFLBIT	
1063					01,2277	0 0006	1		EXTEND		END ROUTINE IF LEM HAS STAGED,
1064	REF	20	LAST	309	01,2300	1 5472	1		BZF	ENDEXT	
1065	REF	1			01,2301	3 2332	1		CAF	V06N48	DISPLAY TRIM ANGLES AND REQUEST RESPONSE
1066	REF	51	LAST	309	01,2302	0 4616	1		TC	BANKCALL	
1067	REF	3	LAST	309	01,2303	20231	0		CADR	GOXDSPFR	
1068	REF	21	LAST	310	01,2304	0 5472	0		TC	ENDEXT	
1069	REF	1			01,2305	1 2312	1		TCF	DPDAT3	V33E GO DO TRIM (WAITLIST TO TRIMGIMB)
1070					01,2306	1 2301	0		TCF	-5	LOAD NEW DATA AND RECYCLE
1071	REF	19	LAST	309	01,2307	3 4751	0		CAF	BIT3	
1072	REF	5	LAST	309	01,2310	0 5464	1		TC	BLANKET	BLANK R3
1073	REF	17	LAST	309	01,2311	1 5155	1		TCF	ENDOFJOB	
1074	REF	19	LAST	261	01,2312	3 4753	1	DPDAT3	CAF	BIT1	GO TO TRIMGIMB VIA WAITLIST SO IT
1075					01,2313	0 0004	0		INHINT		CAN USE FIXDELAY AND VARDELAY
1076	REF	11	LAST	298	01,2314	0 5203	0		TC	WAITLIST	
1077	REF	1			E6,1401				EBANK=	ROLLTIME	
1078	REF	1			01,2315	03106	0		2CADR	TRIMGIMB	
1078	REF	1			01,2316	56066	1				
1079	REF	18	LAST	310	01,2317	1 5155	1		TCF	ENDOFJOB	DOES A RELINT
1080	REF	1			01,2320	3 2333	0	TRIMDONE	CAF	V50N48	
1081	REF	52	LAST	310	01,2321	0 4616	1		TC	BANKCALL	TRIM IS FINISHED; PLEASE TERMINATE R03
1082	REF	1			01,2322	20237	0		CADR	GOMARK3R	
1083	REF	22	LAST	310	01,2323	0 5472	0		TC	ENDEXT	V34E TERMINATE
1084	REF	23	LAST	310	01,2324	0 5472	0		TC	ENDEXT	
1085	REF	24	LAST	310	01,2325	0 5472	0		TC	ENDEXT	
1086	REF	4	LAST	282	01,2326	3 6007	0		CAF	OCT24	BIT5 TO CHANGE TO PERFORM, 3 TO BLANK R3
1087	REF	6	LAST	310	01,2327	0 5464	1		TC	BLANKET	
1088	REF	19	LAST	310	01,2330	1 5155	1		TCF	ENDOFJOB	
10885					01,2331	01457	0	V0647	VN	0647	
1089					01,2332	01460	1	V06N48	VN	0648	
1090					01,2333	14460	0	V50N48	VN	5048	
1091					01,2334	25101	0	NORMAL	DEC	.660214	
A1092											NORMAL SCALING IS 20 D/S
1093					01,2335	05220	1	FINE	DEC	.165054	FINE STICK SCALING (4 D/S).
1094					01,2336	03146	1	1/10	DEC	.1	FACTOR FOR CSM-DOCKED SCALING
1095					01,2337	77445	1	-0.6D/S	DEC	-218	

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1096

01,2340 77622 1 -0.3D/S DEC -109

L EXTENDED VERBS

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P1097 VERB 66. VEHICLES ARE ATTACHED. MOVF THIS VEHICLE STATE VECTOR TO
R1098 OTHER VEHICLE STATE VECTOR.

R1099 USE SUBROUTINE GENTRAN.

1100					07,2667			BANK 7		
1101	REF	6	LAST	303	43,2000			SETLOC EXTVERBS		
1102					43,3150			BANK		
1103	REF	6	LAST	303 TO	307:	61	428*	COUNT* \$\$/EXTVR		
1104	REF	1			E3,1626			EBANK= RRECTHIS		
1105	REF	3	LAST	301	43,3150	3	4737 0	ATTACHED CAF PRI010		
1106	REF	10	LAST	305	43,3151	0	5105 0	TC FINDVAC		
1107	REF	2	LAST	312	E3,1626			EBANK= RRECTHIS		
1108	REF	1			43,3152	0	3155 0	2CADR ATTACHIT		
1108	REF	1			43,3153		66103 0			
1109	REF	20	LAST	310	43,3154	0	5155 0	TC ENDOFJOB		
1110	REF	7	LAST	302	43,3155	0	6036 1	ATTACHIT TC INTPRET		
1111					43,3156		77624 1	CALL		
1112	REF	4	LAST	302	43,3157		27412 0	SET INSTALL		
1113					43,3160		43014 0	RON		
1114	REF	1			43,3161		04063 0	MOONOTH		
1115	REF	1			43,3162		04304 1	MOONTHIS		
1116					43,3163		67166 1	+3		
1117					43,3164		77614 1	CLEAR		
1118	REF	2	LAST	312	43,3165		04263 1	MOONOTH		
1119					43,3166		77776 1	EXIT		
1120	REF	1			43,3167	3	3212 0	CAF OCT51		
1121	REF	1			43,3170	0	5544 1	TC GENTRAN		
1122	REF	3	LAST	312	43,3171		01626 1	ADRES RRECTHIS		OUR STATE VECTOR INTO OTHER VIA GENTRAN
1123	REF	1			43,3172		01554 1	ADRES RRECTOTH		
1124					43,3173	0	0003 1	RELINT		
1125	REF	8	LAST	312	43,3174	0	6036 1	TC INTPRET		
1126					43,3175		77624 1	CALL		UPDATE R-OTHER, V-OTHER
1127	REF	1			43,3176		26760 1	PTOALEM		
1128					43,3177		45154 0	CALL		
1129	REF	2	LAST	130	43,3200		02030 0	PBODY		
1130	REF	1			43,3201		26114 1	SVDWNI		
1131					43,3202		77776 1	EXIT		
1132	REF	1			43,3203	3	3213 1	CAF TCPINAD		
1133	REF	8	LAST	267	43,3204	50	120 1	INDEX FIXLOC		
1134	REF	1			43,3205	54	052 1	TS QPRFT		
1135	REF	14	LAST	308	43,3206	0	4635 0	TC POSTJUMP		
1136	REF	1			43,3207		27427 0	CADR INTWAKE		FREE INTEGRATION AND EXIT.

L EXTENDED VERBS

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1137 43,3210 77634 0 TCPIN RTB
 1138 REF 3 LAST 279 43,3211 20723 0 PINBRNCH

1139 43,3212 00051 0 OCT51 OCT 51
 1140 REF 1 43,3213 67210 0 TCPINAD CADR TCPIN

R1141 VERB 96 SET QUITFLAG TO STOP INTEGRATION.

R1142 GO TO V37 WITH ZERO TO CAUSE POO.
 R1143 STATEINT WILL CHECK QUITFLAG AND SKIP 1ST PASS,
 R1144 THUS ALLOWING A 10 MINUTE PERIOD WITHOUT INTEGRATION.

1145 REF 10 LAST 304 43,3214 0 5504 0 VERB96 TC UPFLAG QUITFLAG WILL CAUSE INTEGRATION TO EXIT
 1146 REF 1 43,3215 00221 0 ADRES QUITFLAG AT NEXT TIMESTEP

1147 REF 31 LAST 294 43,3216 3 4755 1 CAF ZERO
 1148 REF 15 LAST 312 43,3217 0 4635 0 TC POSTJUMP
 1149 REF 1 43,3220 10037 1 CADR V37 GO TO POO

R1150
 R1151 VERB 67 : DISPLAY CF W MATRIX

1152 REF 17 LAST 307 43,3221 0 2076 1 V67 TC TESTXACT
 1153 REF 2 LAST 244 43,3222 3 5017 1 CAF PRI05
 1154 REF 11 LAST 312 43,3223 0 5105 0 TC FINDVAC
 1155 REF 1 43,3224 02011 0 EBANK= WWPOS
 1156 REF 1 43,3225 62064 1 2CADR V67CALL
 1157 REF 21 LAST 312 43,3226 0 5155 0 TC ENDOFJOB

R1158 VERB 65 DISABLE U,V JETS DURING DPS BURNS

1159 REF 11 LAST 313 43,3227 0 5504 0 SNUFFOUT TC UPFLAG
 1160 REF 1 43,3230 00115 1 ADRES SNUFFER
 1161 REF 23 LAST 305 43,3231 0 2121 1 TC GOPIN

R1162 VERB 75 ENABLE U,V JETS DURING DPS BURNS

1163 REF 22 LAST 304 43,3232 0 5516 0 OUTSNUFF TC DOWNFLAG
 1164 REF 2 LAST 313 43,3233 00115 1 ADRES SNUFFER
 1165 REF 24 LAST 313 43,3234 0 2121 1 TC GOPIN

R1166 VERB 85 DISPLAY RR LOS AZIMUTH AND ELEVATION.

R1167 AZIMUTH IS THE ANGLE BETWEEN THE LOS AND THE X-Z NB PLANE, 0 - 90 DEG IN THE +Y HEMISPHERE,
 R1169 360 - 270 DEG IN THE -Y HEMISPHERE.

R1170 ELEVATION IS THE ANGLE BETWEEN +ZNB AND THE PROJECTION OF THE LOS INTO THE X-Z PLANE, 0 - 360 ABOUT +Y.

1172 REF 4 LAST 216 E7,1750 EBANK= TANGNB

L EXTENDED VERBS

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1173	REF	18	LAST	313	43,3235	0	2076	1	VERB85	TC	TESTXACT
1174	REF	16	LAST	313	43,3236	0	4635	0		TC	POSTJUMP
1175	REF	1			43,3237	60000	1			CADR	DSPPRLOS

1176	REF	1			40,2000					SETLOC	PINBALL1
1177					40,2000					BANK	

1178	REF	1								COUNT*	\$/EXTV8
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1179	REF	3	LAST	313	40,2000	3	5017	1	DSPPRLOS	CAF	PRIO5
1180	REF	12	LAST	313	40,2001	0	5105	0		TC	FINDVAC
1181	REF	5	LAST	313	F7,1750					EBANK=	TANGNB
1182	REF	1			40,2002	0	2017	0		2CADR	PRLOS DSP
1182	REF	1			40,2003	60107	1				
1183	REF	3	LAST	295	40,2004	3	4740	0		CAF	PRIO4
1184	REF	5	LAST	307	40,2005	0	5146	1		TC	PRIOCHNG
1185	REF	1			40,2006	3	2076	1		CAF	V16N56
1186	REF	53	LAST	310	40,2007	0	4616	1		TC	BANKCALL
1187	REF	3	LAST	292	40,2010	20231	0			CADR	GOMARKFR
1188	REF	1			40,2011	0	5563	1		TC	B5OFF
1189	REF	2	LAST	314	40,2012	0	5563	1		TC	B5OFF
1190	REF	3	LAST	314	40,2013	0	5563	1		TC	B5OFF

1191	REF	20	LAST	310	40,2014	3	4751	0		CAF	BIT3
1192	REF	7	LAST	310	40,2015	0	5464	1		TC	BLANKET
1193	REF	22	LAST	313	40,2016	0	5155	0		TC	ENDGFJOB

1194					40,2017	0	0006	1	RRLOS DSP	EXTEND	
1195	REF	2	LAST	202	40,2020	3	0036	1		DCA	CDUT
1196	REF	6	LAST	314	40,2021	53	751	1		DXCH	TANGNB
1197	REF	9	LAST	312	40,2022	0	6036	1		TC	INTPRET
1198					40,2023	77624	1			CALL	
1199	REF	1			40,2024	46041	0			RRNB	GET RR LOS IN BODY AXES.
1200					40,2025	00001	0			STORE	0D
1201					40,2026	14007	0			STODL	6D
1202	REF	1			40,2027	06424	0				H16ZEROS
1203					40,2030	24011	1			STOVL	8D
1204					40,2031	00007	0				6D
1205					40,2032	77656	1			UNIT	
1206					40,2033	00007	0			STORE	6D
1207					40,2034	77641	1			DOT	UNIT OF LOS PROJ IN X-Z PLANE
1208	REF	3	LAST	36	40,2035	06416	1				UNITZ
1209	REF	1			40,2036	24021	1			STOVL	COSTH
1210	REF	3	LAST	36	40,2037	06422	0				UNITX
1211					40,2040	77641	1			DOT	
1212					40,2041	00007	0				6D
1213	REF	1			40,2042	34023	1			STCALL	SINTH
1214	REF	1			40,2043	47222	0				ARC TRIG
1215					40,2044	43244	1			BPL	DAD
1216					40,2045	60047	1				+2

INSURE DISPLAY OF 0 - 360 DEG.

L EXTENDED VERBS

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1217	REF	1		40,2046	06432 1		DPPOS MAX	INTRODUCES AN ERROR OF B-28 REVS.
1218	REF	1		40,2047	26207 0	STOVL	RP-ELEV	
1219				40,2050	00001 0		OD	
1220				40,2051	77641 1	DOT		
1221	REF	2	LAST 36	40,2052	06420 1		UNITY	
1222	REF	2	LAST 314	40,2053	24023 0	STOVL	SINTH	
1223				40,2054	00001 0		OD	
1224				40,2055	77641 1	DOT		
1225				40,2056	00007 0		6D	
1226	REF	2	LAST 314	40,2057	34021 0	STCALL	COSTH	
1227	REF	2	LAST 314	40,2060	47222 0		ARCTRIG	
1228				40,2061	43244 1	BPL	DAD	INSURE DISPLAY OF 0 - 360 DEG.
1229				40,2062	60064 0		+2	
1230	REF	2	LAST 315	40,2063	06432 1		DPPOS MAX	INTRODUCES AN ERROR OF B-28 REVS.
1231	REF	2	LAST 134	40,2064	02205 1	STORE	RR-AZ	
1232				40,2065	77776 1	EXIT		
1233	REF	2	LAST 285	40,2066	3 4777 1	CA	1SEC	
1234	REF	54	LAST 314	40,2067	0 4616 1	TC	BANKCALL	
1235	REF	7	LAST 294	40,2070	01735 1	CADR	DELAYJOB	
1236	REF	16	LAST 269	40,2071	3 4747 1	CA	RIT5	
1237	REF	6	LAST 278	40,2072	7 1044 1	MASK	EXTVBACT	
1238	REF	90	LAST 309	40,2073	10 000 0	CCS	A	
1239	REF	2	LAST 314	40,2074	0 2017 0	TC	RFLOSDSP	
1240	REF	25	LAST 310	40,2075	0 5472 0	TC	ENDEXT	
1241				40,2076	04070 1	V16N56	VN	1656

L PINBALL NOUN TABLES

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P1000 THE FOLLOWING REFERS TO THE NOUN TABLES

R1001	CCMPDNENT CODE NUMBER	INTERPRETATION
R1002	00000	1 COMPONENT
R1003	00001	2 CDPDNENT
R1004	00010	3 COMPDNENT
R1005	X1XXX	BIT4 = 1. DECIMAL ONLY
R1006	1XXXX	BIT5 = 1. NO LOAD
R1007	END OF COMPONENT CODE NUMBERS	

R1008	SF ROUTINE CODE NUMBER	INTERPRETATION
R1009	00000	OCTAL ONLY
R1010	00001	STRAIGHT FRACTIONAL
R1011	00010	CDU DEGREES (XXX.XX)
R1012	00011	ARITHMETIC SF
R1013	00100	ARITH DP1 OUT(MULT BY 2EXP14 AT END) IN(STRAIGHT)
R1014	00101	ARITH DP2 OUT(STRAIGHT) IN(SL 7 AT END)
R1015	00110	LANDING RADAR POSITION (+0000X)
R1016	00111	ARITH DP3 OUT (SL 7 AT END) IN (STRAIGHT)
R1017	01000	WHOLE HOURS IN R1, WHOLE MINUTES (MOD 60) IN R2,
R1018		SECONDS (MOD 60) 0XX.XX IN R3. *** ALARMS IF USED WITH OCTAL
R1019	01001	MINUTES (MOD 60) IN D1D2, D3 BLANK, SFCONDS (MOD 60) IN D4D5
R1020		LIMITS TO 59859 IF MAG EXCEEDS THIS VALUE.
R1021		ALARMS IF USED WITH OCTAL ***** IN (ALARM)
R1022	01010	ARITH DP4 OUT (STRAIGHT) IN (SL 3 AT END)
R10221	01011	ARITH1 SF OUT(MULT BY 2EXP14 AT END) IN(STRAIGHT)
R10222	01100	2 INTEGERS IN D1D2, D4D5, D3 BLANK.
R10223		ALARMS IF USED WITH OCTAL ***** IN (ALARM)
R10224	01101	360-CDU DEGREES (XXX.XX)
R1023	END OF SF ROUTINE CODE NUMBERS	

R1024	SF CONSTANT CODE NUMBER	INTERPRETATION
R1025	00000	WHOLE USE ARITH
R1026	00000	DP TIME SEC (XXX.XX SEC) USE ARITHDP1
R10265	00000	LR POSITION (+0000X) USE LR POSITION
R1027	00001	SPARE
R1028	00010	CDU DEGREES USE CDU DEGREES
R1029	00010	360-CDU DEGREES USE 360-CDU DEGRFES
R1030	00011	DP DEGREES (90) XX.XXX DEG USE ARITHDP3
R1031	00100	DP DEGRFES (360) XXX.XX DE; USE ARITHDP4
R1032	00101	DEGREES (180) XXX.XX DEG USE ARITH
R10321	00101	OPTICAL TRACKER AZIMUTH ANGLE(XXX.XXDEG)
R10322		USE ARITHDP1
R1034	00110	WEIGHT2 (XXXXX. LBS) USE ARITH1

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R1035	00111	POSITION5 (XXX.XX NAUTICAL MILES)	
R10351		USE ARITHDP3	
R1037	01000	POSITION4 (XXXX.X NAUTICAL MILES)	
R10371		USE ARITHDP3	
R1038	01001	VELOCITY2 (XXXXX. FT/SEC)	USE ARITHDP4
R1039	01010	VELOCITY3 (XXXX.X FT/SEC)	USE ARITHDP3
R1040	01011	ELEVATION DEGREES(89.999MAX)	USE ARITH
R1041	01100	RENDEZVCUS RADAR RANGE (XXX.XX NAUT MI)	
R1042		USE ARITHDP1	
R1043	01101	RENDEZVCUS RADAR RANGE RATE (XXXXX.ET/SEC)	
R1044		USE ARITHDP1	
R1045	01110	LANDING RADAR ALTITUDE(XXXXX.FEET)	
R1046		USE ARITHDP1	
R1047	01111	INITIAL/FINAL ALTITUDE(XXXXX.FEET)	
R1048		USE ARITHDP1	
R1049	10000	ALTITUDE RATE(XXXXX.FT/SEC)	USE ARITH
R1050	10001	FORWARD/LATERAL VELOCITY(XXXXX.FEET/SEC)	
R1051		USE ARITH	
R1052	10010	ROTATIONAL HAND CONTROLLER ANGLE RATES	
R1053		XXXXX.DEG/SEC	USE ARITH
R1054	10011	LANDING RADAR VELX(XXXXX.FEET/SEC)	
R1055		USE ARITHDP1	
R1056	10100	LANDING RADAR VELY(XXXXX.FEET/SEC)	
R1057		USE ARITHDP1	
R1058	10101	LANDING RADAR VELZ(XXXXX.FEET/SEC)	
R1059		USE ARITHDP1	
R1060	10110	POSITION7 (XXXX.X NAUT MI)	USE ARITHDP4
R10601	10111	TRIM DEGREES2 (XXX.XX DEG)	USE ARITH
R1061	11000	COMPUTED ALTITUDE (XXXXX. FEET)	
R106101		USE ARITHDP1	
R106102	11001	DP DEGREES (XXXX.X DEG)	USE ARITHDP3
R106103	11010	POSITION9 (XXX.XX NAUT MI)	USE ARITHDP4
R106104	11011	VELOCITY4 (XXXX.X ET/SEC)	USE ARITHDP2
R1062	END OF SE CONSTANT CODE NUMBERS		

R1063 EOR GREATER THAN SINGLE PRECISION SCALES, PUT ADDRESS OF MAJOR PART INTO
 R1064 NOUN TABLES.
 R1065 OCTAL LOADS PLACE +0 INTO MAJOR PART, DATA INTO MINOR PART.
 R1066 OCTAL DISPLAYS SHOW MINOR PART ONLY.
 R1067 TO GET AT BOTH MAJOR AND MINOR PARTS(IN OCTAL), USE NOUN 01.

R1068 A NOUN MAY BE DECLARED :DECIMAL ONLY: BY MAKING BIT4=1 OF ITS COMPONENT
 R1069 CODE NUMBER. IF THIS NOUN IS USED WITH ANY OCTAL DISPLAY VERB, OR IF
 R1070 DATA IS LOADED IN OCTAL, IT ALARMS.

R1071 IN LOADING AN :HOURS, MINUTES, SECONDS: NOUN, ALL 3 WORDS MUST BE
 R1072 LOADED, OR ALARM.
 R1073 ALARM IF AN ATTEMPT IS MADE TO LOAD :SPLIT MINUTES/SECONDS: (MMBSS).

GAP: ASSEMBLE REVISION 069 OF AGC PROGRAM LUMINARY BY NASA 2021112-011

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R1074 THIS IS USED FOR DISPLAY ONLY.

L PINBALL NOUN TABLFS

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P1075 THE FOLLOWING ROUTINES ARE FOR READING THE NOUN TABLES AND THE SF TABLES
 R1076 (WHICH ARE IN A SEPARATE BANK FROM THE REST OF PINBALL). THESE READING
 R1077 ROUTINES ARE IN THE SAME BANK AS THE TABLES. THEY ARE CALLED BY DXCH Z.

R1078 LCDNNTAB LCADS NNADTEM WITH THE NNADTAB ENTRY, NNTYPTM WITH THE
 R1079 NNTYPTAB ENTRY. IF THE NOUN IS MIXED, IDAD1TEM IS LOADED WITH THE FIRST
 R1080 ICADDTAB ENTRY, IDAD2TEM THE SECOND ICADDTAB ENTRY, IDAD3TEM THE THIRD
 R1081 ICADDTAB ENTRY, RUTMXTEM WITH THE RUTMXTAB ENTRY. MIXBR IS SET FOR
 R1082 MIXED OR NORMAL NOUN.

1200					06,3263		BANK	6	
12002	REF	2	LAST	296	42,2000		SFTLOC	PINBALL3	
12003					42,2103		BANK		
12005	REF	1					COUNT*	\$/NOUNS	
1201	RFF	1			42,2103	52 152 0	LODNNTAB	DXCH	IDAD2TEM
1202	REF	3	LAST	282	42,2104	51'002 1	INDEX	NOUNRFG	SAVE RETURN INFO IN IDAD2TEM, IDAD3TEM.
1203	REF	1			42,2105	3 2154 0	CAF	NNADTAB	
1204	RFF	1			42,2106	54 146 0	TS	NNADTEM	
1205	REF	4	LAST	319	42,2107	51'002 1	INDEX	NOUNRFG	
1206	RFF	1			42,2110	3 2320 1	CAF	NNTYPTAB	
1207	REF	1			42,2111	54 147 1	TS	NNTYPTM	
1208	RFF	5	LAST	319	42,2112	4 1002 0	CS	NOUNRFG	
1209	REF	1			42,2113	6 4771 1	AD	MIXCON	
1210					42,2114	0 0006 1	EXTEND		
1211	REF	1			42,2115	6 2121 1	BZMF	LODMIXNN	NOUN NUMBER G/E FIRST MIXED NOUN
1212	REF	14	LAST	293	42,2116	3 4753 1	CAF	ONE	NOUN NUMBER L/ FIRST MIXED NOUN
1213	RFF	1			42,2117	54 140 0	TS	MIXBR	NORMAL. +1 INTO MIXBR.
1214	RFF	1			42,2120	0 2137 0	TC	LODNLV	
1215	RFF	11	LAST	297	42,2121	3 4752 0	LODMIXNN	CAF	TWO
1216	REF	2	LAST	319	42,2122	54 140 0	TS	MIXBR	MIXED. +2 INTO MIXBR.
1217	REF	6	LAST	319	42,2123	51'002 1	INDEX	NOUNRFG	
1218	REF	1			42,2124	3 3060 1	CAF	RUTMXTAB -40D	FIRST MIXED NOUN = 40.
1219	RFF	1			42,2125	54 153 1	TS	RUTMXTEM	
1220	REF	2	LAST	247	42,2126	3 5012 1	CAF	LOW10	
1221	REF	2	LAST	319	42,2127	7 0146 0	MASK	NNADTEM	
1222	REF	28	LAST	297	42,2130	54 002 1	TS	Q	TEMP
1223	REF	91	LAST	315	42,2131	50 000 1	INDEX	A	
1224	RFF	1			42,2132	3 2644 0	CAF	IDADDTAB	
1225	RFF	1			42,2133	54 150 1	TS	IDAD1TEM	LOAD IDAD1TEM WITH FIRST IDADDTAB ENTRY
1226					42,2134	0 0006 1	EXTEND		
1227	REF	29	LAST	319	42,2135	5 0002 0	INDEX	Q	LOAD IDAD2TEM WITH 2ND IDADDTAB ENTRY
1228	RFF	2	LAST	319	42,2136	3 2646 1	DCA	IDADDTAB +1	LOAD IDAD3TEM WITH 3RD IDADDTAB ENTRY.
1229	REF	2	LAST	319	42,2137	52 152 0	LODNLV	DXCH	PUT RETURN INFO INTO A, L.
1230	REF	1			42,2140	52 006 0	DXCH	Z	
1231	REF	1			4771		MIXCON	=	OCT50
R1232									(DEC 40)
1233	REF	1			42,2141	52 124 1	GTSFOUT	DXCH	SFTFMP1
									2X(SFCONUM) ARRIVES IN SFTFMP1.

L PINBALL NOUN TABLES

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1234					42,2142	0 0006 1		EXTEND
1235	REF	92	LAST	319	42,2143	5 0000 1		INDEX A
1236	REF	1			42,2144	3 2555 0		OCA SFDUTAB
1237	REF	2	LAST	319	42,2145	52 124 1	SFCOM	OXCH SFTFMP1
1238	REF	2	LAST	319	42,2146	52 006 0		OXCH Z

R1239 GTSFIN LOADS SFTFMP1, SFTFMP2 WITH THE DP SFINTAB ENTRIES.

1240	REF	3	LAST	320	42,2147	52 124 1	GTSFIN	OXCH SFTFMP1	2X(SFCOM) ARRIVES IN SFTFMP1.
1241					42,2150	0 0006 1		EXTEND	
1242	REF	93	LAST	320	42,2151	5 0000 1		INDEX A	
1243	REF	1			42,2152	3 2465 1		OCA SFINTAB	
1244	REF	1			42,2153	1 2145 1		TCF SFCOM	

A1400									NN NORMAL NOUNS
1401					42,2154	00000 1	NNADTAB	OCT 00000	00 NOT IN USE
1402					42,2155	40000 0		OCT 40000	01 SPECIFY MACHINE ADDRESS (FRACTIONAL)
1403					42,2156	40000 0		OCT 40000	02 SPECIFY MACHINE ADDRESS (WHOLE)
1404					42,2157	40000 0		OCT 40000	03 SPECIFY MACHINE ADDRESS (DEGREES)
1405	REF	3	LAST	292	42,2160	01045 1		ECAOR DSPTFMP1	04 ANGULAR ERROR/DIFFERENCE
1406	REF	4	LAST	320	42,2161	01045 1		ECAOR DSPTFMP1	05 ANGULAR ERROR/DIFFERENCE
1407	REF	1			42,2162	01144 1		ECAOR OPTION1	06 OPTION CODE
1408	REF	1			42,2163	01003 0		ECAOR XREG	07 ECAOR OF WORD TO BE MODIFIED
A14081									ONES FOR BITS TO BE MODIFIED
A14082									1 TO SET OR 0 TO RESET SELECTED BITS
1409	REF	2	LAST	124	42,2164	01363 0		ECAOR ALMCADR	08 ALARM DATA
1410	REF	4	LAST	226	42,2165	00375 0		ECAOR FAILREG	09 ALARM CODES
1411					42,2166	77776 1		OCT 77776	10 CHANNEL TO BE SPECIFIED
1412	REF	3	LAST	213	42,2167	03631 0		ECAOR TCSI	11 TIG OF CSI (HRS,MIN,SEC)
1413	REF	7	LAST	292	42,2170	01051 1		ECAOR OPTIONX	12 OPTION CODE
A14131									(USED BY EXTENDED VERBS ONLY)
1414	REF	3	LAST	213	42,2171	03373 0		ECAOR TCDH	13 TIG OF CDH (HRS,MIN,SEC)
1415	REF	4	LAST	222	42,2172	01051 1		ECAOR DSPTFMPX	14 CHECKLIST
A14151									(USED BY EXTENDED VERBS ONLY)
1416					42,2173	77777 0		OCT 77777	15 INCREMENT MACHINE ADDRESS
1417	REF	5	LAST	320	42,2174	01051 1		ECAOR DSPTFMPX	16 TIME OF EVFNT (HRS,MIN,SEC)
1418					42,2175	00000 1		OCT 00000	17 SPARE
1419	REF	1			42,2176	02350 0		ECAOR FDAIX	18 AUTO MANEUVER BALL ANGLES
1420					42,2177	00000 1		OCT 00000	19 SPARE
1421	REF	6	LAST	269	42,2200	00032 0		ECAOR CDUX	20 ICDU ANGLES
1422	REF	1			42,2201	00037 0		ECAOR PIPAX	21 PIPAS
1423	REF	6	LAST	297	42,2202	00321 1		ECAOR THETAD	22 NEW ICDU ANGLES
1424					42,2203	00000 1		OCT 00000	23 SPARE
1425	REF	3	LAST	290	42,2204	01051 1		ECAOR DSPTFMP2 +1	24 DELTA TIME FOR AGC CLOCK(HRS,MIN,SEC)
1426	REF	5	LAST	320	42,2205	01045 1		ECAOR OSPTFMP1	25 CHECKLIST
A14261									(USED WITH PLEASE PERFORM ONLY)
1427	REF	6	LAST	320	42,2206	01045 1		ECAOR OSPTFMP1	26 PRI0/DELAY, ADRES, BBCON
1428	REF	4	LAST	305	42,2207	01362 1		ECAOR SMODE	27 SELF TEST ON/OFF SWITCH

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1429				42,2210	00000	1	OCT	00000	28	SPARE	
1430				42,2211	00000	1	OCT	00000	29	SPARE	
1431				42,2212	00000	1	OCT	0	30	SPARE	
1432				42,2213	00000	1	OCT	0	31	SPARE	
1433	REF	1		42,2214	02142	1	ECADR	-TPER	32	TIME TO PERIGEE (HRS,MIN,SEC)	
1434	REF	7	LAST	258	42,2215	03437	1	ECADR	TIG	33	TIME OF IGNITION (HRS,MIN,SEC)
1435	REF	7	LAST	320	42,2216	01045	1	ECADR	DSPTM1	34	TIME OF EVENT (HRS,MIN,SEC)
1436	REF	7	LAST	256	42,2217	03451	1	ECADR	TTCGO	35	TIME TO GO TO EVENT (HRS,MIN,SEC)
1437	REF	10	LAST	290	42,2220	00024	1	ECADR	TIME2	36	TIME OF AGC CLOCK (HRS,MIN,SEC)
1438	REF	3	LAST	213	42,2221	03633	1	ECADR	TTPI	37	TIG OF TPI (HRS,MIN,SEC)
1439	REF	2	LAST	126	42,2222	01516	1	ECADR	TET	38	TIME OF STATE BEING INTEGRATED
1440				42,2223	00000	1	OCT	00000	39	SPARE	
R14401	END OF NNACTAB FOR NORMAL NOUNS										

A14402									NN	MIXED NOUNS
1441				42,2224	64000	0	OCT	64000	40	TIME TO IGNITION/CUTOFF
A14411									VG	
A14412										DELTA V (ACCUMULATED)
1442				42,2225	02003	0	OCT	02003	41	TARGET AZIMUTH
A14421										ELEVATION
1443				42,2226	24006	1	OCT	24006	42	APOGEE
A14431										PERIGEE
A14432										DELTA V (REQUIRED)
1444				42,2227	24011	1	OCT	24011	43	LATITUDE
A14441										LONGITUDE
A14442										ALTITUDE
1445				42,2230	64014	0	OCT	64014	44	APOGEE
A14451										PERIGEE
A14452										TFF
1446				42,2231	64017	0	OCT	64017	45	MARKS
A14461										TTI OF NEXT BURN
A14462										MGA
1447				42,2232	00022	1	OCT	00022	46	AUTOPILOT CONFIGURATION
1448				42,2233	22025	0	OCT	22025	47	LEM WEIGHT
A14481										CSM WEIGHT
1449				42,2234	22030	1	OCT	22030	48	GIMBAL PITCH TRIM
A14491										GIMBAL ROLL TRIM
1450				42,2235	22033	1	OCT	22033	49	DELTA R
A14501										DELTA V
1451				42,2236	00000	1	OCT	0	50	SPARE
1452				42,2237	22041	1	OCT	22041	51	S-BAND ANTENNA PITCH
A14521										YAW
1453				42,2240	00044	1	OCT	00044	52	CENTRAL ANGLE OF ACTIVE VEHICLE
1454				42,2241	00000	1	OCT	00000	53	SPARE
1455				42,2242	24052	0	OCT	24052	54	RANGE
A14551										RANGE RATE
A14552										THETA
1458				42,2243	24055	1	OCT	24055	55	NO. OF APSIDAL CROSSINGS
A14581										ELEVATION ANGLE

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A14582						56	CNTRAL ANGLE
1459	42,2244	02060 0	OCT	02060			RR LOS AZIMUTH
A14591							ELEVATION
1460	42,2245	20063 0	OCT	20063		57	DELTA R
1461	42,2246	24066 1	OCT	24066		58	PERIGEE ALT
A14611							DELTA V TPI
A14612							DELTA V TPE
1462	42,2247	24071 1	OCT	24071		59	DELTA VELOCITY LOS
1463	42,2250	24074 1	OCT	24074		60	HORIZONTAL VELOCITY
A14631							ALTITUDE RATE
A14632							COMPUTED ALTITUDE
1464	42,2251	64077 0	OCT	64077		61	TIME TO GO IN BRAKING PHASE
A14641							TIME TO IGNITION
A14642							CROSS RANGE DISTANCE
1465	42,2252	64102 0	OCT	64102		62	ABSOLUTE VALUE OF VELOCITY
A14651							TIME TO IGNITION
A14652							DELTA V (ACCUMULATED)
1466	42,2253	24105 0	OCT	24105		63	ABSOLUTE VALUE OF VELOCITY
A14661							ALTITUDE RATE
A14662							COMPUTED ALTITUDE
1467	42,2254	64110 0	OCT	64110		64	TIME LEFT FOR REDESIGNATION-LPD ANGLE
A14671							ALTITUDE RATE
A14672							COMPUTED ALTITUDE
1468	42,2255	24113 1	OCT	24113		65	SAMPLED AGC TIME (HRS, MIN, SEC)
A14681							(ETCHED IN INTERRUPT)
1470	42,2256	62116 0	OCT	62116		66	LR RANGE
A14701							POSITION
1471	42,2257	04121 1	OCT	04121		67	LRVX
A14711							LRVY
A14712							LRVZ
1472	42,2260	64124 1	OCT	64124		68	SLANT RANGE TO LANDING SIGHT
A14721							TIME TO GO IN BRAKING PHASE
A14722							LR ALTITUDE - COMPUTED ALTITUDE
1473	42,2261	00000 1	OCT	00000		69	SPARE
1474	42,2262	04132 0	OCT	04132		70	AOT DETENT CODE/STAR CODE
1475	42,2263	04135 1	OCT	04135		71	AOT DETENT CODE/STAR CODE
1476	42,2264	02140 0	OCT	02140		72	RR 360 - TRUNNION ANGLE
A14761							SHAFT ANGLE
1477	42,2265	02143 0	OCT	02143		73	NEW RR 360 - TRUNNION ANGLE
A14771							SHAFT ANGLE
1478	42,2266	64146 0	OCT	64146		74	TIME TO IGNITION
A14781							YAW AFTER VEHICLE RISE
A14782							PITCH AFTER VEHICLE RISE
1479	42,2267	64151 0	OCT	64151		75	DELTA ALTITUDE CDH
A14791							DELTA TIME (CDH-CSI OR TPI-CDH)
A14792							DELTA TIME (TPI-CDH OR TPI-NOMTPI)
1480	42,2270	22154 1	OCT	22154		76	CROSS-RANGE DISTANCE
A14801							APOCYNTHION ALTITUDE
1481	42,2271	62157 0	OCT	62157		77	TIME TO ENGINE CUTOFF
A14811							VELOCITY NORMAL TO CSM PLANE

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1482	42,2272	02162 0	OCT	02162	78 RR RANGE
A14821					RANGE RATE
1483	42,2273	24165 0	OCT	24165	79 CURSOR ANGLE
A14831					SPIRAL ANGLE
A14832					POSITION CODE
1484	42,2274	02170 0	OCT	02170	80 DATA INDICATOR
A14841					OMEGA
1485	42,2275	24173 1	OCT	24173	81 DELTA V (LV)
1486	42,2276	24176 1	OCT	24176	82 DELTA V (LV)
1487	42,2277	24201 1	OCT	24201	83 DELTA V (BODY)
1488	42,2300	24204 1	OCT	24204	84 DELTA V (OTHER VEHICLE)
1489	42,2301	24207 1	OCT	24207	85 VG (BODY)
1490	42,2302	24212 0	OCT	24212	86 VG (LV)
1491	42,2303	02215 0	OCT	02215	87 BACKUP OPTICS LOS AZIMUTH
A14911					ELEVATION
1492	42,2304	24220 1	OCT	24220	88 HALF UNIT SUN OR PLANET VECTOR
1493	42,2305	24223 1	OCT	24223	89 LANDMARK LATITUDE
A14931					LONGITUDE/2
A14932					ALTITUDE
1494	42,2306	24226 1	OCT	24226	90 Y
A14941					Y DOT
A14942					PSI
1495	42,2307	00000 1	OCT	00000	91 SPARE
1496	42,2310	00000 1	OCT	00000	92 SPARE
1497	42,2311	04237 0	OCT	04237	93 DELTA GYRO ANGLES
1498	42,2312	00000 1	OCT	00000	94 SPARE
1499	42,2313	00000 1	OCT	0	95 SPARE
1500	42,2314	00000 1	OCT	0	96 SPARE
1501	42,2315	04253 1	OCT	04253	97 SYSTEM TEST INPUTS
1502	42,2316	04256 1	OCT	04256	98 SYSTEM TEST RESULTS
1503	42,2317	22261 1	OCT	22261	99 RMS IN POSITION
A15031					RMS IN VELOCITY
R1504	END OF NNADTAB FOR MIXED NOUNS				

A1800					NN	NORMAL NOUNS
1801	42,2320	00000 1	NNTYPTAB OCT	00000	00 NOT IN	USE
1802	42,2321	04040 1	OCT	04040	01 3COMP	FRACTIONAL
1803	42,2322	04140 0	OCT	04140	02 3COMP	WHOLE
1804	42,2323	04102 0	OCT	04102	03 3COMP	CDU DEGREES
1805	42,2324	00504 0	OCT	00504	04 1COMP	DPDEG(360)
1806	42,2325	00504 0	OCT	00504	05 1COMP	DPDEG(360)
1807	42,2326	04000 0	OCT	04000	06 3COMP	OCTAL ONLY
1808	42,2327	04000 0	OCT	04000	07 3COMP	OCTAL ONLY
1809	42,2330	04000 0	OCT	04000	08 3COMP	OCTAL ONLY
1810	42,2331	04000 0	OCT	04000	09 3COMP	OCTAL ONLY
1811	42,2332	00000 1	OCT	00000	10 1COMP	OCTAL ONLY
1812	42,2333	24400 0	OCT	24400	11 3COMP	HMS (DEC ONLY)
1813	42,2334	02000 0	OCT	02000	12 2COMP	OCTAL ONLY
1814	42,2335	24400 0	OCT	24400	13 3COMP	HMS (DEC ONLY)

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1815	42,2336	04140 0	OCT	04140	14 3COMP	WHOLE
1816	42,2337	00000 1	OCT	00000	15 1COMP	OCTAL ONLY
1817	42,2340	24400 0	OCT	24400	16 3COMP	HMS (DEC ONLY)
1818	42,2341	00000 1	OCT	0	17	SPARE
1819	42,2342	04102 0	OCT	04102	18 3COMP	CDU DEG
1820	42,2343	00000 1	OCT	00000	19	SPARE
1821	42,2344	04102 0	OCT	04102	20 3COMP	CDU DEGREES
1822	42,2345	04140 0	OCT	04140	21 3COMP	WHOLE
1823	42,2346	04102 0	OCT	04102	22 3COMP	CDU DEGREES
1824	42,2347	00000 1	OCT	00000	23	SPARE
1825	42,2350	24400 0	OCT	24400	24 3COMP	HMS (DEC ONLY)
1826	42,2351	04140 0	OCT	04140	25 3COMP	WHOLE
1827	42,2352	04000 0	OCT	04000	26 3COMP	OCTAL ONLY
1828	42,2353	00140 1	OCT	00140	27 1COMP	WHOLE
1829	42,2354	00000 1	OCT	00000	28	SPARE
1830	42,2355	00000 1	OCT	00000	29	SPARE
1831	42,2356	00000 1	OCT	0	30	SPARE
1832	42,2357	00000 1	OCT	0	31	SPARE
1833	42,2360	24400 0	OCT	24400	32 3COMP	HMS (DEC ONLY)
1834	42,2361	24400 0	OCT	24400	33 3COMP	HMS (DEC ONLY)
1835	42,2362	24400 0	OCT	24400	34 3COMP	HMS (DEC ONLY)
1836	42,2363	24400 0	OCT	24400	35 3COMP	HMS (DEC ONLY)
1837	42,2364	24400 0	OCT	24400	36 3COMP	HMS (DEC ONLY)
1838	42,2365	24400 0	OCT	24400	37 3COMP	HMS (DEC ONLY)
1839	42,2366	24400 0	OCT	24400	38 3COMP	HMS (DEC ONLY)
1840	42,2367	00000 1	OCT	00000	39	SPARE
R18401	END OF NNTYPTAB FOR NORMAL NOUNS					
A18402	NN MIXED NOUNS					
1841	42,2370	24500 1	OCT	24500	40 3COMP	MIN/SEC, VEL3, VEL3
A18411	(NO LOAD, DEC ONLY)					
1842	42,2371	00542 1	OCT	00542	41 2COMP	CDU DEG, ELEV DEG
1843	42,2372	24410 1	OCT	24410	42 3COMP	POS4, POS4, VEL3
A18431	(DEC ONLY)					
1844	42,2373	20204 0	OCT	20204	43 3COMP	DPDEG(360), DPDEG(360), POS4
A18441	(DEC ONLY)					
1845	42,2374	00410 1	OCT	00410	44 3COMP	POS4, POS4, MIN/SEC
A18451	(NO LOAD, DEC ONLY)					
1846	42,2375	10000 0	OCT	10000	45 3COMP	WHOLE, MIN/SEC, DPDEG(360)
A18461	(NO LOAD, DEC ONLY)					
1847	42,2376	00000 1	OCT	00000	46 1COMP	OCTAL ONLY
1848	42,2377	00306 1	OCT	00306	47 2COMP	WEIGHT2 FOR EACH
A18481	(DEC ONLY)					
1849	42,2400	01367 1	OCT	01367	48 2COMP	TRIM DEG2 FOR EACH
A18491	(DEC ONLY)					
1850	42,2401	00510 0	OCT	00510	49 2COMP	POS4, VEL3
A18501	(DEC ONLY)					
1851	42,2402	00000 1	OCT	0	50	SPARE
1852	42,2403	00204 1	OCT	00204	51 2COMP	DPDEG(360), DPDEG(360)

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A18521							(DEC ONLY)
1853	42,2404	00004 0	OCT	00004	52 1COMP	DPDEG(360)	
1854	42,2405	00000 1	OCT	00000	53	SPARE	
1855	42,2406	10507 1	OCT	10507	54 3COMP	POS5, VEL3, DPDEG(360)	
A18551						(DEC ONLY)	
1858	42,2407	10200 1	OCT	10200	55 3COMP	WHOLE, DPDEG(360), DPDEG(360)	
A18581						(DEC ONLY)	
1859	42,2410	00204 1	OCT	00204	56 2COMP	DPDEG(360), DPDEG(360)	
1860	42,2411	00010 0	OCT	00010	57 1COMP	POS4	
A18601						(DEC ONLY)	
1861	42,2412	24510 0	OCT	24510	58 3COMP	POS4, VEL3, VEL3	
A18611						(DEC ONLY)	
1862	42,2413	24512 1	OCT	24512	59 3COMP	VEL3 FOR EACH	
A18621						(DEC ONLY)	
1863	42,2414	60512 1	OCT	60512	60 3COMP	VEL3, VEL3, COMP ALT	
A18631						(DEC ONLY)	
1864	42,2415	54000 0	OCT	54000	61 3COMP	MIN/SEC, MIN/SEC, POS7	
A18641						(NO LOAD, DEC ONLY)	
1865	42,2416	24012 1	OCT	24012	62 3COMP	VEL3, MIN/SEC, VEL3	
A18651						(NO LOAD, DEC ONLY)	
1866	42,2417	60512 1	OCT	60512	63 3COMP	VEL3, VEL3, COMP ALT	
A18661						(DEC ONLY)	
1867	42,2420	60500 1	OCT	60500	64 3COMP	2INT, VEL3, COMP ALT	
A18671						(NO LOAD, DEC ONLY)	
1868	42,2421	00000 1	OCT	00000	65 3COMP	HMS (DEC ONLY)	
1869	42,2422	00016 0	OCT	00016	66 2COMP	LANDING RADAR ALT, POSITION	
A18691						(NO LOAD, DEC ONLY)	
1870	42,2423	53223 1	OCT	53223	67 3COMP	LANDING RADAR VELX, Y, Z	
1871	42,2424	60026 0	OCT	60026	68 3COMP	POS7, MIN/SEC, COMP ALT	
A18711						(NO LOAD, DEC ONLY)	
1872	42,2425	00000 1	OCT	00000	69	SPARE	
1873	42,2426	00000 1	OCT	0	70 3COMP	OCTAL ONLY FOR EACH	
1874	42,2427	00000 1	OCT	0	71 3COMP	OCTAL ONLY FOR EACH	
1875	42,2430	00102 1	OCT	00102	72 2COMP	360-CDU DEG, CDU DEG	
1876	42,2431	00102 1	OCT	00102	73 2COMP	360-CDU DEG, CDU DEG	
1877	42,2432	10200 1	OCT	10200	74 3COMP	MIN/SEC, DPDEG(360), DPDEG(360)	
A18771						(NO LOAD, DEC ONLY)	
1878	42,2433	00010 0	OCT	00010	75 3COMP	POS4, MIN/SEC, MIN/SEC	
A18781						(NO LOAD, DEC ONLY)	
1879	42,2434	00410 1	OCT	00410	76 2COMP	POS4, POS4	
A18791						(DEC ONLY)	
1880	42,2435	00500 1	OCT	00500	77 2COMP	MIN/SEC, VEL3	
A18801						(NO LOAD, DEC ONLY)	
1881	42,2436	00654 0	OCT	00654	78 2 COMP	RR RANGE, RR RANGE RATE	
1882	42,2437	00102 1	OCT	00102	79 3COMP	CDU DEG, CDU DEG, WHOLE	
A18821						(DEC ONLY)	
1883	42,2440	00200 0	OCT	00200	80 2COMP	WHOLE, DPDEG(360)	
1884	42,2441	24512 1	OCT	24512	81 3COMP	VEL3 FOR EACH	
A18841						(DEC ONLY)	
1885	42,2442	24512 1	OCT	24512	82 3COMP	VEL3 FOR EACH	

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A18851							(DEC ONLY)
1886	42,2443	24512 1	OCT	24512	83 3COMP	VEL3 FOR EACH	(DEC ONLY)
A18861							(DEC ONLY)
1887	42,2444	24512 1	OCT	24512	84 3COMP	VEL3 FOR EACH	(DEC ONLY)
A18871							(DEC ONLY)
1888	42,2445	24512 1	OCT	24512	85 3COMP	VEL3 FOR EACH	(DEC ONLY)
A18881							(DEC ONLY)
1889	42,2446	24512 1	OCT	24512	86 3COMP	VEL3 FOR EACH	(DEC ONLY)
A18891							(DEC ONLY)
1890	42,2447	00102 1	OCT	00102	87 2COMP	CDU DEG FOR EACH	
1891	42,2450	00000 1	OCT	0	88 3COMP	FRAC FOR EACH	(DEC ONLY)
A18912							(DEC ONLY)
1892	42,2451	16143 0	OCT	16143	89 3COMP	DPDEG(90), DPDEG(90), POSS	
A18921							(DEC ONLY)
1893	42,2452	10507 1	OCT	10507	90 3COMP	POSS, VEL3, DPDEG(360)	(DEC ONLY)
A18931							(DEC ONLY)
1894	42,2453	00000 1	OCT	00000	91	SPARE	
1895	42,2454	00000 1	OCT	00000	92	SPARE	
1896	42,2455	06143 1	OCT	06143	93 3COMP	DPDEG(90) FOR EACH	
1897	42,2456	00000 1	OCT	00000	94	SPARE	
1898	42,2457	00000 1	OCT	0	95	SPARE	
1899	42,2460	00000 1	OCT	0	96	SPARE	
1900	42,2461	00000 1	OCT	00000	97 3COMP	WHOLE FOR EACH	
1901	42,2462	00000 1	OCT	00000	98 3COMP	WHOLE, FRAC, WHOLE	
1902	42,2463	01572 0	OCT	01572	99 3COMP	POSS, VEL4	(DEC ONLY)
A19021							(DEC ONLY)
R1903	END OF NNTYPTAB FOR MIXED NOUNS						

2200	42,2464	00006 1	SFINTAB	OCT	00006	WHOLE, DP TIME (SEC)
2201	42,2465	03240 1		OCT	03240	
2202	42,2466	00000 1		OCT	00000	SPARE
2203	42,2467	00000 1		OCT	00000	
2204	42,2470	00000 1		OCT	00000	CDU DEGREES, 360-CDU DEGREES
2205	42,2471	00000 1		OCT	00000	(SFCONS IN DEGINSF)
2206	42,2472	10707 0		OCT	10707	DP DEGREES (90)
2207	42,2473	03435 0		OCT	03435	UPPED BY 1
2208	42,2474	13070 1		OCT	13070	DP DEGREES (360)(POINT 8ETWN BITS 11-12)
2209	42,2475	34345 1		OCT	34345	UPPED BY 1
2210	42,2476	00005 1		OCT	00005	DEGREES (180)
2211	42,2477	21616 0		OCT	21616	
2212	42,2500	26113 0		OCT	26113	WEIGHT2
2213	42,2501	31713 0		OCT	31713	
2214	42,2502	00070 0		OCT	00070	POSITION5
2215	42,2503	20460 1		OCT	20460	
2216	42,2504	01065 0		OCT	01065	POSITION4
2217	42,2505	05740 1		OCT	05740	
2218	42,2506	11414 0		OCT	11414	VELOCITY2 (POINT BETWN 8ITS 11-12)
2219	42,2507	31463 1		OCT	31463	
2220	42,2510	07475 0		OCT	07475	VELOCITY3

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2221	42,2511	16051 1	OCT	16051	
2222	42,2512	00001 0	OCT	00001	ELEVATION DEGREES
2223	42,2513	03434 1	OCT	03434	
2224	42,2514	00047 1	OCT	00047	RENDEZVOUS RADAR RANGE
2225	42,2515	21135 0	OCT	21135	
2226	42,2516	77766 0	OCT	77766	RENDEZVOUS RADAR RANGE RATE
2227	42,2517	50711 0	OCT	50711	
2228	42,2520	00005 1	2DEC*	.9267840599 E5	B-28 * LANDING RADAR ALTITUDE
2228	42,2521	25006 0			
2230	42,2522	00002 0	OCT	00002	INITIAL/FINAL ALTITUDE
2231	42,2523	23224 1	OCT	23224	
2232	42,2524	00014 1	OCT	00014	ALTITUDE RATE
2233	42,2525	06500 1	OCT	06500	
2234	42,2526	00012 1	OCT	00012	FORWARD/LATERAL VELOCITY
2235	42,2527	36455 0	OCT	36455	
2236	42,2530	04256 1	OCT	04256	ROT HAND CONT ANGLE RATE
2237	42,2531	07071 0	OCT	07071	
2238	42,2532	77766 0	2DEC*	-1.552795030 E5	B-28 * LANDING RADAR VELX
2238	42,2533	60557 0			
2240	42,2534	00005 1	2DEC*	.8250825087 E5	B-28 * LANDING RADAR VELY
2240	42,2535	01114 1			
2242	42,2536	00007 0	2DEC*	1.153668673 E5	B-28 * LANDING RADAR VELZ
2242	42,2537	01247 1			
2244	42,2540	04324 0	OCT	04324	POSITION7
2245	42,2541	27600 1	OCT	27600	
2246	42,2542	00036 1	OCT	00036	TRIM DEGREES2
2247	42,2543	20440 0	OCT	20440	
2248	42,2544	00035 1	OCT	00035	COMPUTED ALTITUDE
2249	42,2545	30400 0	OCT	30400	
2250	42,2546	23420 0	OCT	23420	DP DEGREES
2251	42,2547	00000 1	OCT	00000	
2252	42,2550	16102 0	2DEC	1852 E3	B-22 POSITION9
2252	42,2551	14000 1			
2253	42,2552	07475 0	2DEC	30.48 B-7	VELOCITY4
2253	42,2553	16051 1			

A2290

END OF SFINTAB

2300	42,2554	05174 0	SFOUTAB	OCT	05174	WHOLE, DP TIME (SEC)
2301	42,2555	13261 0		OCT	13261	
2302	42,2556	00000 1		OCT	00000	SPARE
2303	42,2557	00000 1		OCT	00000	
2304	42,2560	00000 1		OCT	00000	CDU DEGREES, 360-CDU DEGREES
2305	42,2561	00000 1		OCT	00000	(SFCONS IN DEGOUTSF, 360-CDU0)
2306	42,2562	00714 0		OCT	00714	DP DEGREES (90) (POINT BETWN BITS 7-8)
2307	42,2563	31463 1		OCT	31463	
2308	42,2564	13412 1		OCT	13412	DP DEGREES (360)
2309	42,2565	07534 1		OCT	07534	
2310	42,2566	05605 1		OCT	05605	DEGREES (180)
2311	42,2567	03656 1		OCT	03656	

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2312	42,2570	00001 0	OCT	00001	WEIGHT2
2313	42,2571	16170 0	OCT	16170	
2314	42,2572	00441 0	OCT	00441	POSITION5
2315	42,2573	34306 0	OCT	34306	
2316	42,2574	07176 0	OCT	07176	POSITION4 (POINT BETWN BITS 7-8)
2317	42,2575	21603 1	OCT	21603	
2318	42,2576	15340 1	OCT	15340	VELOCITY2
2319	42,2577	15340 1	OCT	15340	
2320	42,2600	01031 1	OCT	01031	VELOCITY3 (POINT BETWN BITS 7-8)
2321	42,2601	21032 0	OCT	21032	
2322	42,2602	34631 1	OCT	34631	ELEVATION DEGREES
2323	42,2603	23146 0	OCT	23146	
2324	42,2604	00636 1	OCT	00636	RENDEZVOUS RADAR RANGE
2325	42,2605	14552 0	OCT	14552	
2326	42,2606	74552 0	OCT	74552	RENDEZVOUS RADAR RANGE RATE
2327	42,2607	70307 1	OCT	70307	
2328	42,2610	05520 0	2DEC	1.079 E-5 B14	LANDING RADAR ALTITUDE
2328	42,2611	15312 0			
2330	42,2612	14226 1	OCT	14226	INITIAL/FINAL ALTITUDE
2331	42,2613	31757 0	OCT	31757	
2332	42,2614	02476 0	OCT	02476	ALTITUDE RATE
2333	42,2615	05531 0	OCT	05531	
2334	42,2616	02727 1	OCT	02727	FORWARD/LATERAL VELOCITY
2335	42,2617	16415 0	OCT	16415	
2336	42,2620	00007 0	OCT	00007	ROT HAND CONT ANGLE RATE
2337	42,2621	13734 0	OCT	13734	
2338	42,2622	74477 0	2DEC	-.6440 E-5 B14	LANDING RADAR VELX
2338	42,2623	50643 0			
2340	42,2624	06265 0	2DEC	1.212 E-5 B14	LANDING RADAR VELY
2340	42,2625	16004 1			
2342	42,2626	04426 0	2DEC	.8668 E-5 B14	LANDING RADAR VELZ
2342	42,2627	31433 1			
2344	42,2630	34772 1	OCT	34772	POSITION7
2345	42,2631	07016 1	OCT	07016	
2346	42,2632	01030 0	OCT	01030	TRIM DEGREES2
2347	42,2633	33675 0	OCT	33675	
2348	42,2634	01046 1	OCT	01046	COMPUTED ALTITUDE
2349	42,2635	15700 1	OCT	15700	
2350	42,2636	00321 1	OCT	00321	DP DEGREES
2351	42,2637	26706 1	OCT	26706	
2352	42,2640	11036 1	2DEC	.283092873	POSITION9
2352	42,2641	06144 0			
2353	42,2642	01031 1	2DEC	.032808399	VELOCITY4
2353	42,2643	21032 0			
A2390					END OF SFOUTAB

A2400

NN SF CONSTANT

SF ROUTINE

2401 REF 8 LAST 321 42,2644 03451 1 IDADDTAB ECADR TTOGC

40 MIN/SEC

M/S

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2402	REF	1		42,2645	03661 0	ECADR	VGDISP	40	VFL3	DP3	
2403	REF	2	LAST	162	42,2646	03505 1	ECADR	DVTOTAL	40	VEL3	DP3
2404	REF	8	LAST	321	42,2647	01045 1	ECADR	DSPTM1	41	CDU DEG	CDU
2405	REF	9	LAST	329	42,2650	01046 1	ECADR	DSPTM1 +1	41	ELEV DEG	ARTH
2406					42,2651	00000 1	OCT	0	41	SPARE COMPONENT	
2407	REF	3	LAST	298	42,2652	02322 0	ECADR	HAPO	42	POS4	DP3
2408	REF	1			42,2653	02324 0	ECADR	HPER	42	POS4	DP3
2409	REF	2	LAST	329	42,2654	03661 0	ECADR	VGDISP	42	VEL3	DP3
2410	REF	2	LAST	120	42,2655	01120 0	ECADR	LAT	43	DPDEG(360)	DP4
2411	REF	2	LAST	120	42,2656	01122 1	ECADR	LCNG	43	DPDEG(360)	DP4
2412	REF	2	LAST	120	42,2657	01124 1	ECADR	ALT	43	POS4	DP3
2413	REF	2	LAST	130	42,2660	02117 1	ECADR	HAPOX	44	POS4	DP3
2414	REF	1			42,2661	02121 1	ECADR	HPERX	44	POS4	DP3
2415	REF	2	LAST	131	42,2662	02140 0	ECADR	TFF	44	MIN/SEC	M/S
2416	REF	3	LAST	256	42,2663	03460 0	ECADR	TRKMKCNT	45	WHOLE	ARTH
2417	REF	9	LAST	328	42,2664	03451 1	ECADR	TTOGO	45	MIN/SEC	M/S
2418	REF	1			42,2665	02256 1	ECADR	+MGA	45	DPDEG(360)	DP4
2419	REF	10	LAST	308	42,2666	01343 1	ECADR	DAPDATR1	46	OCTAL ONLY	OCT
2420					42,2667	00000 1	OCT	0	46	SPARE COMPONENT	
2421					42,2670	00000 1	OCT	0	46	SPARE COMPONENT	
2422	REF	10	LAST	310	42,2671	01331 1	ECADR	LEMMASS	47	WEIGHT2	ARTH1
2423	REF	4	LAST	310	42,2672	01332 1	ECADR	CSMASS	47	WEIGHT2	ARTH1
2424					42,2673	00000 1	OCT	0	47	SPARE COMPONENT	
2425	REF	1			42,2674	03002 0	ECADR	PITTIME	48	TRIM DEG2	ARTH
2426	REF	2	LAST	310	42,2675	03001 0	ECADR	ROLLTIME	48	TRIM DEG2	ARTH
2427					42,2676	00000 1	OCT	0	48	SPARE COMPONENT	
2428	REF	1			42,2677	00314 1	ECADR	R22DISP	49	POS4	DP3
2429	REF	2	LAST	329	42,2700	00316 0	ECADR	R22DISP +2	49	VEL3	DP3
2430					42,2701	00000 1	OCT	00000	49	SPARE COMPONENT	
2431					42,2702	00000 1	OCT	0	50	SPARE	
2432					42,2703	00000 1	OCT	0	50	SPARE	
2433					42,2704	00000 1	OCT	0	50	SPARE	
2434	REF	4	LAST	295	42,2705	02204 0	ECADR	ALPHASB	51	DPDEG(360)	DP4
2435	REF	3	LAST	134	42,2706	02206 1	ECADR	BETASB	51	DPDEG(360)	DP4
2436					42,2707	00000 1	OCT	0	51	SPARE COMPONENT	
2437	REF	1			42,2710	01755 1	ECADR	ACTCENT	52	DPDEG(360)	DP4
2438					42,2711	00000 1	OCT	00000	52	SPARE COMPONENT	
2439					42,2712	00000 1	OCT	00000	52	SPARE COMPONENT	
2440					42,2713	00000 1	OCT	00000	53	SPARE	
2441					42,2714	00000 1	OCT	00000	53		
2442					42,2715	00000 1	OCT	00000	53		
2443	REF	7	LAST	134	42,2716	02204 0	ECADR	RANGE	54	POS5	DP1
2444	REF	3	LAST	131	42,2717	02206 1	ECADR	RRATE	54	VFL3	DP3
2445	REF	2	LAST	131	42,2720	02210 0	ECADR	RTHETA	54	DPDEG(360)	DP4
2446	REF	2	LAST	213	42,2721	03464 1	ECADR	NN	55	WHOLF	ARTH
2447	REF	3	LAST	213	42,2722	02262 0	ECADR	ELFV	55	DPDEG(360)	DP4
2448	REF	2	LAST	213	42,2723	03616 0	ECADR	CENTANG	55	DPDEG(360)	DP4
2449	REF	3	LAST	315	42,2724	02204 0	ECADR	RR-AZ	56	DPDEG(360)	DP4
2450	REF	2	LAST	315	42,2725	02206 1	ECADR	RR-ELFV	56	DPDEG(360)	DP4
2451					42,2726	00000 1	OCT	0	56	SPARE COMPONENT	

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2452	REF	4	LAST	213	42,2727	02306 0	ECADR DELTAR	57 POS4	DP3
2453					42,2730	00000 1	OCT 0	57 SPARE COMPONENT	
2454					42,2731	00000 1	OCT 0	57 SPARE COMPONENT	
2455	REF	3	LAST	156	42,2732	03603 1	ECADR POSTTPI	58 POS4	DP3
2456	REF	5	LAST	156	42,2733	03573 0	ECADR DELVTPI	58 VEL3	DP3
2457	REF	2	LAST	213	42,2734	02353 0	ECADR DELVTPF	58 VEL3	DP3
2458	REF	2	LAST	133	42,2735	02306 0	ECADR DVLOS	59 VEL3	DP3
2459	REF	3	LAST	330	42,2736	02310 1	ECADR DVLOS +2	59 VEL3	DP3
2460	REF	4	LAST	330	42,2737	02312 0	ECADR DVLJS +4	59 VEL3	DP3
2461	REF	2	LAST	135	42,2740	02266 1	ECADR VHDRIZ	60 VEL3	DP3
2462	REF	2	LAST	162	42,2741	03471 0	ECADR HDOTDISP	60 VEL3	DP3
2463	REF	2	LAST	162	42,2742	03532 0	ECADR HCALC	60 COMP ALT	DP1
2464	REF	2	LAST	162	42,2743	03473 1	ECADR TTFDISP	61 MIN/SEC	M/S
2465	REF	10	LAST	329	42,2744	03451 1	ECADR TTOGO	61 MIN/SEC	M/S
2466	REF	2	LAST	138	42,2745	02533 0	ECADR OUTCFPLN	61 POST	DP4
2467	REF	2	LAST	162	42,2746	03467 1	ECADR A8VEL	62 VEL3	DP3
2468	REF	11	LAST	330	42,2747	03451 1	ECADR TTOGO	62 MIN/SEC	M/S
2469	REF	3	LAST	329	42,2750	03505 1	ECADR DVTOTAL	62 VEL3	DP3
2470	REF	3	LAST	330	42,2751	03467 1	ECADR A8VEL	63 VEL3	DP3
2471	REF	3	LAST	330	42,2752	03471 0	ECADR HDOTDISP	63 VEL3	DP3
2472	REF	3	LAST	330	42,2753	03532 0	ECADR HCALC	63 COMP ALT	DP1
2473	REF	5	LAST	165	42,2754	03664 0	ECADR FUNNYDSP	64 2INT	2INT
2474	REF	4	LAST	330	42,2755	03471 0	ECADR HDOTDISP	64 VEL3	DP3
2475	REF	4	LAST	330	42,2756	03532 0	ECADR HCALC	64 COMP ALT	DP1
2476	REF	2	LAST	222	42,2757	00013 0	ECADR SAMPTIME	65 HMS (MIXED ONLY TO KEEP CODE 65)	HMS
2477	REF	3	LAST	330	42,2760	00013 0	ECADR SAMPTIME	65 HMS	HMS
2478	REF	4	LAST	330	42,2761	00013 0	ECADR SAMPTIME	65 HMS	HMS
2479	REF	3	LAST	292	42,2762	02212 1	ECADR RSTACK +6	66 LANDING RADAR ALT	DP1
2480					42,2763	00000 1	OCT 0	66 LR POSITION	LRPOS
2481					42,2764	00000 1	OCT 0	66 SPARE COMPONENT	
2482	REF	4	LAST	330	42,2765	02204 0	ECADR RSTACK	67 LANDING RADAR VELX	DP1
2483	REF	5	LAST	330	42,2766	02206 1	ECADR RSTACK +2	67 LANDING RADAR VELY	DP1
2484	REF	6	LAST	330	42,2767	02210 0	ECADR RSTACK +4	67 LANDING RADAR VELZ	DP1
2485	REF	2	LAST	138	42,2770	02531 1	ECADR RANGEDSP	68 POST	DP4
2486	REF	3	LAST	330	42,2771	03473 1	ECADR TTFDISP	68 MIN/SEC	M/S
2487	REF	3	LAST	215	42,2772	03662 0	ECADR DELTAH	68 COMP ALT	DP1
2488					42,2773	00000 1	OCT 00000	69 SPARE	
2489					42,2774	00000 1	OCT 00000	69	
2490					42,2775	00000 1	OCT 00000	69	
2491	REF	3	LAST	261	42,2776	00735 0	ECADR AOTCODE	70 DCTAL ONLY	OCT
2492	REF	4	LAST	330	42,2777	00736 0	ECADR AOTCODE +1	70 DCTAL ONLY	OCT
2493	REF	5	LAST	330	42,3000	00737 1	ECADR AOTCODE +2	70 DCTAL ONLY	OCT
2494	REF	6	LAST	330	42,3001	00735 0	ECADR AOTCODE	71 DCTAL ONLY	OCT
2495	REF	7	LAST	330	42,3002	00736 0	ECADR AOTCODE +1	71 DCTAL ONLY	OCT
2496	REF	8	LAST	330	42,3003	00737 1	ECADR AOTCODE +2	71 DCTAL ONLY	OCT
2497	REF	3	LAST	314	42,3004	00035 1	ECADR CDUT	72 360-CDU DEG	360-CDU
2498	REF	3	LAST	213	42,3005	00036 1	ECADR CDUS	72 CDU DEG	CDU
2499					42,3006	00000 1	OCT 0	72 SPARE COMPONENT	
2500	REF	2	LAST	119	42,3007	01107 0	ECADR TANG	73 360-CDU DEG	360-CDU
2501	REF	3	LAST	330	42,3010	01110 0	ECADR TANG +1	73 CDU DEG	CDU

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2502					42,3011	00000	1	OCT	0	73 SPARE COMPONENT	
2503	REF	12	LAST	330	42,3012	03451	1	ECADR	TTCGO	74 MIN/SEC	M/S
2504	REF	2	LAST	136	42,3013	02366	0	ECADR	YAW	74 DPDEG(360)	DP4
2505	REF	1			42,3014	02370	1	ECADR	PITCH	74 DPDEG(360)	DP4
2506	REF	3	LAST	213	42,3015	03575	0	ECADR	DIFFALT	75 POS4	DP3
2507	REF	3	LAST	135	42,3016	02256	1	ECADR	T1TOT2	75 MIN/SEC	
2508	REF	1			42,3017	02260	1	ECADR	T2TOT3	75 MIN/SEC	M/S
2509	REF	2	LAST	167	42,3020	03640	0	ECADR	XRANGE	76 POS4	DP3
2510	REF	2	LAST	167	42,3021	03642	1	ECADR	APD	76 POS4	DP3
2511					42,3022	00000	1	OCT	0	76 SPARE COMPONENT	
2512	REF	13	LAST	331	42,3023	03451	1	ECADR	TTCGO	77 MIN/SEC	M/S
2513	REF	2	LAST	136	42,3024	02314	0	ECADR	YDOT	77 VEL3	DP3
2514					42,3025	00000	1	OCT	0	77 SPARE COMPONENT	
2515	REF	7	LAST	330	42,3026	02204	0	ECADR	RSTACK	78 RR RANGE	DP1
2516	REF	8	LAST	331	42,3027	02206	1	ECADR	RSTACK +2	78 RR RANGE RATE	DP1
2517					42,3030	00000	1	OCT	00000	78 SPARE COMPONENT	
2518	REF	2	LAST	276	42,3031	01045	1	ECADR	CURSOR	79 CDU DEG	CDU
2519	REF	2	LAST	276	42,3032	01046	1	ECADR	SPIRAL	79 CDU DEG	CDU
2520	REF	1			42,3033	01052	1	ECADR	POSCODE	79 WHOLE	ARTH
2521	REF	2	LAST	159	42,3034	03731	1	ECADR	DATAGOOD	80 WHOLE	ARTH
2522	REF	1			42,3035	03732	1	ECADR	OMEGAD	80 DPDEG(360)	DP4
2523					42,3036	00000	1	OCT	0	80 SPARE COMPONENT	
2524	REF	2	LAST	154	42,3037	03431	1	ECADR	DELVLVC	81 VEL3	DP3
2525	REF	3	LAST	331	42,3040	03433	0	ECADR	DELVLVC +2	81 VEL3	DP3
2526	REF	4	LAST	331	42,3041	03435	0	ECADR	DELVLVC +4	81 VEL3	DP3
2527	REF	5	LAST	331	42,3042	03431	1	ECADR	DELVLVC	82 VEL3	DP3
2528	REF	6	LAST	331	42,3043	03433	0	ECADR	DELVLVC +2	82 VEL3	DP3
2529	REF	7	LAST	331	42,3044	03435	0	ECADR	DELVLVC +4	82 VEL3	DP3
2530	REF	1			42,3045	03620	0	ECADR	DELVIMU	83 VEL3	DP3
2531	REF	2	LAST	331	42,3046	03622	1	ECADR	DELVIMU +2	83 VEL3	DP3
2532	REF	3	LAST	331	42,3047	03624	1	ECADR	DELVIMU +4	83 VEL3	DP3
2533	REF	1			42,3050	02226	0	ECADR	DELVOV	84 VFL3	DP3
2534	REF	2	LAST	331	42,3051	02230	1	ECADR	DELVCV +2	84 VEL3	DP3
2535	REF	3	LAST	331	42,3052	02232	0	ECADR	DELVCV +4	84 VEL3	DP3
2536	REF	3	LAST	162	42,3053	03477	0	ECADR	VGBODY	85 VEL3	DP3
2537	REF	4	LAST	331	42,3054	03501	0	ECADR	VGBODY +2	85 VEL3	DP3
2538	REF	5	LAST	331	42,3055	03503	1	ECADR	VGBODY +4	85 VEL3	DP3
2539	REF	8	LAST	331	42,3056	03431	1	ECADR	DELVLVC	86 VEL3	DP3
2540	REF	9	LAST	331	42,3057	03433	0	ECADR	DELVLVC +2	86 VEL3	DP3
2541	REF	10	LAST	331	42,3060	03435	0	ECADR	DELVLVC +4	86 VEL3	DP3
2542	REF	3	LAST	261	42,3061	01347	0	ECADR	AZ	87 CDU DEG	CDU
2543	REF	1			42,3062	01350	0	ECADR	EL	87 CDU DEG	CDU
2544											

L PINBALL NOUN TABLES

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2552	REF	4	LAST	329	42,3073	02206 1	ECADR	RRATE	90	VEL3	DP3
2553	REF	3	LAST	329	42,3074	02210 0	ECADR	RTHETA	90	DPDEG(360)	DP4
2554					42,3075	00000 1	OCT	00000	91	SPARE	
2555					42,3076	00000 1	OCT	00000	91		
2556					42,3077	00000 1	OCT	00000	91		
2557					42,3100	00000 1	OCT	00000	92	SPARE	
2558					42,3101	00000 1	OCT	00000	92		
2559					42,3102	00000 1	OCT	00000	92		
2560	REF	6	LAST	288	42,3103	02737 0	ECADR	OGC	93	DPDEG(90)	DP3
2561	REF	7	LAST	332	42,3104	02741 1	ECADR	OGC +2	93	DPDEG(90)	DP3
2562	REF	8	LAST	332	42,3105	02743 0	ECADR	OGC +4	93	DPDEG(90)	DP3
2563					42,3106	00000 1	OCT	00000	94	SPARE	
2564					42,3107	00000 1	OCT	00000	94		
2565					42,3110	00000 1	OCT	00000	94		
2566					42,3111	00000 1	OCT	0	95	SPARE	
2567					42,3112	00000 1	OCT	0	95	SPARE	
2568					42,3113	00000 1	OCT	0	95	SPARE	
2569					42,3114	00000 1	OCT	0	96	SPARE	
2570					42,3115	00000 1	OCT	0	96	SPARE	
2571					42,3116	00000 1	OCT	0	96	SPARE	
2572	REF	10	LAST	329	42,3117	01045 1	ECADR	DSPTM1	97	WHOLE	ARTH
2573	REF	11	LAST	332	42,3120	01046 1	ECADR	DSPTM1 +1	97	WHOLE	ARTH
2574	REF	12	LAST	332	42,3121	01047 0	ECADR	DSPTM1 +2	97	WHOLE	ARTH
2575	REF	4	LAST	320	42,3122	01050 0	ECADR	DSPTM2	98	WHOLE	ARTH
2576	REF	5	LAST	332	42,3123	01051 1	ECADR	DSPTM2 +1	98	FRAC	FRAC
2577	REF	6	LAST	332	42,3124	01052 1	ECADR	DSPTM2 +2	98	WHOLE	ARTH
2578	REF	2	LAST	313	42,3125	02204 0	ECADR	WWPOS	99	POS9	DP4
2579	REF	1			42,3126	02206 1	ECADR	WWVEL	99	VEL4	DP2
2580					42,3127	00000 1	OCT	0	99	SPARE COMPDNENT	

R2600 END OF IDACDTAB

A2800

NN SF ROUTINES

2801		42,3130	16351 1	RUTMXTAB	OCT	16351	40	M/S, DP3, DP3
2802		42,3131	00142 0		OCT	00142	41	CDU, ARTH
2803		42,3132	16347 0		OCT	16347	42	DP3, DP3, DP3
2804		42,3133	16512 0		OCT	16512	43	DP4, DP4, DP3
2805		42,3134	22347 1		OCT	22347	44	DP3, DP3, M/S
2806		42,3135	24443 1		OCT	24443	45	ARTH, M/S, DP4
2807		42,3136	00000 1		OCT	00000	46	DCT
2808		42,3137	00553 1		OCT	00553	47	ARITH1, ARITH1
2809		42,3140	00143 1		OCT	00143	48	ARTH, ARTH
2810		42,3141	00347 1		OCT	00347	49	DP3, DP3
2811		42,3142	00000 1		OCT	0	50	SPARE
2812		42,3143	00512 1		OCT	00512	51	DP4, DP4
2813		42,3144	00012 1		OCT	00012	52	DP4
2814		42,3145	00000 1		OCT	00000	53	SPARE
2815		42,3146	24344 1		OCT	24344	54	DP1, DP3, DP4
2816		42,3147	24503 1		OCT	24503	55	ARTH, DP4, DP4

L PINBALL NOUN TABLES

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2817	42,3150	00512 1	OCT	00512	56 DP4, DP4
2818	42,3151	00007 0	OCT	00007	57 DP3
2819	42,3152	16347 0	OCT	16347	58 DP3, DP3, DP3
2820	42,3153	16347 0	OCT	16347	59 DP3, DP3, DP3
2821	42,3154	10347 0	OCT	10347	60 DP3, DP3, DP1
2822	42,3155	24451 1	OCT	24451	61 M/S, M/S, DP4
2823	42,3156	16447 1	OCT	16447	62 DP3, M/S, DP3
2824	42,3157	10347 0	OCT	10347	63 DP3, DP3, DP1
2825	42,3160	10354 1	OCT	10354	64 2INT, DP3, DP1
2826	42,3161	20410 0	OCT	20410	65 HMS, HMS, HMS
2827	42,3162	00304 0	OCT	00304	66 DP1, LRPOS
2828	42,3163	10204 0	OCT	10204	67 DP1, DP1, DP1
2829	42,3164	10452 0	OCT	10452	68 DP4, M/S, DP1
2830	42,3165	00000 1	OCT	00000	69 SPARE
2831	42,3166	00000 1	OCT	0	70 OCT, OCT, OCT
2832	42,3167	00000 1	OCT	0	71 OCT, OCT, OCT
2833	42,3170	00115 1	OCT	00115	72 360-CDU, CDU
2834	42,3171	00115 1	OCT	00115	73 360-CDU, CDU
2835	42,3172	24511 1	OCT	24511	74 M/S, DP4, DP4
2836	42,3173	22447 0	OCT	22447	75 DP3, M/S, M/S
2837	42,3174	00347 1	OCT	00347	76 DP3, DP3
2838	42,3175	00351 0	OCT	00351	77 M/S, DP3
2839	42,3176	00204 1	OCT	00204	78 DP1, DP1
2840	42,3177	06102 1	OCT	06102	79 CDU, CDU, ARTH
2841	42,3200	00503 1	OCT	00503	80 ARTH, DP4
2842	42,3201	16347 0	OCT	16347	81 DP3, DP3, DP3
2843	42,3202	16347 0	OCT	16347	82 DP3, DP3, DP3
2844	42,3203	16347 0	OCT	16347	83 DP3, DP3, DP3
2845	42,3204	16347 0	OCT	16347	84 DP3, DP3, DP3
2846	42,3205	16347 0	OCT	16347	85 DP3, DP3, DP3
2847	42,3206	16347 0	OCT	16347	86 DP3, DP3, DP3
2848	42,3207	00102 1	OCT	00102	87 CDU, CDU
2849	42,3210	02041 0	OCT	02041	88 FRAC FOR EACH
2850	42,3211	10347 0	OCT	10347	89 DP3, DP3, DP1
2851	42,3212	24344 1	OCT	24344	90 DP1, DP3, DP4
2852	42,3213	00000 1	OCT	00000	91 SPARE
2853	42,3214	00000 1	OCT	00000	92 SPARE
2854	42,3215	16347 0	OCT	16347	93 DP3, DP3, DP3
2855	42,3216	00000 1	OCT	00000	94 SPARE
2856	42,3217	00000 1	OCT	0	95 SPARE
2857	42,3220	00000 1	OCT	0	96 SPARE
2858	42,3221	06143 1	OCT	06143	97 ARTH, ARTH, ARTH
2859	42,3222	06043 0	OCT	06043	98 ARTH, FRAC, ARTH
2860	42,3223	00252 1	OCT	00252	99 DP4, DP2
R2870	END OF RUMXTAB				

L LEM GEOMETRY

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0001				23,2041	BANK 23
000101	REF	1		13,2000	SETLOC LEMGEOM
000102				13,2070	BANK

00015	REF	4	LAST	333	30,2000	SBANK= LOWSUPER
0002	REF	3	LAST	138	E5,1642	EBANK= XSM

R0500 THESE TWO ROUTINES COMPUTE THE ACTUAL STATE VECTOR FOR LM,CSM BY ADDING
 R0501 THE CONIC R,V AND THE DEVIATIONS R,V. THE STATE VECTORS ARE CONVERTED TO
 R0502 METERS B-29 AND METERS/CSEC B-7 AND STORED APPROPRIATELY IN RN,VN OR
 R0503 R-OTHER, V-OTHER FOR DOWNLINK. THE ROUTINES NAMES ARE SWITCHED IN THE
 R0504 OTHER VEHICLES COMPUTER.

R0505 INPUT
 R0506 STATE VECTOR IN TEMPORARY STORAGE AREA
 R05061 IF STATE VECTOR IS SCALED POS B27 AND VEL B5
 R05062 SET X2 TO +2
 R05063 IF STATE VECTOR IS SCALED POS B29 AND VEL B7
 R05064 SFT X2 TO 0

R0507 OUTPUT
 R0508 R(T) IN RN, V(T) IN VN, T IN PIPTIME
 R0509 OR
 R0510 R(T) IN R-OTHER, V(T) IN V-OTHER (T IS DEFINED BY T-OTHER)

05106	REF	1				COUNT* \$\$/GEOM	
0511				13,2070	43414 1	BOF RVQ	SW=1=AVETOMID DOING W-MATRIX INTEG.
05112	REF	1		13,2071	04756 1	AVEM IDSW	
05113				13,2072	26073 1	+1	
05114				13,2073	53775 1	VLOAD VSL*	
0512	REF	2	LAST	126	13,2074	TDELTAV	
0513				13,2075	01521 0	0 -7,2	
0514				13,2076	57605 0	VAD VSL*	
0515	REF	2	LAST	126	13,2077	RCV	
0516				13,2100	01535 0	0,2	
0517	REF	4	LAST	210	13,2101	STOVL RN	
0518	REF	2	LAST	126	13,2102	TNUV	
0519				13,2103	01527 0	VSL* VAD	
0520				13,2104	53257 1	0 -4,2	
0521	REF	2	LAST	126	13,2105	VCV	
0522				13,2106	01543 1	VSL*	
0523				13,2107	77657 0	0,2	
0524	REF	4	LAST	210	13,2110	STODL VN	
0525	REF	3	LAST	321	13,2111	TET	
0526	REF	2	LAST	210	13,2112	STORE PIPTIME	
0527				13,2113	01235 1	RVQ	
					77616 0		

L

LEM GEOMETRY

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0528					13,2114	53775 1	SVDWN1	VLOAD	VSL*
0529	REF	3	LAST	334	13,2115	01521 0			TDELTAV
0530					13,2116	57605 0			0 -7,2
0531					13,2117	53655 1		VAD	VSL*
0532	REF	3	LAST	334	13,2120	01535 0			RCV
0533					13,2121	57576 1			0,2
0534	REF	5	LAST	209	13,2122	25720 0		STOVL	R-OTHER
0535	REF	3	LAST	334	13,2123	01527 0			TNUV
0536					13,2124	53257 1		VSL*	VAD
0537					13,2125	57602 1			0 -4,2
0538	REF	3	LAST	334	13,2126	01543 1			VCV
0539					13,2127	77657 0		VSL*	
0540					13,2130	57576 1			0,2
0541	REF	5	LAST	209	13,2131	01726 0		STORE	V-OTHEP
0542					13,2132	77616 0		RVQ	

L LEM GEOMETRY

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06649 THE FOLLOWING ROUTINE TAKES A HALF UNIT TARGET VECTOR REFERRED TO NAV BASE COORDINATES AND FINDS BOTH
 R0651 GIMBAL ORIENTATIONS AT WHICH THE RR MIGHT SIGHT THE TARGET. THE GIMBAL ANGLES CORRESPONDING TO THE PRESENT MODE
 R0653 ARE LEFT IN MODEA AND THOSE WHICH WOULD BE USED AFTER A REMODE IN MODEB. THIS ROUTINE ASSUMES MODE 1 IS TRUNNION
 R0655 ANGLE LESS THAN 90 DEGS IN ABS VALUE WITH ARBITRARY SHAFT, WITH A CORRESPONDING DEFINITION FOR MODE 2. MODE
 R0657 SELECTION AND LIMIT CHECKING ARE DONE ELSEWHERE.

R0658 THE MODE 1 CONFIGURATION IS CALCULATED FROM THE VECTOR AND THEN MODE 2 IS FOUND USING THE RELATIONS

R0660 $S(2) = 180 + S(1)$
 R0661 $T(2) = 180 - T(1)$

R066101 THE VECTOR ARRIVES IN MPAC WHERE TRG*SMNB OR *SMNB* WILL HAVE LEFT IT.

0662			13,2133	00041 1	RRANGLES	STORE	32D	
06625			13,2134	57545 1		DLOAD	DCOMP	SINCE WE WILL FIND THE MODE 1 SHAFT
0663			13,2135	00043 0			34D	ANGLE LATER, WE CAN FIND THE MODE 1
0664			13,2136	67401 0		SETPD	ASIN	TRUNNION BY SIMPLY TAKING THE ARCSIN OF
0665			13,2137	00001 0			0	THE Y COMPONENT, THE ASIN GIVING AN
0666			13,2140	44206 0		PUSH	BDSU	ANSWER WHOSE ABS VAL IS LESS THAN 90 DEG
0667	REF	1	13,2141	22273 1			LODPHALF	
0668			13,2142	14005 1		STODL	4	MODE 2 TRUNNION TO 4.
0669	REF	3	LAST	264	13,2143	22275 1		
0670					13,2144	24043 0		
0671					13,2145	00041 1		
0672					13,2146	41056 1		
0673	REF	1			13,2147	52421 1		
0674					13,2150	14041 1		
0675					13,2151	00041 1		
0676					13,2152	44142 0		
0677	REF	1			13,2153	00051 0		
0678	REF	3	LAST	315	13,2154	14023 0		
0679					13,2155	00045 0		
0680					13,2156	77742 0		
0681	REF	3	LAST	315	13,2157	34021 0		
0682	REF	3	LAST	315	13,2160	47222 0		

UNIT THE PROJECTION OF THE VECTOR
 IN THE X-Z PLANE
 IF OVERFLOW, TARGET VECTOR IS ALONG Y
 CALL FOR MANEUVER UNLESS ON LUNAR SURF
 PROJECTION VECTOR.

USE ARCTRIG SINCE SHAFT COULD BE ARB.

L LEM GEOMETRY

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```

0683      13,2161  43206 1
0684 REF  2 LAST 336 13,2162  22273 1
0685      13,2163  24007 0
0686      13,2164  00005 1
0687      13,2165  77634 0
0688 REF  1      13,2166  21541 1
0689 RFF  2 LAST 119 13,2167  25112 1
0690      13,2170  00001 0
0691      13,2171  77634 0
0692 REF  2 LAST 337 13,2172  21541 1
0693 REF  1      13,2173  01110 0
0694      13,2174  77776 1

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0695 REF 26 LAST 291 13,2175  4 0110 0
0696 REF 20 LAST 269 13,2176  7 4740 1
0697 REF 94 LAST 320 13,2177  10 000 0
0698      13,2200  1 2204 1

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0699 REF  2 LAST 337 13,2201  53'110 1
0700 REF  3 LAST 337 13,2202  53'112 0
0701 REF  3 LAST 337 13,2203  53'110 1

```

```

0702 REF 10 LAST 314 13,2204  0 6036 1
0703      13,2205  77650 1
0704 REF  2 LAST 336 13,2206  00051 0

```

```

PUSH  DAD
      LODPHALF
STOVL 5
      4
RTB
      2V1ST02S
STOVL MODEB
      0
RTB
      2V1ST02S
STORE MODEA
EXIT

```

MODE 1 SHAFT TO 2.

FIND MODE 2 CDU ANGLES.

MODE 1 ANGLES TO MODE A.

SWAP MODEA AND MODEB IF RP IN MODE 2.

```

CS  RADMODES
MASK BIT12
CCS A
TCF +4

```

```

DXCH  MODEA
DXCH  MODEB
DXCH  MODEA

```

```

TC  INTPRET
GOTO S2

```

L LEM GEOMETRY

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0705 GIVEN RR TRUNNION AND SHAFT (T,S) IN TANGNB,+1,FIND THE ASSOCIATED
 R0706 LINE CF SIGHT IN NAV BASE AXES. THE HALF UNIT VECTOR, .5(SIN(S)COS(T),
 R0707 -SIN(T),COS(S)COS(T)) IS LEFT IN MPAC AND 32D.

07072	REF	1		23,2000		SETLOC INFLIGHT	
07074				23,2041		BANK	
07076	REF	1				COUNT* \$\$/GEOM	
0708				23,2041	47135 0	RRNB	
0709	REF	7	LAST 314	23,2042	03751 1		
07091	REF	5	LAST 265	23,2043	21465 0		
0710				23,2044	41401 1	SETPD	PUSH TRUNNION ANGLE TO 0
0711				23,2045	00001 0		
0712				23,2046	57556 0	SIN	DCOMP
0713				23,2047	14043 0	STODL	34D Y COMPONENT
0714				23,2050	41546 0	COS	PUSH .5 COS(T) TO 0
0715				23,2051	47135 0	SLOAD	RTB
0716	REF	8	LAST 338	23,2052	03752 1		TANGNB +1
0717	REF	6	LAST 338	23,2053	21465 0		CDULOGIC
0718				23,2054	71406 0	PUSH	COS SHAFT ANGLE TO 2
0719				23,2055	72405 0	DMP	SL1
0720				23,2056	00001 0		0
0721				23,2057	14045 0	STODL	36D Z COMPONENT
0722				23,2060	41356 1	SIN	DMP
0723				23,2061	77752 1	SL1	
0724				23,2062	24041 1	STOVL	32D
0725				23,2063	00041 1		32D
0726				23,2064	77616 0	RVQ	

L IMU COMPENSATION PACKAGE

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0001					07,2667			BANK 7		
000101	REF	1			06,2000			SETLOC IMUCCMP		
000102					06,3263			BANK		
0002	REF	1			E3,1460			EBANK= NRDX		
0100	REF	1						COUNT* \$\$/ICOMP		
0112	REF	1			06,3263	3 3531 0	1/PIPA	CAF LGCOMP		SAVE EBANK OF CALLING PROGRAM
0113	REF	9	LAST	309	06,3264	56 003 1		XCH EBANK		
0114	REF	1			06,3265	54 163 1		TS MODE		
0115	REF	1			06,3266	11'477 0		CCS GCOMP SW		BYPASS IF GCOMP SW NEGATIVE
0116					06,3267	1 3272 1		TCF +3		
0117					06,3270	1 3272 1		TCF +2		
0118	REF	1			06,3271	1 3353 0		TCF IRIG1		RETURN
0119	REF	4	LAST	270	06,3272	3 4751 0	1/PIPA1	CAF FOUR		PIPAZ, PIPAY, PIPAX
0120	REF	7	LAST	137	06,3273	54 132 0		TS BUF +2		
0121	REF	8	LAST	339	06,3274	50 132 1		INDEX BUF +2		
0122	REF	1			06,3275	3 1453 1		CA PIPASCF		(P.P.M.) X 2(-9)
0123					06,3276	0 0006 1		EXTEND		
0124	REF	9	LAST	339	06,3277	5 0132 1		INDEX BUF +2		
0125	REF	1			06,3300	7 0324 0		MP DELVX		(PP) X 2(+14) NOW (PIPA PULSES) X 2(+5)
0126	REF	30	LAST	319	06,3301	54 002 1		TS Q		SAVE MAJOR PART
0127	REF	26	LAST	308	06,3302	3 0001 0		CA L		MINOR PART
0128					06,3303	0 0006 1		EXTEND		
0129	REF	33	LAST	296	06,3304	7 4746 1		MP BIT6		SCALE 2(+9) SHIFT RIGHT 9
0130	REF	10	LAST	339	06,3305	50 132 1		INDEX BUF +2		
0131	REF	2	LAST	339	06,3306	54 325 1		TS DELVX +1		FRACTIONAL PIPA PULSES SCALED 2(+14)
0132	REF	31	LAST	339	06,3307	3 0002 0		CA Q		MAJOR PART
0133					06,3310	0 0006 1		EXTEND		
0134	REF	34	LAST	339	06,3311	7 4746 1		MP BIT6		SCALE 2(+9) SHIFT RIGHT 9
0135	REF	11	LAST	339	06,3312	50 132 1		INDEX BUF +2		
0136	REF	3	LAST	339	06,3313	20 325 1		DAS DELVX		(PIPAI) + (PTPAI)(SFE)
0137	REF	12	LAST	339	06,3314	50 132 1		INDEX BUF +2		(PIPA PULSES)/(CS) X 2(-5) *
0138	REF	1			06,3315	4 1452 1		CS PIPABIAS		
0139					06,3316	0 0006 1		EXTEND		(CS) X 2(+8) NOW (PIPA PULSES) X 2(+3) *
0140	REF	2	LAST	180	06,3317	7 1075 0		MP 1/PIPADT		
0141					06,3320	0 0006 1		EXTEND		SCALE 2(+11) SHIFT RIGHT 11
0142	REF	19	LAST	269	06,3321	7 4750 0		INDEX BUF +2		(PIPAI) + (PTPAI)(SFE) - (BIAS)(DELTA)
0143	REF	13	LAST	339	06,3322	50 132 1		DAS DELVX		PIPAI, PIPAY, PIPAX
0144	REF	4	LAST	339	06,3323	20 325 1		CCS		19:02 NOV. 25, 1968 LEMONAID.070 PAGE 340
0145	REF	14	LAST	339	06,3324	10 132 0		MP +1		
0146	REF	1			06,3325	10 132 0		MP +1		





L

IMU COMPENSATION PACKAGE

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0148

06,3327 13 330 0

NOOP

LESS THAN ZERO IMPOSSIBLE

L IMU COMPENSATION PACKAGE

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01481	REF	2	LAST	339	06,3330	55'477 0	IRIGCOMP	TS	GCOMP SW	INDICATE COMMANDS 2 PULSES OR LESS.
01482	REF	15	LAST	339	06,3331	54 130 1		TS	BUF	INDEX COUNTER . IRIGX, IRIGY, IRIGZ.
01483	REF	1			06,3332	0 3356 1		TC	IRIGX	COMPENSATE ACCELERATION TERMS
01484	REF	2	LAST	339	06,3333	4 1460 0		CS	NBDX	(GYRO PULSES)/(CS) X 2(-5)
01485	REF	1			06,3334	0 3454 1		TC	DRIFTSUB	-(NBDX)(DELTAT) (GYRO PULSES) X 2(+14)
01486	REF	1			06,3335	0 3373 0		TC	IRIGY	COMPENSATE ACCELERATION TERMS
01487	REF	1			06,3336	4 1461 1		CS	NBDY	(GYRO PULSES)/(CS) X 2(-5)
01488	REF	2	LAST	341	06,3337	0 3454 1		TC	DRIFTSUB	-(NBDY)(DELTAT) (GYRO PULSES) X 2(+14)
01489	REF	1			06,3340	0 3410 1		TC	IRIGZ	COMPENSATE ACCELERATION TERMS
0149	REF	1			06,3341	3 1462 0		CA	NBDZ	(GYRO PULSES)/(CS) X 2(-5)
01491	REF	3	LAST	341	06,3342	0 3454 1		TC	DRIFTSUB	+(NBDZ)(DELTAT) (GYRO PULSES) X 2(+14)
01492	REF	3	LAST	341	06,3343	11'477 0		CCS	GCOMP SW	ARE GYRO COMMANDS GREATER THAN 2 PULSES
01493					06,3344	1 3346 1		TCF	+2	YES SEND OUT GYRO TORQUING COMMANDS.
01494	REF	2	LAST	339	06,3345	1 3353 0		TCF	IRIG1	NO RETURN
01495	REF	1			06,3346	3 5031 0		CA	PRI021	PRI0 GREATER THAN SERVICER
01496	REF	4	LAST	275	06,3347	0 5072 1		TC	NOVAC	SEND OUT GYRO TORQUING COMMANDS.
01497	REF	3	LAST	341	F3,1460			EBANK=	NBDX	
01498	REF	1			06,3350	03507 0		2CADR	1/GYRO	
01498	REF	1			06,3351	14063 1				
01499					06,3352	0 0003 1		RELINT		
0150	REF	2	LAST	339	06,3353	3 0163 0	IRIG1	CA	MODE	RESTORE CALLERS EBANK
01501	REF	10	LAST	339	06,3354	54 003 0		TS	EBANK	
01502	REF	2	LAST	259	06,3355	1 4631 0		TCF	SWRETURN	

L IPV COMPENSATION PACKAGE

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0151					06,3356	0 0006 1	IRIGX	EXTEND		
01511	REF	42	LAST	305	06,3357	22 156 0		QXCH	MPAC +2	SAVE Q
01512					06,3360	0 0006 1		EXTEND		
0152	REF	5	LAST	339	06,3361	4 0325 1		DCS	DELVX	(PIPA PULSES) X 2(+14)
0153	REF	43	LAST	342	06,3362	52 155 1		DXCH	MPAC	
0154	REF	1			06,3363	3 1463 1		CA	ADIAX	(GYRD PULSES)/(PIPA PULSE) X 2(-6) *
0155	REF	1			06,3364	0 3425 1		TC	GCDMP SUB	-(ADIAX)(PIPA X) (GYRD PULSES) X 2(+14)
0156					06,3365	0 0006 1		EXTEND		
0157	REF	1			06,3366	4 0327 0		DCS	DELVY	(PIPA PULSES) X 2(+14)
0158	REF	44	LAST	342	06,3367	52 155 1		DXCH	MPAC	
0159	REF	1			06,3370	4 1466 0		CS	ADSRAX	(GYRD PULSES)/(PIPA PULSE) X 2(-6) *
0160	REF	2	LAST	342	06,3371	0 3425 1		TC	GCDMP SUB	+(ADSRAX)(PIPAY) (GYRD PULSES) X 2(+14)
A01603								EXTEND	***	
A01604								DCS	DELVZ	(PIPA PULSES) X 2(+14)
A01605								DXCH	MPAC	***
A01606								CA	ADDAX	(GYRD PULSES)/(PIPA PULSE) X 2(-6) *
A01607								TC	GCDMP SUB	-(ADDAX)(PIPAZ) (GYRD PULSES) X 2(+14)
0161	REF	45	LAST	342	06,3372	0 0156 0		TC	MPAC +2	
0163					06,3373	0 0006 1	IRIGY	EXTEND		
01631	REF	46	LAST	342	06,3374	22 156 0		QXCH	MPAC +2	SAVE Q
01632					06,3375	0 0006 1		EXTEND		
0164	REF	2	LAST	342	06,3376	4 0327 0		DCS	DELVY	(PIPA PULSES) X 2(+14)
0165	REF	47	LAST	342	06,3377	52 155 1		DXCH	MPAC	
0166	REF	1			06,3400	3 1464 0		CA	ADIA Y	(GYRD PULSES)/(PIPA PULSE) X 2(-6) *
0167	REF	3	LAST	342	06,3401	0 3425 1		TC	GCDMP SUB	-(ADIA Y)(PIPAY) (GYRD PULSES) X 2(+14)
0168					06,3402	0 0006 1		EXTEND		
0169	REF	1			06,3403	4 0331 1		DCS	DELVZ	(PIPA PULSES) X 2(+14)
0170	REF	48	LAST	342	06,3404	52 155 1		DXCH	MPAC	
0171	REF	1			06,3405	4 1467 1		CS	ADSRAY	(GYRD PULSES)/(PIPA PULSE) X 2(-6) *
0172	REF	4	LAST	342	06,3406	0 3425 1		TC	GCDMP SUB	+(ADSRAY)(PIPAZ) (GYRD PULSES) X 2(+14)
A01723								EXTEND	***	
A01724								DCS	DELVX	(PIPA PULSES) X 2(+14)
A01725								DXCH	MPAC	***
A01726								CA	ADCA Y	(GYRD PULSES)/(PIPA PULSE) X 2(-6) *
A01727								TC	GCDMP SUB	-(ADCA Y)(PIPA X) (GYRD PULSES) X 2(+14)
0173	REF	49	LAST	342	06,3407	0 0156 0		TC	MPAC +2	
0175					06,3410	0 0006 1	IRIGZ	EXTEND		
01751	REF	50	LAST	342	06,3411	22 156 0		QXCH	MPAC +2	SAVE Q
01752					06,3412	0 0006 1		EXTEND		
0176	REF	3	LAST	342	06,3413	4 0327 0		DCS	DELVY	(PIPA PULSES) X 2(+14)
0177	REF	51	LAST	342	06,3414	52 155 1		DXCH	MPAC	
0178	REF	1			06,3415	3 1470 0		CA	ADSR AZ	(GYRD PULSES)/(PIPA PULSE) X 2(-6) *

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0179 REF 5 LAST 342 06,3416 0 3425 1

TC GCOMPSUB

-(ADSRZ)(PIPAY) (GYRO PULSES) X 2(+14)

0180 06,3417 0 0006 1

EXTEND

0181 REF 2 LAST 342 06,3420 4 0331 1

DCS DELVZ

(PIPA PULSES) X 2(+14)

0182 REF 52 LAST 342 06,3421 52 155 1

DXCH MPAC

0183 REF 1 06,3422 3 1465 1

CA ADIAZ

(GYRO PULSES)/(PIPA PULSE) X 2(-6) *

0184 REF 6 LAST 343 06,3423 0 3425 1

TC GCOMPSUB

-(ADIAZ)(PIPAZ) (GYRO PULSES) X 2(+14)

A01843

EXTEND

A01844

DCS DELVX

(PIPA PULSE) X 2(+14)

A01845

DXCH MPAC

A01846

CS ADDAZ

(GYRO PULSES)/(PIPA PULSE) X 2(-6) *

A01847

TC GCOMPSUB

+(ADDAZ)(PIPAZ) (GYRO PULSES) X 2(+14)

0185 REF 53 LAST 343 06,3424 0 0156 0

TC MPAC +2

L INVU COMPENSATION PACKAGE

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0199	REF	54	LAST	343	06,3425	56 154 1	GCOMP SUB	XCH	MPAC	ADIA OR ADSRA COEFFICIENT ARRIVES IN A
0200					06,3426	0 0006 1		EXTEND		C(MPAC) = (PIPA PULSES) X 2(+14)
0201	REF	55	LAST	344	06,3427	7 0154 0		MP	MPAC	(GYRO PULSES)/(PIPA PULSE) X 2(-6) *
0202	REF	18	LAST	114	06,3430	52 123 0		DXCH	VBUF	NOW = (GYRO PULSES) X 2(+8) *
0203	REF	56	LAST	344	06,3431	3 0155 0		CA	MPAC +1	MINOR PART PIPA PULSES
0204					06,3432	0 0006 1		EXTEND		
0205	REF	57	LAST	344	06,3433	7 0154 0		MP	MPAC	ADIA OR ADSRA
0206	REF	27	LAST	339	06,3434	54 001 1		TS	L	
0207	REF	32	LAST	313	06,3435	3 4755 1		CAF	ZERO	
0208	REF	19	LAST	344	06,3436	20 123 0		DAS	VBUF	NOW = (GYRO PULSES) X 2(+8) *
0209	REF	20	LAST	344	06,3437	3 0122 0		CA	VBUF	PARTIAL RESULT - MAJOR
0210					06,3440	0 0006 1		EXTEND		
0211	REF	18	LAST	261	06,3441	7 4743 1		MP	BIT9	SCALE 2(+6) SHIFT RIGHT 6 *
0212	REF	16	LAST	341	06,3442	50 130 0		INDEX	BUF	RESULT = (GYRO PULSES) X 2(+14)
0213	REF	3	LAST	126	06,3443	21*472 0		DAS	GCOMP	HI(ADIA)(PIPA1) OR HI(ADSRA)(PIPA1)
0214	REF	21	LAST	344	06,3444	3 0123 1		CA	VBUF +1	PARTIAL RESULT - MINOR
0215					06,3445	0 0006 1		EXTEND		
0216	REF	19	LAST	344	06,3446	7 4743 1		MP	BIT9	SCALE 2(+6) SHIFT RIGHT 6 *
0217	REF	28	LAST	344	06,3447	54 001 1		TS	L	
0218	REF	33	LAST	344	06,3450	3 4755 1		CAF	ZERO	
0219	REF	17	LAST	344	06,3451	50 130 0		INDEX	BUF	RESULT = (GYRO PULSES) X 2(+14)
0220	REF	4	LAST	344	06,3452	21*472 0		DAS	GCOMP	(ADIA)(PIPA1) OR (ADSRA)(PIPA1)
0221	REF	32	LAST	339	06,3453	0 0002 0		TC	Q	

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0222					06,3454	0 0006	1	DRIFTSUB	EXTEND		
0223	REF	18	LAST	344	06,3455	22 131	1		QXCH	BUF +1	
0224					06,3456	0 0006	1		EXTEND		C(A) = NBD (GYRO PULSES)/(CS) X 2(-5)
0225	REF	3	LAST	339	06,3457	7 1075	0		MP	1/PIPADT	(CS) X 2(+8) NOW (GYRO PULSES) X 2(+3)
0226	REF	58	LAST	344	06,3460	22 155	0		LXCH	MPAC +1	SAVE FOR FRACTIONAL COMPENSATION
0227					06,3461	0 0006	1		EXTEND		
0228	REF	20	LAST	339	06,3462	7 4750	0		MP	BIT4	SCALE 2(+11) SHIFT RIGHT 11
0229	REF	19	LAST	345	06,3463	50 130	0		INDEX	BUF	
0230	REF	5	LAST	344	06,3464	21'472	0		DAS	GCOMP	HI(NBD)(DELTAT) (GYRO PULSES) X 2(+14)
0231	REF	59	LAST	345	06,3465	3 0155	0		CA	MPAC +1	NOW MINOR PART
0232					06,3466	0 0006	1		EXTEND		
0233	REF	21	LAST	345	06,3467	7 4750	0		MP	BIT4	SCALE 2(+11) SHIFT RIGHT 11
0234	REF	29	LAST	344	06,3470	54 001	1		TS	L	
0235	REF	34	LAST	344	06,3471	3 4755	1		CAF	ZERO	
0236	REF	20	LAST	345	06,3472	50 130	0		INDEX	BUF	ADD IN FRACTIONAL COMPENSATION
0237	REF	6	LAST	345	06,3473	21'472	0		DAS	GCOMP	(NBD)(DELTAT) (GYRO PULSES) X 2(+14)
0238	REF	12	LAST	319	06,3474	3 4752	0	DRIFTSUB2	CAF	TWO	PIPAX, PIPAY, PIPAZ
0239	REF	21	LAST	345	06,3475	6 0130	0		AD	BUF	
0240	REF	22	LAST	345	06,3476	56 130	0		XCH	BUF	
0241	REF	95	LAST	337	06,3477	50 000	1		INDEX	A	
0242	REF	7	LAST	345	06,3500	11'471	0		CCS	GCOMP	ARE GYRO COMMANDS 1 PULSE OR GREATER
0243					06,3501	1 3503	0		TCF	+2	YES
0244	REF	23	LAST	345	06,3502	0 0131	1		TC	BUF +1	NO
0245	REF	1			06,3503	7 3553	0		MASK	COMPCHK	DEC -1
0246	REF	96	LAST	345	06,3504	10 000	0		CCS	A	ARE GYRO COMMANDS GREATER THAN 2 PULSES
0247	REF	4	LAST	341	06,3505	55'477	0		TS	GCOMP SW	YES - SET GCOMP SW POSITIVE
0248	REF	24	LAST	345	06,3506	0 0131	1		TC	BUF +1	NO

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0249	REF	5	LAST	339	06,3507	3 4751 0	1/GYRO	CAF	FOUR	PIPAZ, PIPAY, PIPAX
0250	REF	25	LAST	345	06,3510	54 130 1		TS	BUF	
0251	REF	26	LAST	346	06,3511	50 130 0		INDEX	BUF	SCALE GYRO COMMANDS FOR IMPULSE
0252	REF	8	LAST	345	06,3512	3 1472 1		CA	GCOMP +1	FRACTIONAL PULSES
0253					06,3513	0 0006 1		EXTEND		
0254	REF	21	LAST	294	06,3514	7 4744 0		MP	BIT8	SHIFT RIGHT 7
0255	REF	27	LAST	346	06,3515	50 130 0		INDEX	BUF	
0256	REF	9	LAST	346	06,3516	55*472 0		TS	GCOMP +1	FRACTIONAL PULSES SCALED
0257	REF	35	LAST	345	06,3517	3 4755 1		CAF	ZERO	SET GCOMP = 0 FOR DAS INSTRUCTION
0258	REF	28	LAST	346	06,3520	50 130 0		INDEX	BUF	
0259	REF	10	LAST	346	06,3521	57*471 1		XCH	GCOMP	GYRO PULSES
0260					06,3522	0 0006 1		EXTEND		
0261	REF	22	LAST	346	06,3523	7 4744 0		MP	BIT8	SHIFT RIGHT 7
0262	REF	29	LAST	346	06,3524	50 130 0		INDEX	BUF	
0263	REF	11	LAST	346	06,3525	21*472 0		DAS	GCOMP	ADD THESE TO FRACTIONAL PULSES ABOVE
0264	REF	30	LAST	346	06,3526	10 130 1		CCS	BUF	PIPAZ, PIPAY, PIPAX
0265	REF	2	LAST	339	06,3527	6 7746 0		AD	NEG1	
0266	REF	2	LAST	341	06,3530	1 3510 1		TCF	1/GYRO +1	
0267	REF	12	LAST	346	06,3531	01471 1	LGCOMP	ECADR	GCOMP	LESS THAN ZERO IMPOSSIBLE
0268	REF	2	LAST	339	06,3532	3 3531 0		CAF	LGCOMP	
0269	REF	55	LAST	315	06,3533	0 4616 1		TC	BANKCALL	
0270	REF	2	LAST	288	06,3534	17276 1		CADR	IMUPULSF	CALL GYRO TORQUING ROUTINE
0271	REF	56	LAST	346	06,3535	0 4616 1		TC	BANKCALL	
0272	REF	6	LAST	288	06,3536	17671 1		CADR	IMUSTALL	WAIT FOR PULSES TO GET OUT
0273	REF	23	LAST	314	06,3537	1 5155 1		TCF	ENDOFJOB	TEMPORARY
0274	REF	6	LAST	346	06,3540	3 4751 0	GCOMP1	CAF	FOUR	PIPAZ, PIPAY, PIPAX
0275	REF	31	LAST	346	06,3541	54 130 1		TS	BUF	
0276	REF	32	LAST	346	06,3542	50 130 0		INDEX	BUF	RESCALE
0277	REF	13	LAST	346	06,3543	3 1472 1		CA	GCOMP +1	
0278					06,3544	0 0006 1		EXTEND		
0279	REF	23	LAST	346	06,3545	7 4744 0		MP	BIT8	SHIFT MINOR PART LEFT 7 - MAJOR PART = 0
0280	REF	33	LAST	346	06,3546	50 130 0		INDEX	BUF	
0281	REF	14	LAST	346	06,3547	23*472 1		LXCH	GCOMP +1	BITS 8-14 OF MINOR PART WERE = 0
0282	REF	34	LAST	346	06,3550	10 130 1		CCS	BUF	PIPAZ, PIPAY, PIPAX
0283	REF	3	LAST	346	06,3551	6 7746 0		AD	NEG1	
0284	REF	1			06,3552	1 3541 0		TCF	GCOMP1 +1	
0285					06,3553	77776 1	COMPCHK	DEC	-1	LESS THAN ZERO IMPOSSIBLE
0286	REF	24	LAST	346	06,3554	1 5155 1		TCF	ENDOFJOB	

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0287	REF	5	LAST	345	06,3555	11'477 0	NBDONLY	CCS	GCOMP SW	BYPASS IF GCOMP SW NEGATIVE
0288					06,3556	1 3561 1		TCF	+3	
0289					06,3557	1 3561 1		TCF	+2	
0290	REF	25	LAST	346	06,3560	1 5155 1		TCF	ENDOFJOB	
029005					06,3561	0 0004 0		INHINT		
02901	REF	6	LAST	244	06,3562	10 076 1		CCS	FLAGWRD2	PREREAD T3RUPT MAY COINCIDE
02902	REF	26	LAST	347	06,3563	1 5155 1		TCF	ENDOFJOB	
02903	REF	27	LAST	347	06,3564	1 5155 1		TCF	ENDOFJOB	
02904					06,3565	1 3566 0		TCF	+1	
02905	REF	2	LAST	273	06,3566	3 0104 1		CA	FLAGWRD8	IF SURFACE FLAG IS SET, SET TEM1
02906	REF	24	LAST	346	06,3567	7 4744 0		MASK	BIT8	POSITIVE SO THAT THE ACCELERATION TERMS
02907	REF	4	LAST	114	06,3570	54 141 1		TS	TFM1	WILL BE COMPENSATED.
02908					06,3571	0 0006 1		EXTEND		
0291					06,3572	1 3575 1		BZF	+3	ARE WE ON THE SURFACE
0292	REF	16	LAST	310	06,3573	0 4674 0		TC	IBNKCALL	ON THE SURFACE
02925	REF	1			06,3574	77533 1		CADR	PIPASR +3	READ PIPAS, BUT DO NOT SCALE THEM
0293	REF	2	LAST	180	06,3575	3 0025 0		CA	TIMF1	(CS) X 2(+14)
0294	REF	4	LAST	345	06,3576	57'075 1		XCH	1/PIPADT	PREVIOUS TIME
0295					06,3577	0 0003 1		RELINT		
0296					06,3600	4 0000 0		COM		
0297	REF	5	LAST	347	06,3601	6 1075 1		AD	1/PIPADT	PRESENT TIME - PREVIOUS TIME
0298	REF	1			06,3602	6 4736 1	NBD2	AD	HALF	CORRECT FOR POSSIBLE TIME1 TICK
0299	REF	2	LAST	347	06,3603	6 4736 1		AD	HALF	
0300	REF	30	LAST	345	06,3604	56 001 0		XCH	L	IF TIME1 DID NOT TICK, REMOVE RESULTING
0301	REF	31	LAST	347	06,3605	56 001 0		XCH	L	OVERFLOW.
0302					06,3606	0 0006 1	NBD3	EXTEND		C(A) = DELTAT (CS) X 2(+14)
0303	REF	18	LAST	270	06,3607	7 4742 0		MP	BIT10	SHIFT RIGHT 5
0304	REF	22	LAST	344	06,3610	52 125 0		DXCH	VBUF +2	
03041	REF	36	LAST	346	06,3611	3 4755 1		CA	ZERO	
03042	REF	6	LAST	347	06,3612	55'477 0		TS	GCOMP SW	INDICATE COMMANDS 2 PULSES OR LESS.
03043	REF	35	LAST	346	06,3613	54 130 1		TS	BUF	INDEX X, Y, Z.
03044	REF	5	LAST	347	06,3614	10 141 1		CCS	TEM1	IF SURFACE FLAG IS SET,
03045	REF	2	LAST	341	06,3615	0 3356 1		TC	IRIGX	COMPENSATE ACCELERATION TERMS.
0305					06,3616	0 0006 1		EXTEND		
0306	REF	23	LAST	347	06,3617	3 0125 1		DCA	VBUF +2	
0307	REF	60	LAST	345	06,3620	52 155 1		DXCH	MPAC	DELTAT NOW SCALED (CS) X 2(+19)
0311	REF	4	LAST	341	06,3621	4 1460 0		CS	NBDX	(GYRO PULSES)/(CS) X 2(-5)
0312	REF	1			06,3622	0 3644 1		TC	FBIASSUB	-(NBDX)(DELTAT) (GYRO PULSES) X 2(+14)
03121	REF	6	LAST	347	06,3623	10 141 1		CCS	TEM1	IF SURFACE FLAG IS SET,
03122	REF	2	LAST	341	06,3624	0 3373 0		TC	IRIGY	COMPENSATE ACCELERATION TERMS.

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0313 06,3625 0 0006 1
 0314 REF 24 LAST 347 06,3626 4 0125 0
 0315 REF 61 LAST 347 06,3627 52 155 1
 0316 REF 2 LAST 341 06,3630 3 1461 0
 0317 REF 2 LAST 347 06,3631 0 3644 1

EXTEND

DCS VBUF +2

DXCH MPAC

CA NBDY

TC FBIASSUB

DELTAT SCALED (CS) X 2(+19)

(GYRO PULSES)/(CS) X 2(-5)

-(NBDY)(DELTAT) (GYRO PULSES) X 2(+14)

03171 REF 7 LAST 347 06,3632 10 141 1
 03172 REF 2 LAST 341 06,3633 0 3410 1

CCS

TC TEM1

IRIGZ

IF SURFACE FLAG IS SET,

COMPENSATE ACCELERATION TERMS

0318 06,3634 0 0006 1
 0319 REF 25 LAST 348 06,3635 4 0125 0
 0320 REF 62 LAST 348 06,3636 52 155 1
 0321 REF 2 LAST 341 06,3637 4 1462 1
 0322 REF 3 LAST 348 06,3640 0 3644 1

EXTEND

DCS VBUF +2

DXCH MPAC

CS NBDZ

TC FBIASSUB

DELTAT SCALED (CS) X 2(+19)

(GYRO PULSES)/(CS) X 2(-5)

+(NBDZ)(DELTAT) (GYRO PULSES) X 2(+14)

0323 REF 7 LAST 347 06,3641 11 477 0
 0324 REF 3 LAST 346 06,3642 1 3507 1
 0325 REF 28 LAST 347 06,3643 1 5155 1

CCS GCOMP SW

TCF 1/GYRO

TCF ENDOFJOB

ARE GYRO COMMANDS GREATER THAN 2 PULSES

YES

NO

L IMU COMPENSATION PACKAGE

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0326	REF	33	LAST	344	06,3644	56 002 0	FBIASSUB	XCH	Q	
0327	REF	36	LAST	347	06,3645	54 131 0		TS	BUF +1	
0328	REF	34	LAST	349	06,3646	3 0002 0		CA	Q	NBD SCALED (GYRO PULSES)/(CS) X 2(-5)
0329					06,3647	0 0006 1		EXTEND		
0330	REF	63	LAST	348	06,3650	7 0154 0		MP	MPAC	DELTAT SCALED (CS) X 2(+19)
0331	REF	37	LAST	349	06,3651	50 130 0		INDEX	BUF	
0332	REF	15	LAST	346	06,3652	21'472 0		DAS	GCOMP	HI(NBD)(DELTAT) (GYRO PULSES) X 2(+14)
0333	REF	35	LAST	349	06,3653	3 0002 0		CA	Q	NOW FRACTIONAL PART
0334					06,3654	0 0006 1		EXTEND		
0335	REF	64	LAST	349	06,3655	7 0155 1		MP	MPAC +1	
0336	REF	32	LAST	347	06,3656	54 001 1		TS	L	
0337	REF	37	LAST	347	06,3657	3 4755 1		CAF	ZERO	
0338	REF	38	LAST	349	06,3660	50 130 0		INDEX	BUF	
0339	REF	16	LAST	349	06,3661	21'472 0		DAS	GCOMP	(NBD)(DELTAT) (GYRO PULSES) X 2(+14)
0340	REF	1			06,3662	1 3474 1		TCF	DRFTSUB2	CHECK MAGNITUDE OF COMPENSATION
0341	REF	57	LAST	346	06,3663	0 4616 1	LASTBIAS	TC	BANKCALL	
03411	REF	1			06,3664	17252 1		CADR	PIPUSE1	
03412	REF	8	LAST	348	06,3665	11'477 0		CCS	GCOMP SW	
0342					06,3666	1 3671 0		TCF	+3	
0343					06,3667	1 3671 0		TCF	+2	
0344	REF	29	LAST	348	06,3670	1 5155 1		TCF	ENDOFJOB	
03441	REF	3	LAST	347	06,3671	3 0104 1		CA	FLAGWRD8	IF SURFACE FLAG IS SET, SET TEM1
03442	REF	2	LAST	228	06,3672	7 4744 0		MASK	SURFFBIT	POSITIVE SO THAT THE ACCELERATION TERMS
03443	REF	8	LAST	348	06,3673	54 141 1		TS	TFM1	WILL BE COMPENSATED.
0345	REF	1			06,3674	3 7715 0		CAF	PRI031	2 SECONDS SCALED (CS) X 2(+8)
0346	REF	6	LAST	347	06,3675	57'075 1		XCH	1/PIPADT	
0347					06,3676	4 0000 0		COM		
0348	REF	3	LAST	334	06,3677	6 1235 1		AD	PIPTIME +1	
0349	REF	1			06,3700	1 3602 1		TCF	NBD2	
0350	REF	3	LAST	346	06,3701	3 3531 0	GCOMPZER	CAF	LGCOMP	ROUTINE TO ZERO GCOMP BEFORE FIRST
0351	REF	11	LAST	341	06,3702	56 003 1		XCH	EBANK	CALL TO 1/PIPA
0352	REF	3	LAST	341	06,3703	54 163 1		TS	MODE	
0353	REF	38	LAST	349	06,3704	3 4755 1		CAF	ZERO	
0354	REF	9	LAST	349	06,3705	55'477 0		TS	GCOMP SW	
0355	REF	17	LAST	349	06,3706	55'471 0		TS	GCOMP	
0356	REF	18	LAST	349	06,3707	55'472 0		TS	GCOMP +1	
0357	REF	19	LAST	349	06,3710	55'473 1		TS	GCOMP +2	
0358	REF	20	LAST	349	06,3711	55'474 0		TS	GCOMP +3	
0359	REF	21	LAST	349	06,3712	55'475 1		TS	GCOMP +4	

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0360 REF 22 LAST 349 06,3713 55'476 1 TS GCOMP +5

0361 REF 3 LAST 341 06,3714 1-3353 0 TCF IRIG1 RESTORE EBANK AND RETURN

L R63

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P0010 SUBROUTINE NAME: V89CALL
R0011 MCD NO: 0 DATE: 9 JAN 1968
R0012 MOD BY: DIGITAL DEVEL GROUP LOG SECTION: R63

R0013 FUNCTIONAL DESCRIPTION:

R0014 CALLED BY VERB 89 ENTER DURING P00. PRIO 10 USED. CALCULATES AND
R0015 DISPLAYS FINAL FDAI BALL ANGLES TO POINT LM +X OR +Z AXIS AT CSM.

R0016 1. KEY IN V 89 E ONLY IF IN PROG 00. IF NOT IN P00, OPERATOR ERROR AND
R0017 EXIT R63, OTHERWISE CONTINUE.

R0018 2. IF IN P00, DO IMU STATUS CHECK ROUTINE (R02BOTH). IF IMU ON AND ITS
R0019 ORIENTATION KNOWN TO LGC, CONTINUE.

R0020 3. FLASH DISPLAY V 04 N 06. R2 INDICATES WHICH SPACECRAFT AXIS IS TO
R0021 BE POINTED AT CSM. INITIAL CHOICE IS PREFERRED (+Z) AXIS (R2=1).
R0022 ASTRONAUT CAN CHANGE TO (+X) AXIS (R2 NOT = 1) BY V 22 E 2 E. CONTINUE
R0023 AFTER KEYING IN PROCEED.

R0024 4. BOTH VEHICLE STATE VECTORS UPDATED BY CONIC EQS.

R0025 5. HALF MAGNITUDE UNIT LOS VECTOR (IN STABLE MEMBER COORDINATES) AND
R0026 HALF MAGNITUDE UNIT SPACECRAFT AXIS VECTOR (IN BODY COORDINATES)
R0027 PREPARED FOR VECPOINT.

R0028 6. GIMBAL ANGLES FROM VECPOINT TRANSFORMED INTO FDAI BALL ANGLES BY
R0029 BALLANGS. FLASH DISPLAY V 06 N 18 AND AWAIT RESPONSE.

R0030 7. RECYCLE - RETURN TO STEP 4.
R0031 TERMINATE - EXIT R63.
R0032 PROCEED - RESET 3AXISFLG AND CALL R60LEM FOR ATTITUDE MANEUVER.

R0033 CALLING SEQUENCE: V 89 E.

R0034 SUBROUTINES CALLED: CHKPOOH, R02BOTH, GOXDSPF, CSMCONIC, LFMCONIC,
R0035 VECPOINT, BALLANGS, R60LEM.

R0036 NORMAL EXIT MODES: TC ENDEXT

R0037 ALARMS: 1. OPERATOR ERROR IF NOT IN P00.
R0038 2. PROGRAM ALARM IF IMU IS OFF.
R0039 3. PROGRAM ALARM IF IMU ORIENTATION IS UNKNOWN.

R0040 OUTPUT: NONE

R0041 ERASABLE INITIALIZATION REQUIRED: NONE

R0042 DEBRIS: OPTION1, +1, TDEC1, POINTVSM, SCAXIS, CPHI, CTHETA, CPS1,

L R63

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R0043 3AXISFLG.

0044 REF 4 LAST 299 E4,1612
 0045 32,2227
 0046 REF 1 26,2000
 0047 26,2000

EBANK= RONE
 BANK 32
 SETLOC BAWLANGS
 BANK

0048 REF 1
 0049 REF 58 LAST 349 26,2000 0 4616 1
 0050 REF 1 26,2001 11175 1
 0051 REF 3 LAST 308 26,2002 3 6244 0
 0052 REF 8 LAST 320 26,2003 55'051 0
 0053 REF 15 LAST 319 26,2004 3 4753 1
 0054 REF 9 LAST 352 26,2005 55'052 0
 0055 REF 1 26,2006 3 2075 1
 0056 REF 59 LAST 352 26,2007 0 4616 1
 0057 REF 2 LAST 240 26,2010 20351 1
 0058 REF 26 LAST 315 26,2011 0 5472 0
 0059 26,2012 0 2014 0
 0060 26,2013 0 2006 0
 0061 REF 11 LAST 337 26,2014 0 6036 1
 0062 26,2015 43234 0
 0063 REF 2 LAST 222 26,2016 21462 1
 00635 REF 1 26,2017 14100 0
 0064 REF 1 26,2020 02211 1
 0065 REF 4 LAST 251 26,2021 34041 0
 0066 REF 1 26,2022 27066 1
 0067 26,2023 77775 1
 0068 REF 1 26,2024 00001 0
 0069 REF 5 LAST 352 26,2025 16213 0
 0070 REF 2 LAST 352 26,2026 02211 1
 0071 REF 5 LAST 352 26,2027 34041 0
 0072 REF 1 26,2030 27100 0
 0073 26,2031 52375 1
 0074 REF 6 LAST 352 26,2032 02213 0
 0075 REF 2 LAST 352 26,2033 00001 0
 0076 26,2034 47121 0
 0077 REF 6 LAST 224 26,2035 01734 0
 00771 REF 1 26,2036 21700 0
 0078 REF 2 LAST 167 26,2037 03767 1
 0079 26,2040 77776 1
 0080 REF 10 LAST 352 26,2041 4 1052 0
 0081 REF 16 LAST 352 26,2042 6 4753 1
 0082 26,2043 0 0006 1
 0083 REF 1 26,2044 1 2071 1
 0084 REF 12 LAST 352 26,2045 0 6036 1
 0085 26,2046 77775 1
 0086 REF 4 LAST 314 26,2047 06422 0

V89CALL

V89RECL

ALINEX

COUNT* \$\$/R63
 TC BANKCALL
 CADR R0280TH
 CAF THRE3
 TS OPTIONX
 CAF ONE
 TS OPTIONX +1
 CAF V804N12
 TC BANKCALL
 CADR GCF LASH
 TC ENDEXT
 TC +2
 TC -5
 TC INTPRET
 RTB DAD
 LOADTIME
 DP1MIN
 STORE TSTART82
 STCALL TDEC1
 CSMCONIC
 VLOAD
 RATT
 STODL RONE
 TSTART82
 STCALL TDEC1
 LEMCONIC
 VLOAD VSU
 RONE
 RATT
 MXV RTB
 REFSMMAT
 NORMUNIT
 STORE POINIVSM
 EXIT
 CS OPTIONX +1
 AD ONE
 EXTEND
 BZF ALINEZ
 TC INTPRET
 VLOAD
 UNITX

IMU STATUS CHECK. RETURNS IF ORIENTATION
 KNOWN. ALARMS IF NOT.
 ALLOW ASTRONAUT TO SELECT DESIRED
 TRACKING ATTITUDE AXIS.

V 04 N 12

TERMINATE

PROCEED

DATA IN. OPTION1+1 = 1 FOR Z AXIS
 = 2 FOR X AXIS

READ PRESENT TIME

SAVE TIME FOR LEMCONIC CALL

STORE TIME FOR CSMCONIC CALL

CSM STATE VECTOR UPDATE

CSMCONIC LEFT R VECTOR IN RATT

SAVE FOR LINE OF SIGHT (LOS) COMPUTATION

STORE TIME FOR LEMCONIC CALL

LEM STATE VECTOR UPDATE

CSM POSITION - LEM POSITION = LOS

LOS VECTOR LEFT IN MPAC

(REFSMMAT X LOS). TRANSFORMS LOS FROM
 REFERENCE COORD TO STAB MEMB COORD.

STORE LOS FOR VECPOINT CALL

1 FOR Z AXIS. 2 FOR X AXIS.

X AXIS ALIGNMENT

READ (.5, 0, 0)

L R63

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0087	REF	9	LAST	266	26,2050	37761	0	V89CALL1	STCALL	SCAXIS
0088	REF	1			26,2051	56016	0			VFCPOINT
0089	REF	1			26,2052	00322	1		STORE	CPHI
0090					26,2053	77776	1		EXIT	
00905	REF	60	LAST	352	26,2054	0	4616	1	TC	BANKCALL
0091	REF	1			26,2055	54244	1		CADR	BALLANGS
0092	REF	1			26,2056	3	2076	1	CAF	V806N18
0093	REF	61	LAST	353	26,2057	0	4616	1	TC	BANKCALL
0094	REF	3	LAST	352	26,2060	20351	1		CADR	GOFLASH
0095	REF	27	LAST	352	26,2061	0	5472	0	TC	ENDEXT
0096					26,2062	0	2064	1	TC	+2
0097	REF	1			26,2063	0	2014	0	TC	V89RECL
0098	REF	23	LAST	313	26,2064	0	5516	0	TC	DOWNFLAG
0099	REF	2	LAST	244	26,2065	00124	0		ADRES	3AXISFLG
0100	REF	62	LAST	353	26,2066	0	4616	1	TC	BANKCALL
0101	REF	1			26,2067	54101	0		CADR	R60LEM
0102	REF	28	LAST	353	26,2070	1	5472	1	TCF	FNDEXT

STORE SELECTED ALIGNMENT AXIS
PUTS DESIRED GIM ANG (OG,IG,MG) IN TMPAC
STORE GIMBAL ANGLES FOR BALLANGS CALL.

PUTS DESIRED BALL ANGLES IN FDAIX,Y,Z
V 06 N 18
NOUN 18 REFERS TO FDAIX,Y,Z

TERMINATE
PROCEED
RECYCLE
RESET 3 AXIS FLAG
RESET BIT6 FLAG WORD 5
PERFORMS LEM MANEUVER TO ALIGN SELECTED
SPACECRAFT AXIS TO CSM.
TERMINATE R63

0103	REF	13	LAST	352	26,2071	0	6036	1	ALINEZ	TC	INTPRET
0104					26,2072	52175	0			VLOAD	GOTO
0105	REF	4	LAST	314	26,2073	06416	1				UNITZ
0106	REF	1			26,2074	54050	0				V89CALL1

Z AXIS ALIGNMENT
READ (0, 0, .5)

0107					26,2075	01014	0	V804N12	VN	412
0108					26,2076	01422	1	V806N18	VN	0618

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01085	26,2077	00000 1	DP1MIN	2DEC	6000
01085	26,2100	13560 0			

L ATTITUDE MANEUVER ROUTINE

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P0001 BLCK 2 LGC ATTITUDE MANEUVER ROUTINE-KALCMANU

R0002 MCD 2 DATE 5/1/67 BY DON KEENE
R0003 PROGRAM DESCRIPTION

R0004 KALCMANU IS A ROUTINE WHICH GENERATES COMMANDS FOR THE LM DAP TO CHANGE THE ATTITUDE OF THE SPACECRAFT
R0006 DURING FREE FALL. IT IS DESIGNED TO MANEUVER THE SPACECRAFT FROM ITS INITIAL ORIENTATION TO SOME DESIRED
R0008 ORIENTATION SPECIFIED BY THE PROGRAM WHICH CALLS KALCMANU, AVOIDING GIMBAL LOCK IN THE PROCESS. IN THE
R0010 MCD 2 VERSION, THIS DESIRED ATTITUDE IS SPECIFIED BY A SET OF THREE COMMANDED CDU ANGLES STORED AS 2S COMPLEMENT
R0012 SINGLE PRECISION ANGLES IN THE THREE CONSECUTIVE LOCATIONS, CPHI, CTHETA, CPSI, WHERE

R0014 CPHI = COMMANDED OUTER GIMBAL ANGLE
R0015 CTHETA = COMMANDED INNER GIMBAL ANGLE
R0016 CPSI = COMMANDED MIDDLE GIMBAL ANGLE

R0017 WHEN POINTING A SPACECRAFT AXIS (E.I. X, Y, Z, THE AOT, THRUST AXIS, ETC) THE SUBROUTINE VECPOINT MAY BE
R0019 USED TO GENERATE THIS SET OF DESIRED CDU ANGLES (SEE DESCRIPTION IN R60) -
R0021 WITH THIS INFORMATION KALCMANU DETERMINES THE DIRECTION OF THE SINGLE EQUIVALENT ROTATION (COF ALSO U) AND THE
R0023 MAGNITUDE OF THE ROTATION (AM) TO BRING THE S/C FROM ITS INITIAL ORIENTATION TO ITS FINAL ORIENTATION.
R0025 THIS DIRECTION REMAINS FIXED BOTH IN INERTIAL COORDINATES AND IN COMMANDED S/C AXES THROUGHOUT THE
R0027 MANEUVER. -
R0028 ONCE COF AND AM HAVE BEEN DETERMINED, KALCMANU THEN EXAMINES THE MANEUVER TO SEE IF IT WILL BRING
R0030 THE S/C THROUGH GIMBAL LOCK. IF SO, COF AND AM ARE READJUSTED SO THAT THE S/C WILL JUST SKIM THE GIMBAL
R0031 LOCK ZONE AND ALIGN THE X-AXIS. IN GENERAL A FINAL YAW ABOUT X WILL BE NECESSARY TO COMPLETE THE MANEUVER.
R0033 NEEDLESS TO SAY, NEITHER THE INITIAL NOR THE FINAL ORIENTATION CAN BE IN GIMBAL LOCK.
R0035

R0037 FOR PROPER ATTITUDE CONTROL THE DIGITAL AUTOPILOT MUST BE GIVEN AN ATTITUDE REFERENCE WHICH IT CAN TRACK.
R0038 KALCMANU DOES THIS BY GENERATING A REFERENCE OF DESIRED GIMBAL ANGLES (CDUXD, CDUYD, CDUZD) WHICH ARE UPDATED
R0040 EVERY ONE SECOND DURING THE MANEUVER. TO ACHIEVE A SMOOTHER SEQUENCE OF COMMANDS BETWEEN SUCCESSIVE UPDATES,
R0042 THE PROGRAM ALSO GENERATES A SET OF INCREMENTAL CDU ANGLES (DELDCDU) TO BE ADDED TO CDU DESIRED BY THE DIGITAL
R0044 AUTOPILOT. KALCMANU ALSO CALCULATES THE COMPONENT MANEUVER RATES (OMEGAPD, OMEGAQD, OMEGARD), WHICH CAN
R0046
R0048
R0049 BE DETERMINED SIMPLY BY MULTIPLYING COF BY SOME SCALAR (ARATE) CORRESPONDING TO THE DESIRED ROTATIONAL RATE.
R0051

R0052 AUTOMATIC MANEUVERS ARE TIMED WITH THE HELP OF WAITLIST SO THAT AFTER A SPECIFIED INTERVAL THE Y AND Z
R0054 DESIRED RATES ARE SET TO ZERO AND THE DESIRED CDU ANGLES (CDUYD, CDUZD) ARE SET EQUAL TO THE FINAL DESIRED CDU
R0056 ANGLES (CTHETA, CPSI). IF ANY YAW REMAINS DUE TO GIMBAL LOCK AVOIDANCE, THE FINAL YAW MANEUVER IS
R0058 CALCULATED AND THE DESIRED YAW RATE SET TO SOME FIXED VALUE (ROLLRATE = + OR - 2 DEGREES PER SEC).
R0060 IN THIS CASE ONLY AN INCREMENTAL CDUX ANGLE (DELFROLL) IS SUPPLIED TO THE DAP. AT THE END OF THE YAW
R0062 MANEUVER OR IN THE EVENT THAT THERE WAS NO FINAL YAW, CDUXD IS SET EQUAL TO CPHI AND THE X-AXIS DESIRED
R0064 RATE SET TO ZERO. THUS, UPON COMPLETION OF THE MANEUVER THE S/C WILL FINISH UP IN A LIMIT CYCLE ABOUT THE
R0066 DESIRED FINAL GIMBAL ANGLES.

R0067 PROGRAM LOGIC FLOW

R0068 KALCMANU IS CALLED AS A HIGH PRIORITY JOB WITH ENTRY POINTS AT KALCMAN3 AND VECPOINT. IT FIRST PICKS
R0070 UP THE CURRENT CDU ANGLES TO BE USED AS THE BASIS FOR ALL COMPUTATIONS INVOLVING THE INITIAL S/C ORIENTATION.

L ATTITUDE MANEUVER ROUTINE

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R0072 IT THEN DETERMINES THE DIRECTION COSINE MATRICES RELATING BOTH THE INITIAL AND FINAL S/C ORIENTATION TO STABLE
 R0074 * *
 R0076 MEMBER AXES (MIS, MFS). IT ALSO COMPUTES THE MATRIX RELATING FINAL S/C AXES TO INITIAL S/C AXES (MFI). THE
 R0078 ANGLE OF ROTATION (AM) IS THEN EXTRACTED FROM THIS MATRIX, AND TESTS ARE MADE TO DETERMINE IF
 R0080
 R0081 A) AM LESS THAN .25 DEGREES (MINANG)
 R0082 B) AM GREATER THAN 170 DEGREES (MAXANG)

R0083 IF AM LESS THAN .25 DEGREES, NO COMPLICATED AUTOMATIC MANEUVERING IS NECESSARY. THEREFORE WE CAN SIMPLY
 R0085 SET CDU DESIRED EQUAL TO THE FINAL CDU DESIRED ANGLES AND TERMINATE THE JOB.

R0087 IF AM IS GREATER THAN .25 DEGREES BUT LESS THAN 170 DEGREES, THE AXES OF THE SINGLE EQUIVALENT ROTATION
 R0088 *
 R0090 (CCF) IS EXTRACTED FROM THE SKEW SYMMETRIC COMPONENTS OF MFI. * *
 R0091 IF AM GREATER THAN 170 DEGREES AN ALTERNATE METHOD EMPLOYING THE SYMMETRIC PART OF MFI (MFISYM) IS USED
 R0093
 R0095
 R0096 TO DETERMINE COF.

R0097 THE PROGRAM THEN CHECKS TO SEE IF THE MANEUVER AS COMPUTED WILL BRING THE S/C THROUGH GIMBAL LOCK. IF
 R0099 SO, A NEW MANEUVER IS CALCULATED WHICH WILL JUST SKIM THE GIMBAL LOCK ZONE AND ALIGN THE S/C X-AXIS. THIS
 R0101 METHOD ASSURES THAT THE ADDITIONAL MANEUVERING TO AVOID GIMBAL LOCK WILL BE KEPT TO A MINIMUM. SINCE A FINAL
 R0103 P AXIS YAW WILL BE NECESSARY, A SWITCH IS RESET (STATE SWITCH 31) TO ALLOW FOR THE COMPUTATION OF THIS FINAL
 R0105 YAW.

R0106 AS STATED PREVIOUSLY KALCMANU GENERATES A SEQUENCE OF DESIRED GIMBAL ANGLES WHICH ARE UPDATED EVERY
 R0108
 R0110 SECOND. THIS IS ACCOMPLISHED BY A SMALL ROTATION OF THE DESIRED S/C FRAME ABOUT THE VECTOR COF. THE NEW
 R0112 DESIRED REFERENCE MATRIX IS THEN,

R0113 * * *
 R0114 MIS = MIS DEL
 R0115 N+1 N

R0116 *
 R0117 WHERE DEL IS THE MATRIX CORRESPONDING TO THIS SMALL ROTATION. THE NEW CDU ANGLES CAN THEN BE EXTRACTED
 R0119 *
 R0120 FROM MIS.

R0121 AT THE BEGINNING OF THE MANEUVER THE AUTOPILOT DESIRED RATES (OMEGAPD, OMEGAQD, OMEGARD) AND THE
 R0123 MANEUVER TIMINGS ARE ESTABLISHED. ON THE FIRST PASS AND ON ALL SUBSEQUENT UPDATES THE CDU DESIRED
 R0125 ANGLES ARE LOADED WITH THE APPROPRIATE VALUES AND THE INCREMENTAL CDU ANGLES ARE COMPUTED. THE AGC CLOCKS
 R0127 (TIME1 AND TIME2) ARE THEN CHECKED TO SEE IF THE MANEUVER WILL TERMINATE BEFORE THE NEXT UPDATE. IF
 R0129 NOT, KALCMANU CALLS FOR ANOTHER UPDATE (RUN AS A JOB WITH PRIORITY TBD) IN ONE SECOND. ANY DELAYS IN THIS
 R0131 CALLING SEQUENCE ARE AUTOMATICALLY COMPENSATED IN CALLING FOR THE NEXT UPDATE.
 R0133

R0134 IF IT IS FOUND THAT THE MANEUVER IS TO TERMINATE BEFORE THE NEXT UPDATE A ROUTINE IS CALLED (AS A WAIT-
 R0136 LIST TASK) TO STOP THE MANEUVER AT THE APPROPRIATE TIME AS EXPLAINED ABOVE.
 R0138

L ATTITUDE MANEUVER ROUTINE

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R0139 CALLING SEQUENCE

R0140 IN ORDER TO PERFORM A KALCMANU SUPERVISED MANEUVER, THE COMMANDED GIMBAL ANGLES MUST BE PRECOMPUTED AND
 R0142 STORED IN LOCATIONS CPHI, CTHETA, CPSI. THE USER'S PROGRAM MUST THEN CLEAR STATE SWITCH NO 33 TO ALLOW THE
 R0144 ATTITUDE MANEUVER ROUTINE TO PERFORM ANY FINAL P-AXIS YAW INCURRED BY AVOIDING GIMBAL LOCK. THE MANEUVER IS
 R0146 THEN INITIATED BY ESTABLISHING THE FOLLOWING EXECUTIVE JOB

R0147 CAE PRI0 *
 R0148 XX
 R0149 --
 R0150 INHINT
 R0151 TC FINDVAC
 R0152 2CADR KALCMAN3
 R0153 RELINT

R0154 THE USER'S PROGRAM MAY EITHER CONTINUE OR WAIT FOR THE TERMINATION OF THE MANEUVER. IF THE USER WISHES TO
 R0156 WAIT, HE MAY PUT HIS JOB TO SLEEP WITH THE FOLLOWING INSTRUCTIONS

R0157 L TC BANKCALL
 R0158 L+1 CADR ATTSTALL
 R0159 L+2 (BAD RETURN)
 R0160 L+3 (GOOD RETURN)

R0161 UPON COMPLETION OF THE MANEUVER, THE PROGRAM WILL BE AWAKENED AT L+3 IF THE MANEUVER WAS COMPLETED
 R0163 SUCCESSFULLY, OR AT L+2 IF THE MANEUVER WAS ABORTED. THIS ABORT WOULD OCCUR IF THE INITIAL OR FINAL ATTITUDE
 R0165 WAS IN GIMBAL LOCK.

R0166 ***NOTA BENE*** IT IS ASSUMED THAT THE DESIRED MANEUVERING RATE (0.5, 2, 5, 10, DEG/SEC) HAS BEEN SELECTED BY
 R0168 KEYBOARD ENTRY PRIOR TO THE EXECUTION OF KALCMANU.
 R0169 IT IS ALSO ASSUMED THAT THE AUTOPILOT IS IN THE AUTO MODE. IF THE MODE SWITCH IS CHANGED DURING THE
 R0171 MANEUVER, KALCMANU WILL TERMINATE VIA GOODEND WITHIN 1 SECOND SO THAT R60 MAY REQUEST A TRIM OF THE S/C ATTITUDE
 R0173 THIS IS THE ONLY MEANS FOR MANUALLY TERMINATING A KALCMANU SUPERVISED MANEUVER.
 R0175 SUBROUTINES

R0176 KALCMANU USES A NUMBER OF INTERPRETIVE SUBROUTINES WHICH MAY BE OF GENERAL INTEREST. SINCE THESE ROUTINES
 R0178 WERE PROGRAMMED EXCLUSIVELY FOR KALCMANU, THEY ARE NOT, AS YET, GENERALLY AVAILABLE FOR USE BY OTHER PROGRAMS.

R0180
 R0181 MXM3
 R0182 ----

R0183 THIS SUBROUTINE MULTIPLIES TWO 3X3 MATRICES AND LEAVES THE RESULT IN THE FIRST 18 LOCATIONS OF THE PUSH
 R0185 DOWN LIST, I.E.,

R0186 (M M M)
 R0187 (0 1 2)
 R0188 () * *
 R0189 (M M M) = M1 X M2
 R0190 (3 4 5)
 R0191 ()
 R0192 (M M M)

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R0193 (6 7 8)

R0194 INDEX REGISTER X1 MUST BE LOADED WITH THE COMPLEMENT OF THE STARTING ADDRESS FOR M1, AND X2 MUST BE
 R0196 *
 R0198 *
 R0199 LOADED WITH THE COMPLEMENT OF THE STARTING ADDRESS FOR M2. THE ROUTINE USES THE FIRST 20 LOCATIONS OF THE PUSH
 R0201 DOWN LIST. THE FIRST ELEMENT OF THE MATRIX APPEARS IN PDO. PUSH UP FOR M.
 R0203 8
 R0205
 R0206
 R0207

TRANSPOS

R0208 THIS ROUTINE TRANSPOSES A 3X3 MATRIX AND LEAVES THE RESULT IN THE PUSH DOWN LIST, I.F.,

R0210 * * T
 R0211 M = M1
 R0212

R0213 INDEX REGISTER X1 MUST CONTAIN THE COMPLEMENT OF THE STARTING ADDRESS FOR M1. PUSH UP FOR THE FIRST AND SUB-
 R0215 *
 R0216 SEQUENT COMPONENTS OF M. THIS SUBROUTINE ALSO USES THE FIRST 20 LOCATIONS OF THE PUSH DOWN LIST.
 R0218
 R0219
 R0220

CDU TO DCM

R0221 THIS SUBROUTINE CONVERTS THREE CDU ANGLES IN T(IMPAC) TO A DIRECTION COSINE MATRIX (SCALED BY 2) RELATING
 R0223 THE CORRESPONDING S/C ORIENTATIONS TO THE STABLE MEMBER FRAME. THE FORMULAS FOR THIS CONVERSION ARE
 R0225
 R0226
 R0227

M = CCSY COSZ
 0

R0228 M = -COSY SINZ COSX + SINY SINX
 R0229 1

R0230 M = COSY SINZ SINX + SINY COSX
 R0231 2

R0232 M = SINZ
 R0233 3

R0234 M = COSZ COSX
 R0235 4

R0236 M = -COSZ SINX
 R0237 5

R0238 M = -SINY COSZ
 R0239 6

R0240 M = SINY SINZ COSX + COSY SINX
 R0241 7

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R0242 M = -SINY SINZ SINX + COSY COSX
 R0243 8

R0244 WHERE X = OUTER GIMBAL ANGLE
 R0245 Y = INNER GIMBAL ANGLE
 R0246 Z = MIDDLE GIMBAL ANGLE

R0247 THE INTERPRETATION OF THIS MATRIX IS AS FOLLOWS

R0248 IF A , A , A REPRESENT THE COMPONENTS OF A VECTOR IN S/C AXES THEN THE COMPONENTS OF THE SAME VECTOR IN
 R0250 X Y Z
 R0251 STABLE MEMBER AXES (B , B , B) ARE
 R0252 X Y Z

R0253	(B)		(A)
R0254	(X)		(X)
R0255	()		()
R0256	()	*	()
R0257	(B)	= M	(A)
R0258	(Y)		(Y)
R0259	()		()
R0260	(B)		(A)
R0261	(Z)		(Z)

R0262 THE SUBROUTINE WILL STORE THIS MATRIX IN SEQUENTIAL LOCATIONS OF ERASABLE MEMORY AS SPECIFIED BY THE CALLING
 R0264 PROGRAM. TO DO THIS THE CALLING PROGRAM MUST FIRST LOAD X2 WITH THE COMPLEMENT OF THE STARTING ADDRESS FOR M.
 R0266
 R0268 INTERNALLY, THE ROUTINE USES THE FIRST 16 LOCATIONS OF THE PUSH DOWN LIST, ALSO STEP REGISTER S1 AND INDEX
 R0269 REGISTER X2.
 R0271

R0272 DCM TO CDU
 R0273 -----

R0274
 R0276 THIS ROUTINE EXTRACTS THE CDU ANGLES FROM A DIRECTION COSINE MATRIX (M SCALED BY 2) RELATING S/C AXIS TO
 R0278
 R0280 STABLE MEMBER AXES. X1 MUST CONTAIN THE COMPLEMENT OF THE STARTING ADDRESS FOR M. THE SUBROUTINE LEAVES THE
 R0282 CORRESPONDING GIMBAL ANGLES IN VIMPAC) AS DOUBLE PRECISION 1:5 COMPLEMENT ANGLES SCALED BY 2PI. THE FORMULAS
 R0284 FOR THIS CONVERSION ARE

R0285 Z = ARCSIN (M)
 R0286 3

R0287 Y = ARCSIN (-M /COSZ)
 R0288 6

R0289 IF M IS NEGATIVE, Y IS REPLACED BY PI SGN Y - Y
 R0290 0

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R0291 X = ARCSIN (-M / CCSZ)
R0292 5

R0293 IE M IS NEGATIVE X IS REPLACED BY PI SGN X - X
R0294 4

R0295 THIS ROUTINE DOES NOT SET THE PUSH DOWN POINTER, BUT USES THE NEXT 8 LOCATIONS OF THE PUSH DOWN LIST AND
R0297 RETURNS THE POINTER TO ITS ORIGINAL SETTING. THIS PROCEDURE ALLOWS THE CALLER TO STORE THE MATRIX AT THE TOP OF
R0299 THE PUSH DOWN LIST.

R0300 DELCOMP
R0301 -----

R0302 *
R0303 THIS ROUTINE COMPUTES THE DIRECTION COSINE MATRIX (DEL) RELATING ON
R0304 IS ROTATED WITH RESPECT TO THE FIRST BY AN ANGLE, A, ABOUT A UNIT VECTOR, U. THE FORMULA FOR THIS MATRIX IS
R0308

R0309 * * --T *
R0310 DEL = I COSA + UU (1-COSA) + V SINA
R0311 X

R0312 WHERE *
R0313 I = $\begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$
R0314

R0315 2
R0316 $\begin{pmatrix} U & U & U \\ X & X & X \\ Y & Y & Y \end{pmatrix}$
R0317 $\begin{pmatrix} U & U & U \\ X & X & X \\ Y & Y & Y \end{pmatrix}$
R0318 $\begin{pmatrix} U & U & U \\ X & X & X \\ Y & Y & Y \end{pmatrix}$
R0319 --T 2
R0320 UU = $\begin{pmatrix} U & U & U \\ Y & Y & Y \\ Z & Z & Z \end{pmatrix}$
R0321 $\begin{pmatrix} U & U & U \\ Y & Y & Y \\ Z & Z & Z \end{pmatrix}$
R0322 $\begin{pmatrix} U & U & U \\ Y & Y & Y \\ Z & Z & Z \end{pmatrix}$
R0323 $\begin{pmatrix} U & U & U \\ Y & Y & Y \\ Z & Z & Z \end{pmatrix}$
R0324 $\begin{pmatrix} U & U & U \\ Y & Y & Y \\ Z & Z & Z \end{pmatrix}$
R0325 $\begin{pmatrix} U & U & U \\ Y & Y & Y \\ Z & Z & Z \end{pmatrix}$

R0326 $\begin{pmatrix} 0 & -U & U \\ & Z & Y \\ & & \end{pmatrix}$
R0327 *
R0328 V = $\begin{pmatrix} U & 0 & -U \\ Z & & X \\ & & \end{pmatrix}$
R0329 X
R0330 $\begin{pmatrix} -U & U & 0 \\ Y & X & \end{pmatrix}$
R0331
R0332
R0333

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R0334 -
 R0335 U = UNIT ROTATION VECTOR RESOLVED INTO S/C AXES
 R0336 A = ROTATION ANGLE

R0337 *
 R0338 THE INTERPRETATION OF DEL IS AS FOLLOWS

R0339 IF A , A , A REPRESENT THE COMPONENT OF A VECTOR IN THE ROTATED FRAME, THEN THE COMPONENTS OF THE SAME
 R0341 X Y Z
 R0342 VECTOR IN THE ORIGINAL S/C AXES (B , B , B) ARE
 R0343 X Y Z

R0344	(B)		(A)
R0345	(X)		(X)
R0346	()	*	()
R0347	(B)	= DEL	(A)
R0348	(Y)		(Y)
R0349	()		()
R0350	(B)		(A)
R0351	(Z)		(Z)

R0352 THE ROUTINE WILL STORE THIS MATRIX (SCALED UNITY) IN SEQUENTIAL LOCATIONS OF ERASABLE MEMORY BEGINNING WITH
 R0354
 R0356 THE LOCATION CALLED DEL. IN ORDER TO USE THE ROUTINE, THE CALLING PROGRAM MUST FIRST STORE U (A HALF UNIT
 R0358 DOUBLE PRECISION VECTOR) IN THE SET OF ERASABLE LOCATIONS BEGINNING WITH THE ADDRESS CALLED CDE. THE ANGLE, A,
 R0360 MUST THEN BE LOADED INTO D(MPAC).

R0361 INTERNALLY, THE PROGRAM ALSO USES THE FIRST 10 LOCATIONS OF THE PUSH DOWN LIST.
 R0363

R0364 READCDUK
 R0365 -----

R0366 THIS BASIC LANGUAGE SUBROUTINE LOADS T(MPAC) WITH THE THREE CDU ANGLES.
 R0368

R0369 SIGNMPAC
 R0370 -----

R0371 THIS IS A BASIC LANGUAGE SUBROUTINE WHICH LIMITS THE MAGNITUDE OF D(MPAC) TO + OR - DPOS MAX ON OVERFLOW.
 R0373

R0374 PROGRAM STORAGE ALLOCATION

R0375	1)	FIXED MEMORY	1059 WORDS
R0376	2)	ERASABLE MEMORY	98
R0377	3)	STATE SWITCHES	3

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R0378 4) FLAGS 1

R0379 JC8 PRIORITIES

R0380 1) KALCMANU TBD
 R0381 2) ONE SECOND UPDATE TBD

R0382 SUMMARY OF STATE SWITCHES AND FLAGWORDS USED BY KALCMANU.

R0383 R0384	STATE SWITCH NO.	FLAGWRD 2 BIT NO.	SETTING	MEANING
R0385	*			
R0386	31	14	0	MANEUVER WENT THROUGH GIMBAL LOCK
R0388			1	MANEUVER DID NOT GO THROUGH GIMBAL LOCK
R0390				
R0391	*			
R0392	32	13	0	CONTINUE UPDATE PROCESS
R0393			1	START UPDATE PROCFS
R0394	33	12	0	PERFORM FINAL P-AXIS YAW IF REQUIRED
R0396			1	IGNORE ANY FINAL P-AXIS YAW
R0398				
R0399	34	11	0	SIGNAL END OF KALCMANU
R0400			1	KALCMANU IN PROCESS USER MUST SET SWITCH BEFORE INITIATING

R0402 * INTERNAL TO KALCMANU

R0403 SUGGESTIONS FOR PROGRAM INTEGRATION

R0404 THE FOLLOWING VARIABLES SHOULD BE ASSIGNED TO UNSWITCH ERASABLE

R0405 CPHI
 R0406 CTHETA
 R0407 CPSI
 R0408 PCINTVSM +5
 R0409 SCAXIS +5
 R0410 DELDCDU
 R0411 DELDCDU1
 R0412 DELDCDU2
 R0413 RATEINDX

R0414 THE FOLLOWING SUBROUTINES MAY BE PUT IN A DIFFERENT BANK

R0415 MXM3

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R0416	TRANSP0S
R0417	SIGNMPAC
R0418	READCDUK
R0419	CDUTCDCM

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0420 15,2050 BANK 15
 0421 REF 1 22,2000 SETLOC KALCMONI
 0422 22,2004 BANK

0423 REF 3 LAST 301 E6,1674 EBANK= BCDU

R0424 THE THREE DESIRED CDU ANGLES MUST BE STORED AS SINGLE PRECISION TWOS COMPLEMENT ANGLES IN THE THREE SUCCESSIVE
 R0426 LOCATIONS, CPHI, CTHETA, CPSI.

0427	REF	1					COUNT*	\$/KALC		
0428	REF	14	LAST	353	22,2004	0 6036 1	KALCMAN3	TC	INTPRET	PICK UP THE CURRENT CDU ANGLES AND
0429					22,2005	77634 0		RTB		COMPUTE THE MATRIX FROM INITIAL S/C
0430	REF	1			22,2006	44403 0			READCDUK	AXES TO FINAL S/C AXES
0431	REF	4	LAST	364	22,2007	03275 1		STORE	BCDU	STORE INITIAL S/C ANGLES
0437					22,2010	51535 0		SLOAD	ABS	CHECK THE MAGNITUDE OF THE DESIRED
0438	REF	1			22,2011	00324 1			CPSI	MIDDLE GIMBAL ANGLE
0439					22,2012	51025 1		DSU	BPL	
0440	REF	1			22,2013	04403 1			LOCKANGL	IF GREATER THAN 70 DEG ABORT MANEUVER
0441	REF	1			22,2014	44724 0			TOOBADF	
0442					22,2015	72364 0		AXC,2	TLOAD	
0443	REF	3	LAST	151	22,2016	03244 0			MIS	
0444	REF	5	LAST	364	22,2017	03275 1			BCDU	
0445					22,2020	77624 1		CALL		COMPUTE THE TRANSFORMATION FROM INITIAL
0446	REF	1			22,2021	44410 1			CDUTODCM	S/C AXES TO STABLE MEMBER AXES
0447					22,2022	72364 0		AXC,2	TLOAD	
0448	REF	4	LAST	132	22,2023	02234 0			MFS	PREPARE TO CALCULATE ARRAY MFS
0449	REF	2	LAST	353	22,2024	00322 1			CPHI	
0450					22,2025	77624 1		CALL		
0451	REF	2	LAST	364	22,2026	44410 1			CDUTODCM	
0452					22,2027	45160 1	SECAD	AXC,1	CALL	MIS AND MFS ARRAYS CALCULATED \$2
0453	REF	4	LAST	364	22,2030	03244 0			MIS	
0454	REF	1			22,2031	44326 0			TRANSPDS	
0455					22,2032	45575 1		VLOAD	STADR	
0456	REF	12	LAST	150	22,2033	50461 1		STOVL	TMIS +12D	
0457					22,2034	77626 0		STADR		
0458	REF	13	LAST	364	22,2035	50467 1		STOVL	TMIS +6	
0459					22,2036	77626 0		STADR		
0460	REF	14	LAST	364	22,2037	74475 1		STORE	TMIS	TMIS = TRANSPOSE(MIS) SCALED BY 2
0461					22,2040	75160 1		AXC,1	AXC,2	
0462	REF	15	LAST	364	22,2041	03301 0			TMIS	
0463	REF	5	LAST	364	22,2042	02234 0			MFS	
0464					22,2043	77624 1		CALL		
0465	REF	1			22,2044	44312 1			MXM3	
0466					22,2045	45575 1		VLOAD	STADR	
0467	REF	1			22,2046	51526 1		STOVL	MFI +12D	
0468					22,2047	77626 0		STADR		
0469	REF	2	LAST	364	22,2050	51534 1		STOVL	MFI +6	
0470					22,2051	77626 0		STADR		
0471	REF	3	LAST	364	22,2052	75542 0		STORE	MFI	MFI = TMIS MFS (SCALED BY 4)
0472					22,2053	45001 1		SETPD	CALL	TRANSPOSE MFI IN PD LIST

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0473				22,2054	00023 0		180	
0474	REF	1		22,2055	44335 1		TRNSPSPD	
0475				22,2056	45575 1		VLOAD	STADR
0476	RFF	1		22,2057	50461 1		STOVL	TMFI +12D
0477				22,2060	77626 0		STADR	
0478	REF	2	LAST	365	22,2061	50467 1	STOVL	TMFI +6
0479				22,2062	77626 0		STADR	
0480	REF	3	LAST	365	22,2063	74475 1	STORE	TMFI
R0481								TMFI = TRANSPOSE (MFI) SCALED BY 4
R0482								
R0483								
0484				22,2064	45345 1		DLOAD	DSU
0485	REF	4	LAST	365	22,2065	03304 0		TMFI +2
0486	REF	4	LAST	364	22,2066	02237 0		MFI +2
0487				22,2067	45325 1		PDDL	DSU
0488	REF	5	LAST	365	22,2070	02241 1		MFI +4
0489	REF	5	LAST	365	22,2071	03306 1		TMFI +4
0490				22,2072	45325 1		PDDL	DSU
0491	RFF	6	LAST	365	22,2073	03314 1		TMFI +10D
0492	REF	6	LAST	365	22,2074	02247 1		MFI +10D
0493				22,2075	77666 1		VDEF	
0494	REF	5	LAST	151	22,2076	03324 1	STORE	COFSKEW
R0495								EQUALS MFI SKFW
R0496								
R0497								
0498				22,2077	43345 1		DLOAD	DAD
0499	RFF	7	LAST	365	22,2100	02235 1		MFI
0500	REF	8	LAST	365	22,2101	02255 1		MFI +16D
0501				22,2102	43225 0		DSU	DAD
0502	REF	2	LAST	36	22,2103	06414 0		DPI/4TH
0503	RFF	9	LAST	365	22,2104	02245 0		MFI +8D
0504	REF	2	LAST	150	22,2105	03332 0	STORE	CAM
0505				22,2106	77726 1		ARCCOS	
0506	REF	1		22,2107	03334 0		STORE	AM
0507				22,2110	51025 1		DSU	BPL
0508	RFF	1		22,2111	04363 0			MINANG
0509	REF	1		22,2112	44117 0			CHCKMAX
0510				22,2113	77751 1		TLOAD	
0511	REF	3	LAST	364	22,2114	00322 1		CPHI
0512	RFF	6	LAST	210	22,2115	37234 0	STCALL	CDUXD
0513	RFF	1		22,2116	44742 0			TOOBADI
								MANEUVER LESS THAN .25 DEGREES
								GO DIRECTLY INTO ATTITUDE HOLD
								ABOUT COMMANDED ANGLES
								STOP RATE AND EXIT
0514				22,2117	45345 1	CHECKMAX	DLOAD	DSU
0515	REF	2	LAST	365	22,2120	03334 0		AM
0516	REF	1		22,2121	04365 0			MAXANG
0517				22,2122	77244 0		BPL	VLOAD
0518	RFF	1		22,2123	44131 1			ALTCALC
0519	REF	6	LAST	365	22,2124	03324 1		COFSKEW
0520				22,2125	77656 1		UNIT	
0521	REF	1		22,2126	03267 1		STORE	COF
								COF IS THE MANEUVER AXIS

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0522				22,2127	77650 1	GOTO		SEE IF MANEUVER GOES THRU GIMBAL LOCK
0523	REF	1		22,2130	44744 0		LOC SKIRT	
0524				22,2131	53375 0	ALTCALC	VLOAD	IF AM GREATER THAN 170 DEGREES
0525	REF	10	LAST	365	22,2132		MFI	
0526	REF	7	LAST	365	22,2133		TMFI	
0527				22,2134	77762 1		VSR1	
0528	REF	1		22,2135	27302 0		STOVL	MFISYM
0529	REF	11	LAST	366	22,2136			MFI +6
0530				22,2137	74455 0		VAD	VSR1
0531	REF	8	LAST	366	22,2140			TMFI +6
0532	REF	2	LAST	366	22,2141		STOVL	MFISYM +6
0533	REF	12	LAST	366	22,2142			MFI +12D
0534				22,2143	74455 0		VAD	VSR1
0535	REF	9	LAST	366	22,2144			TMFI +12D
0536	REF	3	LAST	366	22,2145		STORE	MFISYM +12D MFISYM=(MFI+TMFI)/2 SCALED BY 4
R0537								
R0538								
R0539								
R0540								
0541				22,2146	70545 1	DLOAD	SR1	
0542	REF	3	LAST	365	22,2147		CAM	
0543				22,2150	45325 1	PDDL	DSU	PDO CAM \$4
0544	REF	1		22,2151	06422 0		DPHALF	
0545	REF	4	LAST	366	22,2152		CAM	
0546				22,2153	65204 1	BOVB	PDDL	PD2 1 - CAM \$2
0547	REF	1		22,2154	21664 0		SIGNMPAC	
0548	REF	4	LAST	366	22,2155		MFISYM +16D	
0549				22,2156	56225 1	DSU	DDV	
0550				22,2157	00001 0		0	
0551				22,2160	00003 1		2	
0552				22,2161	65366 1	SQRT	PDDL	COFZ = SQRT(MFISYM8-CAM)/(1-CAM) \$ ROOT 2
0553	REF	5	LAST	366	22,2162		MFISYM +8D	
0554				22,2163	56225 1	DSU	DCV	
0555				22,2164	00001 0		0	
0556				22,2165	00003 1		2	
0557				22,2166	65366 1	SQRT	PDDL	COFY = SQRT(MFISYM4-CAM)/(1-CAM) \$ROOT2
0558	REF	6	LAST	366	22,2167		MFISYM	
0559				22,2170	56225 1	DSU	DDV	
0560				22,2171	00001 0		0	
0561				22,2172	00003 1		2	
0562				22,2173	55566 1	SQRT	VDEF	COFX = SQRT(MFISYM-CAM)/(1-CAM) \$ROOT 2
0563				22,2174	77656 1	UNIT		
0564	REF	2	LAST	365	22,2175		STORE	COF
R0565								
R0566								
R0567								
0568				22,2176	45345 1	COFMAXGO	DLOAD	
0569	REF	3	LAST	366	22,2177		DSU	
0570	REF	4	LAST	366	22,2200		COF	
0571				22,2201	71240 1	BMN	COF +2	
							DLOAD	COFY G COFX

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0572	REF	1		22,2202	44211 0		COMP12		
0573	REF	5	LAST 366	22,2203	03267 1		COF		
0574				22,2204	50025 0	DSU	BMN		
0575	REF	6	LAST 367	22,2205	03273 1		COF +4		
0576	REF	1		22,2206	44266 0		METHCD3	COFZ G COFX OR COFY	
0577				22,2207	77650 1	GOTO			
0578	REF	1		22,2210	44242 0		METHOD1	COFX G COFY OR COFZ	
0579				22,2211	45345 1	COMP12	DLOAD	DSU	
0580	REF	7	LAST 367	22,2212	03271 0		COF +2		
0581	REF	8	LAST 367	22,2213	03273 1		COF +4		
0582				22,2214	77640 0	BMN			
0583	REF	2	LAST 367	22,2215	44266 0		METHOD3	COFZ G COFY OR COFX	
0584				22,2216	51145 0	METHOD2	DLOAD	BPL	COFY MAX
0585	REF	7	LAST 365	22,2217	03326 0		COFSKEW +2	UY	
0586	REF	1		22,2220	44224 0		U2POS		
0587				22,2221	57575 1		VLOAD	VCOMP	
0588	REF	9	LAST 367	22,2222	03267 1		COF		
0589	REF	10	LAST 367	22,2223	03267 1		STORE	COF	
0590				22,2224	51145 0	U2POS	DLOAD	BPL	
0591	REF	7	LAST 366	22,2225	03304 0		MFISYM +2	UX UY	
0592	REF	1		22,2226	44232 1		OKU21		
0593				22,2227	57545 1		DLOAD	DCOMP	SIGN OF UX OPPOSITE TO UY
0594	REF	11	LAST 367	22,2230	03267 1		COF		
0595	REF	12	LAST 367	22,2231	03267 1		STORE	COF	
0596				22,2232	51145 0	OKU21	DLOAD	BPL	
0597	REF	8	LAST 367	22,2233	03314 1		MFISYM +10D	UY UZ	
0598	REF	2	LAST 366	22,2234	44744 0		LOCKSKIRT		
0599				22,2235	57545 1		DLOAD	DCOMP	SIGN OF UZ OPPOSITE TO UY
0600	REF	13	LAST 367	22,2236	03273 1		COF +4		
0601	REF	14	LAST 367	22,2237	03273 1		STORE	COF +4	
0602				22,2240	77650 1		GOTO		
0603	REF	3	LAST 367	22,2241	44744 0		LOCKSKIRT		
0604				22,2242	51145 0	METHOD1	DLOAD	BPL	COFX MAX
0605	REF	8	LAST 367	22,2243	03324 1		COFSKEW	UX	
0606	REF	1		22,2244	44250 0		UIPOS		
0607				22,2245	57575 1		VLOAD	VCOMP	
0608	REF	15	LAST 367	22,2246	03267 1		COF		
0609	REF	16	LAST 367	22,2247	03267 1		STORE	COF	
0610				22,2250	51145 0	UIPOS	DLOAD	BPL	
0611	REF	9	LAST 367	22,2251	03304 0		MFISYM +2	UX UY	
0612	REF	1		22,2252	44256 0		OKU12		
0613				22,2253	57545 1		DLOAD	DCOMP	
0614	REF	17	LAST 367	22,2254	03271 0		COF +2	SIGN OF UY OPPOSITE TO UX	
0615	REF	18	LAST 367	22,2255	03271 0		COF +2		
0616				22,2256	51145 0	OKU12	DLOAD	BPL	
0617	REF	10	LAST 367	22,2257	03306 1		MFISYM +4	UX UZ	
0618	REF	4	LAST 367	22,2260	44744 0		LOCKSKIRT		
0619				22,2261	57545 1		DLOAD	DCOMP	SIGN OF UZ OPPOSITE TO UY
0620	REF	19	LAST 367	22,2262	03273 1		COF +4		

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0621	REF	20	LAST	367	22,2263	03273 1	STORE	COF +4	
0622					22,2264	77650 1	GOTO		
0623	REF	5	LAST	367	22,2265	44744 0		LOCKSKIRT	
0624					22,2266	51145 0	METHOD3	DLOAD	BPL
0625	REF	9	LAST	367	22,2267	03330 1		COFSKEW +4	COFZ MAX
0626	REF	1			22,2270	44274 0		U3POS	UZ
0627					22,2271	57575 1		VLOAD	VCOMP
0628	REF	21	LAST	368	22,2272	03267 1		COF	
0629	REF	22	LAST	368	22,2273	03267 1	STORE	COF	
0630					22,2274	51145 0	U3POS	DLOAD	BPL
0631	REF	11	LAST	367	22,2275	03306 1		MFISYM +4	UX UZ
0632	REF	1			22,2276	44302 0		OKU31	
0633					22,2277	57545 1		DLOAD	DCOMP
0634	REF	23	LAST	368	22,2300	03267 1		COF	SIGN OF UX OPPOSITE TO UZ
0635	REF	24	LAST	368	22,2301	03267 1	STORE	COF	
0636					22,2302	51145 0	OKU31	DLOAD	BPL
0637	REF	12	LAST	368	22,2303	03314 1		MFISYM +10D	UY UZ
0638	REF	6	LAST	368	22,2304	44744 0		LOCKSKIRT	
0639					22,2305	57545 1		DLOAD	DCOMP
0640	REF	25	LAST	368	22,2306	03271 0		COF +2	SIGN OF UY OPPOSITE TO UZ
0641	REF	26	LAST	368	22,2307	03271 0	STORE	COF +2	
0642					22,2310	77650 1	GOTO		
0643	REF	7	LAST	368	22,2311	44744 0		LOCKSKIRT	

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R0644 MATRIX OPERATIONS

0645				13,2207			BANK	13	
0646	REF	1		22,2000			SETLOC	KALCMON2	
0647				22,2312			BANK		

0648	REF	6	LAST	364	E6,1674		EBANK=	BCDU	
------	-----	---	------	-----	---------	--	--------	------	--

0649				22,2312	76601	1	MXM3	SETPD	VLOAD*		
0650				22,2313	00001	0			0		
0651				22,2314	00001	0			0,1		
0652				22,2315	62703	1		VXM*	PDVL*		
0653				22,2316	77776	1			0,2		
0654				22,2317	00007	0			6,1		
0655				22,2320	62703	1		VXM*	PDVL*		
0656				22,2321	77776	1			0,2		
0657				22,2322	00015	0			120,1		
0658				22,2323	41503	1		VXM*	PUSH		
0659				22,2324	77776	1			0,2		
0660				22,2325	77616	0		RVQ			

MXM3 MULTIPLIES 2 3X3 MATRICES
AND LEAVES RESULT IN PD LIST
AND MPAC

RETURN WITH MIXM2 IN PD LIST

R0661											
R0662											
0663				22,2326	76601	1	TRANSPS	SETPD	VLOAD*		
0664				22,2327	00001	0			0		
0665				22,2330	00001	0			0,1		
0666				22,2331	62713	0		PDVL*	PDVL*		
0667				22,2332	00007	0			6,1		
0668				22,2333	00015	0			120,1		
0669				22,2334	77606	1		PUSH			
0670				22,2335	77776	1	TRNSPSPD	EXIT			
0671	REF	9	LAST	312	22,2336	50 120	1	INDEX	FIXLOC		
0672				22,2337	52 013	1		DXCH	12		
0673	REF	10	LAST	369	22,2340	50 120	1	INDEX	FIXLOC		
0674				22,2341	52 017	0		DXCH	16		
0675	REF	11	LAST	369	22,2342	50 120	1	INDEX	FIXLOC		
0676				22,2343	52 013	1		DXCH	12		
0677	REF	12	LAST	369	22,2344	50 120	1	INDEX	FIXLOC		
0678				22,2345	52 015	1		DXCH	14		
0679	REF	13	LAST	369	22,2346	50 120	1	INDEX	FIXLOC		
0680				22,2347	52 005	0		DXCH	4		
0681	REF	14	LAST	369	22,2350	50 120	1	INDEX	FIXLOC		
0682				22,2351	52 015	1		DXCH	14		
0683	REF	15	LAST	369	22,2352	50 120	1	INDEX	FIXLOC		
0684				22,2353	52 003	0		DXCH	2		
0685	REF	16	LAST	369	22,2354	50 120	1	INDEX	FIXLOC		
0686				22,2355	52 007	1		DXCH	6		
0687	REF	17	LAST	369	22,2356	50 120	1	INDEX	FIXLOC		
0688				22,2357	52 003	0		DXCH	2		

TRANSPS TRANSPOSES A 3X3 MATRIX
AND LEAVES RESULT IN PD LIST
MATRIX ADDRESS IN XR1

MATRIX IN PD
ENTER WITH MATRIX AT 0 IN PD LIST

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0689 REF 15 LAST 364 22,2360 0 6036 1 TC INTPRET
0690 22,2361 77616 0 RVQ

0691 15,2050 BANK 15
0692 REF 2 LAST 364 22,2000 SETLDC KALCMDN1
0693 22,2362 BANK

0694 REF 7 LAST 369 E6,1674 EBANK= BCDU

0695 22,2362 00013 0 MINANG 2DEC 0.00069375
0695 22,2363 13563 0
0696 22,2364 17070 0 MAXANG 2DEC 0.47222222
0696 22,2365 34343 1
R0697 GIMBAL LOCK CDNSTANTS

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R0698 D = MGA CDRRESPONDING TO GIMBAL LOCK = 60 DEGREES
R0699 NGL = BUFFER ANGLE (TO AVOID DIVISIONS BY ZERO) = 2 DEGREES

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0700 22,2366 15666 0 SD 2DEC .433015 = SIN(D) $2
0700 22,2367 20443 0
0701 22,2370 33555 1 K3S1 2DEC .86603 = SIN(D) $1
0701 22,2371 01106 1
0702 22,2372 67777 1 K4 2DEC -.25 = -COS(D) $2
0702 22,2373 77777 0
0703 22,2374 04000 0 K4SQ 2DEC .125 = COS(D)COS(D) $2
0703 22,2375 00000 1
0704 22,2376 00216 1 SNGLCD 2DEC .008725 = SIN(NGL)COS(D) $2
0704 22,2377 36323 0
0705 22,2400 17773 1 CNGL 2DEC .499695 CDS(NGL) $2
0705 22,2401 00057 0
0706 22,2402 14344 1 LDCKANGL DEC .388889 = 70 DEGREES
R0707 INTERPRETIVE SUBROUTINE TO READ THE CDU ANGLES

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0708 REF 5 LAST 269 22,2403 3 0034 0 READCDUK CA CDUZ LDAD T(MPAC) WITH CDU ANGLES
0709 REF 65 LAST 349 22,2404 54 156 1 TS MPAC +2
0710 22,2405 0 0006 1 EXTEND
0711 REF 7 LAST 320 22,2406 3 0033 1 DCA CDUX AND CHANGE MODE TO TRIPLE PRECISION
0712 REF 1 22,2407 1 6475 0 TCF TLJAD +6

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0713 22,2410 66370 0 CDUTDDCM AXT,1 SSP
0714 22,2411 00003 1 OCT 3
0715 REF 1 22,2412 00051 0 S1
0716 22,2413 00001 0 DCT 1 SET XR1, S1, AND PD FOR LDDP
0717 22,2414 00010 0 STORE 7
0718 22,2415 77601 0 SETPD
0719 22,2416 00001 0
0720 22,2417 47133 0 LDDPSIN SLOAD* RTB
0721 22,2420 00013 0 100,1
0722 REF 7 LAST 338 22,2421 21465 0 CDULDGIC

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0723	22,2422	00013 0	STORE	10D	LOAD PD WITH 0 SIN(PHI)
0724	22,2423	65356 1	SIN	PDDL	2 COS(PHI)
0725	22,2424	00013 0		10D	4 SIN(THETA)
0726	22,2425	41546 0	COS	PUSH	6 COS(THETA)
0727	22,2426	71300 1	TIX,1	DLOAD	8 SIN(PSI)
0728	REF 1	22,2427		LOOPSIN	10 COS(PSI)
0729		22,2430		6	
0730		22,2431	DMP	SL1	
0731		22,2432		10D	
0732		22,2433	STORE	0,2	C0=COS(THETA)COS(PSI)
0733		22,2434	DLOAD	DMP	
0734		22,2435		4	
0735		22,2436		0	
0736		22,2437	PDDL	DMP	(PD6 SIN(THETA)SIN(PHI))
0737		22,2440		6	
0738		22,2441		8D	
0739		22,2442	DMP	SL1	
0740		22,2443		2	
0741		22,2444	BDSU	SL1	
0742		22,2445		12D	
0743		22,2446	STORE	2,2	C1=-COS(THETA)SIN(PSI)COS(PHI)
0744		22,2447	DLOAD	DMP	
0745		22,2450		2	
0746		22,2451		4	
0747		22,2452	PDDL	DMP	(PD7 COS(PHI)SIN(THETA)) SCALED 4
0748		22,2453		6	
0749		22,2454		8D	
0750		22,2455	DMP	SL1	
0751		22,2456		0	
0752		22,2457	DAD	SL1	
0753		22,2460		14D	
0754		22,2461	STORE	4,2	C2=COS(THETA)SIN(PSI)SIN(PHI)
0755		22,2462	DLOAD		
0756		22,2463		8D	
0757		22,2464	STORE	6,2	C3=SIN(PSI)
0758		22,2465	DLOAD		
0759		22,2466		10D	
0760		22,2467	DMP	SL1	
0761		22,2470		2	
0762		22,2471	STORE	8D,2	C4=COS(PSI)COS(PHI)
0763		22,2472	DLOAD	DMP	
0764		22,2473		10D	
0765		22,2474		0	
0766		22,2475	DCOMP	SL1	
0767		22,2476	STORE	10D,2	C5=-COS(PSI)SIN(PHI)
0768		22,2477	DLOAD	DMP	
0769		22,2500		4	
0770		22,2501		10D	
0771		22,2502	DCOMP	SL1	
0772		22,2503	STORE	12D,2	C6=-SIN(THETA)COS(PSI)

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0773	22,2504	77745 1	DLOAO		
0774	22,2505	72405 0	OMP	SL1	(PUSH UP 7)
0775	22,2506	00011 1		80	
0776	22,2507	41325 0	PDDL	DMP	(PD7 COS(PHI)SIN(THETA)SIN(PSI)) SCALE4
0777	22,2510	00007 0		6	
0778	22,2511	00001 0		0	
0779	22,2512	72415 1	DAD	SL1	(PUSH UP 7)
0780	22,2513	77626 0	STADR		C7=COS(PHI)SIN(THETA)SIN(PSI)
0781	22,2514	67760 1	STORE	14D,2	+COS(THETA)SIN(PHI)
0782	22,2515	77745 1	DLOAO		
0783	22,2516	72405 0	DMP	SL1	(PUSH UP 6)
0784	22,2517	00011 1		80	
0785	22,2520	41325 0	POOL	DMP	(PD6 SIN(THETA)SIN(PHI)SIN(PSI)) SCALE4
0786	22,2521	00007 0		6	
0787	22,2522	00003 1		2	
0788	22,2523	72425 1	DSU	SL1	(PUSH UP 6)
0789	22,2524	77626 0	STADR		
0790	22,2525	67756 1	STORE	16D,2	C8=-SIN(THETA)SIN(PHI)SIN(PSI)
0791	22,2526	77616 0	RVQ		+COS(THETA)COS(PHI)

R0792 CALCULATION OF THE MATRIX DEL.....

R0793 * * --T *
 R0794 DEL = (IDMATRIX)COS(A)+UU (1-COS(A))+UX SIN(A) SCALED 1

R0795 -
 R0796 WHERE U IS A UNIT VECTOR (DP SCALED 2) ALONG THE AXIS OF ROTATION.
 R0798 A IS THE ANGLE OF ROTATION (DP SCALED 2)

R0799 -
 R0800 UPON ENTRY THE STARTING ADDRESS OF U IS COF, AND A IS IN MPAC

0801	22,2527	41401 1	DELCOMP	SETPO	PUSH	MPAC CONTAINS THE ANGLE A
0802	22,2530	00001 0			0	
0803	22,2531	65356 1		SIN	POOL	P00 = SIN(A)
0804	22,2532	41546 0		COS	PUSH	P02 = COS(A)
0805	22,2533	65302 0		SR2	PDDL	P02 = COS(A)
0806	22,2534	41021 1		BOSU	BOVB	\$8
0807	REF 2 LAST 366	22,2535			OPHALF	
0808	REF 2 LAST 366	22,2536			SIGNMPAC	
0809	22,2537	77725 1		PDDL		P04 = 1-COS(A)

R0810 COMPUTE THE DIAGONAL COMPONENTS OF DEL

0811	REF 27 LAST 368	22,2540	03267 1		COF
0812		22,2541	41316 0	OSQ	OMP
0813		22,2542	00005 1		4
0814		22,2543	52415 0	DAO	SL3
0815		22,2544	00003 1		2
0816		22,2545	77604 0	BOVB	
0817	REF 3 LAST 372	22,2546	21664 0		SIGNMPAC

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0818	REF	1		22,2547	16235 1	STODL	KEL	UX UX(1-COS(A)) +COS(A)	\$1
0819	REF	28	LAST	372	22,2550 03271 0		COF	+2	
0820				22,2551	41316 0	DSQ	OMP		
0821				22,2552	00005 1		4		
0822				22,2553	52415 0	DAD	SL3		
0823				22,2554	00003 1		2		
0824				22,2555	77604 0	BOVB			
0825	REF	4	LAST	372	22,2556 21664 0		SIGNMPAC		
0826	REF	2	LAST	373	22,2557 16245 0	STODL	KEL +8D	UY UY(1-COS(A)) +COS(A)	\$1
0827	REF	29	LAST	373	22,2560 03273 1		COF	+4	
0828				22,2561	41316 0	DSQ	DMP		
0829				22,2562	00005 1		4		
0830				22,2563	52415 0	DAO	SL3		
0831				22,2564	00003 1		2		
0832				22,2565	77604 0	BOVB			
0833	REF	5	LAST	373	22,2566 21664 0		SIGNMPAC		
0834	REF	3	LAST	373	22,2567 02255 1	STORE	KEL +16D	UZ UZ(1-COS(A)) +COS(A)	\$1

R0835 CCMPUTE THE OFF DIAGONAL TERMS OF DEL

0836				22,2570	41345 0	DLOAD	DMP		
0837	REF	30	LAST	373	22,2571 03267 1		COF		
0838	REF	31	LAST	373	22,2572 03271 0		COF	+2	
0839				22,2573	72405 0	OMP	SL1		
0840				22,2574	00005 1		4		
0841				22,2575	41325 0	PDDL	DMP	D6 UX UY (1-COS A)	\$ 4
0842	REF	32	LAST	373	22,2576 03273 1		COF	+4	
0843				22,2577	00001 0		0		
0844				22,2600	43206 1	PUSH	DAD	D8 UZ SIN A	\$ 4
0845				22,2601	00007 0		6		
0846				22,2602	41112 0	SL2	BOVB		
0847	REF	6	LAST	373	22,2603 21664 0		SIGNMPAC		
0848	REF	4	LAST	373	22,2604 16243 0	STODL	KEL +6		
0849				22,2605	62421 1	BDSU	SL2		
0850				22,2606	77604 0	BOVB			
0851	REF	7	LAST	373	22,2607 21664 0		SIGNMPAC		
0852	REF	5	LAST	373	22,2610 16237 0	STODL	KEL +2		
0853	REF	33	LAST	373	22,2611 03267 1		COF		
0854				22,2612	41205 0	DMP	DMP		
0855	REF	34	LAST	373	22,2613 03273 1		COF	+4	
0856				22,2614	00005 1		4		
0857				22,2615	65352 0	SL1	PDDL	D6 UX UZ (1-COS A)	\$ 4
0858	REF	35	LAST	373	22,2616 03271 0		COF	+2	
0859				22,2617	41405 0	DMP	PUSH	D8 UY SIN(A)	
0860				22,2620	00001 0		0		
0861				22,2621	62415 0	DAD	SL2		
0862				22,2622	00007 0		6		
0863				22,2623	77604 0	BOVB			
0864	REF	8	LAST	373	22,2624 21664 0		SIGNMPAC		
0865	REF	6	LAST	373	22,2625 16241 1	STODL	KEL +4	UX UZ (1-COS(A))+UY SIN(A)	

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0866				22,2626	62421 1	BDSU	SL2	
0867				22,2627	77604 0	BOVB		
0868	RFF	9	LAST	373	22,2630	21664 0	SIGNMPAC	
0869	REF	7	LAST	373	22,2631	16251 0	STODL	KEL +12D UX UZ (1-COS(A))-UY SIN(A)
0870	RFF	36	LAST	373	22,2632	03271 0		COF +2
0871				22,2633	41205 0	DMP	DMP	
0872	REF	37	LAST	374	22,2634	03273 1		COF +4
0873				22,2635	00005 1			4
0874				22,2636	65352 0	SL1	PDDL	D6 UY UZ (1-COS(A)) \$ 4
0875	RFF	38	LAST	374	22,2637	03267 1		COF
0876				22,2640	41405 0	DMP	PUSH	D8 UX SIN(A)
0877				22,2641	00001 0			0
0878				22,2642	62415 0	DAD	SL2	
0879				22,2643	00007 0			6
0880				22,2644	77604 0	BOVB		
0881	RFF	10	LAST	374	22,2645	21664 0	SIGNMPAC	
0882	RFF	8	LAST	374	22,2646	16253 1	STODL	KFL +14D UY UZ(1-COS(A)) +UX SIN(A)
0883				22,2647	62421 1	BDSU	SL2	
0884				22,2650	77604 0	BOVB		
0885	RFF	11	LAST	374	22,2651	21664 0	SIGNMPAC	
0886	REF	9	LAST	374	22,2652	02247 1	STORE	KFL +100 UY UZ (1-COS(A)) -UX SIN(A)
0887				22,2653	77616 0	RVQ		

R0888 DIRECTION COSINE MATRIX TO CDU ANGLE ROUTINE
 R0889 X1 CONTAINS THE COMPLIMENT OF THE STARTING ADDRESS FOR MATRIX (SCALED 2)
 R0890 LEAVES CDU ANGLES SCALED 2PI IN V(MPAC)
 R0891 COS(MGA) WILL BE LEFT IN S1 (SCALED 1)

R0892 THE DIRECTION COSINE MATRIX RELATING S/C AXES TO STABLE MEMBER AXES CAN BE WRITTEN AS***

R0894	C = COS(THETA)COS(PHI)
R0895	0
R0896	C = -COS(THETA)SIN(PHI)COS(PHI) + SIN(THETA)SIN(PHI)
R0897	1
R0898	C = COS(THETA)SIN(PHI)SIN(PHI) + SIN(THETA)COS(PHI)
R0899	2
R0900	C = SIN(PHI)
R0901	3
R0902	C = COS(PHI)COS(PHI)
R0903	4
R0904	C = -COS(PHI)SIN(PHI)
R0905	5
R0906	C = -SIN(THETA)COS(PHI)
R0907	6
R0908	C = SIN(THETA)SIN(PHI)COS(PHI) + COS(THETA)SIN(PHI)
R0909	7
R0910	C = -SIN(THETA)SIN(PHI)SIN(PHI) + COS(THETA)COS(PHI)
R0911	8

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R0912 WHERE PHI = OGA
 R0913 THETA = IGA
 R0914 PSI = MGA

0915			22,2654	67543 1	DCMTOCDU	DLOAD*	ARCS IN	
0916			22,2655	00007 0			S,1	
0917			22,2656	71406 0		PUSH	COS	PD +0 PSI
0918			22,2657	41152 1		SL1	BOVB	
0919	REF	12	LAST 374	22,2660			SIGNMPAC	
0920	RFF	2	LAST 370	22,2661		STORE	S1	
0921			22,2662	57543 1		DLOAD*	DCOMP	
0922			22,2663	00015 0			12D,1	
0923			22,2664	67471 1		DDV	ARCS IN	
0924	RFF	3	LAST 375	22,2665			S1	
0925			22,2666	51123 0		PDDL*	BPL	PD +2 THETA
0926			22,2667	00001 0			0,1	MUST CHECK THE SIGN OF COS(THETA)
0927	REF	1		22,2670			OKTHETA	TO DETERMINE THE PROPER QUADRANT
0928			22,2671	57545 1		DLOAD	DCOMP	
0929			22,2672	43244 1		BPL	DAD	
0930	RFF	1		22,2673			SUHALFA	
0931	RFF	3	LAST 372	22,2674			DPHALF	
0932			22,2675	77650 1		GOTO		
0933	REF	1		22,2676			CALCPHI	
0934			22,2677	77625 0	SUHALFA	DSU		
0935	REF	4	LAST 375	22,2700			DPHALF	
0936			22,2701	77606 1	CALCPHI	PUSH		
0937			22,2702	57543 1	OKTHETA	DLOAD*	DCOMP	
0938			22,2703	00013 0			10D,1	
0939			22,2704	67471 1		DDV	ARCS IN	
0940	RFF	4	LAST 375	22,2705			S1	
0941			22,2706	51123 0		PDDL*	BPL	PUSH DOWN PHI
0942			22,2707	00011 1			8D,1	
0943	REF	1		22,2710			OKPHI	
0944			22,2711	57545 1		DLOAD	DCOMP	PUSH UP PHI
0945			22,2712	43244 1		BPL	DAD	
0946	RFF	1		22,2713			SUHALFAP	
0947	REF	5	LAST 375	22,2714			DPHALF	
0948			22,2715	77650 1		GOTO		
0949	REF	1		22,2716			VECCFANG	
0950			22,2717	52025 1	SUHALFAP	DSU	GOTO	
0951	REF	6	LAST 375	22,2720			DPHALF	
0952	REF	2	LAST 375	22,2721			VECOFANG	
0953			22,2722	77745 1	OKPHI	DLOAD		PUSH UP PHI
0954			22,2723	43466 1	VECOFANG	VDEF	RVQ	

L ATTITUDE MANEUVER ROUTINE

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P0955 ROUTINES FOR TERMINATING THE AUTOMATIC MANEUVER AND RETURNING TO USER

0956					22,2724	77776	1	TOOBADF	EXIT		
0957	REF	19	LAST	285	22,2725	0 5567	0		TC	ALARM	
0958					22,2726	00401	1		OCT	00401	
0959	REF	1			22,2727	1 2732	1		TCF	NOGO	DO NOT ZERO ATTITUDE ERRORS
0960	REF	63	LAST	353	22,2730	0 4616	1		TC	BANKCALL	
0961	REF	2	LAST	300	22,2731	40153	1		CADR	ZATTEROP	ZERO ATTITUDE ERRORS
0962	REF	64	LAST	376	22,2732	0 4616	1	NOGO	TC	BANKCALL	
0963	REF	2	LAST	303	22,2733	40165	1		CADR	STOPRATE	STOP RATES
0964	REF	13	LAST	345	22,2734	3 4752	0		CAF	TWO	
0965					22,2735	0 0004	0		INHINT		ALL RETURNS ARE NOW MADE VIA GOODEND
0966	REF	12	LAST	310	22,2736	0 5203	0		TC	WAITLIST	
0967	REF	8	LAST	370	E6,1674				EBANK=	BCDU	
0968	REF	1			22,2737	03234	1		2CADR	GOODMANU	
0968	REF	1			22,2740	44066	1				
0969	REF	30	LAST	349	22,2741	1 5155	1		TCF	ENDQFJOB	
0970					22,2742	77776	1	TOOBADI	EXIT		
0971	REF	2	LAST	376	22,2743	1 2732	1		TCF	NOGO	

L GIMBAL LOCK AVOIDANCE

USER'S PAGE NO. 1 EO S3

```

0001                15,2050                BANK 15
0002 REF 3 LAST 370 22,2000                SETLOC KALCMON1
0003                22,2744                BANK
R0004
R0005 DETECTING GIMBAL LOCK
0006 REF 1 22,2744                LOCKSKIRT EQUALS NOGIMLOC
0007                22,2744 77614 1 NOGIMLOC SET
0008 REF 1 22,2745 01074 0                CALCMAN3
0009                22,2746 70740 0 WCALC LXC,1 DLOAD*
0010 REF 3 LAST 308 22,2747 01325 1                RATEINDX
0011 REF 1 22,2750 04772 1                ARATE,1
0012                22,2751 45002 1                SR4 CALL
0013 REF 1 22,2752 44527 1                DELCOMP
A0014
0015                22,2753 74343 0                DLOAD* VXSC
0016 REF 2 LAST 377 22,2754 04772 1                ARATE,1
0017 REF 39 LAST 374 22,2755 03267 1                COF
0018 REF 1 22,2756 17324 1                STODL BRATE
0019 REF 3 LAST 365 22,2757 03334 0                AM
0020                22,2760 55605 1                DMP DDV*
0021 REF 1 22,2761 05002 0                ANGLTIME
0022 REF 3 LAST 377 22,2762 04772 1                ARATE,1
0023                22,2763 77661 0                SR
0024                22,2764 20606 0                5
0025 REF 1 22,2765 03332 0                STORE TM
0026                22,2766 77614 1                SETGO
0027 REF 1 22,2767 01035 0                CALCMAN2
0028 REF 1 22,2770 45010 1                NEWANGL +1
R0029 THE FOUR SELECTABLE FREE FALL MANEUVER RATES SELECTED BY
R0030 LOADING RATEINDX WITH 0,2,4,6, RESPECTIVELY

```

CHOOSE THE DESIRED MANEUVER RATE
FROM A LIST OF FOUR
COMPUTE THE INCREMENTAL ROTATION MATRIX
DEL CORRESPONDING TO A 1 SEC ROTATION
ABOUT COF

COMPONENT MANEUVER RATES 45 DEG/SEC

MANEUVER EXECUTION TIME SCALED AS T2

0(OFF) = CONTINUE MANEUVER
1(ON) = START MANEUVER

```

0031                22,2771 00221 0 ARATE 2DEC .0088888888 = 0.2 DEG/SEC $ 22.5 DEG/SEC
0031                22,2772 24255 0
0032                22,2773 00554 0 2DEC .0222222222 = 0.5 DEG/SEC $ 22.5 DEG/SEC
0032                22,2774 02660 0
0033                22,2775 02660 0 2DEC .0888888888 = 2.0 DEG/SEC $ 22.5 DEG/SEC
0033                22,2776 13301 1
0034                22,2777 16161 0 2DEC .4444444444 = 10.0 DEG/SEC $ 22.5 DEG/SEC
0034                22,3000 30707 1
0035                22,3001 00003 1 ANGLTIME 2DEC .0001907349 = 100B-19 FUDGE FACTOR TO CONVERT
0035                22,3002 04000 0
A0036

```

MANEUVER ANGLE TO MANEUVER TIME

L KALCMANU STEERING

USER'S PAGE NO. 1 EO S3

R0001 GENERATION OF STEERING COMMANDS FOR DIGITAL AUTOPILOT FREE FALL MANEUVERS

R0003 NEW COMMANDS WILL BE GENERATED EVERY ONE SECOND DURING THE MANEUVER

0004	REF	1		E6,1705		EBANK= TTEMP			
0005	REF	65	LAST	376	22,3003	0 4616 1	NEWDELHI	TC BANKCALL	CHECK FOR AUTO STABILIZATION
0006	REF	1			22,3004	54240 0		CADR ISITAUTO	ONLY
0007	REF	97	LAST	345	22,3005	10 000 0		CCS A	
0008	REF	3	LAST	376	22,3006	1 2730 0		TCF NOGO -2	
0009	REF	16	LAST	370	22,3007	0 6036 1	NEWANGL	TC INTPRET	
0010					22,3010	75160 1		AXC,1 AXC,2	
0011	REF	5	LAST	364	22,3011	03244 0		MIS	COMPUTE THE NEW MATRIX FROM S/C TO
0012	REF	10	LAST	374	22,3012	02234 0		KEL	STABLE MEMBER AXES
0013					22,3013	77624 1		CALL	
0014	REF	2	LAST	364	22,3014	44312 1		MXM3	
0015					22,3015	45575 1		VLOAD STADR	
0016	REF	6	LAST	378	22,3016	50516 0		STOVL MIS +12D	CALCULATE NEW DESIRED CDU ANGLES
0017					22,3017	77626 0		STADR	
0018	REF	7	LAST	378	22,3020	50524 1		STOVL MIS +6D	
0019					22,3021	77626 0		STADR	
0020	REF	8	LAST	378	22,3022	74532 0		STORE MIS	
0021					22,3023	45160 1		AXC,1 CALL	
0022	REF	9	LAST	378	22,3024	03244 0		MIS	
0023	REF	1			22,3025	44654 0		DCMTOCDU	PICK UP THE NEW CDU ANGLES FROM MATRIX
0024					22,3026	77634 0		RTB	
0025	REF	1			22,3027	21524 1		V1STC2S	
0026	REF	1			22,3030	03302 0		STORE NCDU	NEW CDU ANGLES
0027					22,3031	77414 0		BONCLR EXIT	
0028	REF	2	LAST	377	22,3032	01215 0		CALCMAN2	
0029	REF	1			22,3033	45122 1		MANUSTAT	TO START MANEUVER
0030	REF	14	LAST	376	22,3034	3 4752 0		TWO	+0 OTHERWISE
0031	REF	1			22,3035	55'272 0	INCRDCDU	TS SPNDX	
0032	REF	2	LAST	378	22,3036	51'272 1		INDEX SPNDX	
0033	REF	9	LAST	376	22,3037	3 1674 0		CA BCDU	INITIAL CDU ANGLES
0034					22,3040	0 0006 1		EXTEND	OR PREVIOUS DESIRED CDU ANGLES
0035	REF	3	LAST	378	22,3041	5 1272 1		INDEX SPNDX	
0036	REF	2	LAST	378	22,3042	21'701 1		MSU NCDU	
0037					22,3043	0 0006 1		EXTEND	
0038	REF	4	LAST	377	22,2000			SETLOC KALCMONI	
0039					22,3044			BANK	
0040	REF	1			22,3044	7 3121 1		MP DT/TAU	
0041	REF	98	LAST	378	22,3045	10 000 0		CCS A	CONVERT TO 2S COMPLEMENT
0042	REF	17	LAST	352	22,3046	6 4753 1		AD ONE	
0043					22,3047	1 3051 1		TCF +2	
0044					22,3050	4 0000 0		COM	
0045	REF	4	LAST	378	22,3051	51'272 1		INDEX SPNDX	
0046	REF	1			22,3052	55'636 1		TS DELDCDU	ANGLE INCREMENTS TO BE ADDED TO
0047	REF	5	LAST	378	22,3053	51'272 1		INDEX SPNDX	CDUXD, CDUYD, CDUZD EVERY TENTH SECOND

L KALCMANU STEERING

USER'S PAGE NO. 2 E6 S3

0048 REF 3 LAST 378 22,3054 3 1701 0
 0049 REF 6 LAST 378 22,3055 51'272 1
 0050 REF 10 LAST 378 22,3056 57'674 0
 0051 REF 7 LAST 379 22,3057 51'272 1
 0052 REF 7 LAST 365 22,3060 55'633 1
 0053 REF 8 LAST 379 22,3061 11'272 0
 0054 REF 1 22,3062 1 3035 0

CA NCDU
 INDEX SPNDX
 XCH BCDU
 INDEX SPNDX
 TS CDUXD
 CCS SPNDX
 TCF INCRDCDU

BY LEM DAP

LOOP FOR THREE AXES

0055 22,3063 0 0003 1

RELINT

R0056 CCMPARE PRESENT TIME WITH TIME TO TERMINATE MANEUVER

0057 REF 1 22,3064 0 3075 0
 0058 REF 1 22,3065 1 3170 0
 0059 REF 18 LAST 378 22,3066 3 4753 1
 0060 22,3067 0 0004 0
 0061 REF 13 LAST 376 22,3070 0 5203 0
 0062 REF 2 LAST 378 E6,1705
 0063 REF 1 22,3071 03213 1
 0063 REF 1 22,3072 44066 1
 0064 22,3073 0 0003 1
 0065 REF 31 LAST 376 22,3074 1 5155 1

TMANUCHK TC TIMECHK
 TCF CONTMANU
 CAF ONE
 MANUSTAL INHINT
 TC WAITLIST
 EBANK= TTEMP
 2CADR MANUSTOP
 RELINT
 TCF ENDOFJOB

END MAJOR PART OF MANEUVER WITHIN 1 SEC
 UNDER WAITLIST CALL TO MANUSTOP

0066 22,3075 0 0006 1
 0067 REF 11 LAST 321 22,3076 4 0025 1
 0068 REF 3 LAST 379 22,3077 53'706 0
 0069 22,3100 0 0006 1
 0070 REF 2 LAST 377 22,3101 3 1732 0
 0071 REF 4 LAST 379 22,3102 21'706 0
 0072 REF 5 LAST 379 22,3103 11'705 0
 0073 REF 36 LAST 349 22,3104 0 0002 0
 0074 22,3105 1 3107 0
 0075 REF 1 22,3106 1 3117 1
 0076 REF 6 LAST 379 22,3107 11'706 0
 0077 REF 37 LAST 379 22,3110 0 0002 0
 0078 REF 1 22,3111 1 3113 0
 0079 22,3112 4 0000 0
 0080 REF 1 22,3113 6 3166 0
 0081 22,3114 0 0006 1
 0082 REF 2 LAST 379 22,3115 6 3117 0
 0083 REF 38 LAST 379 22,3116 24 002 0
 0084 REF 39 LAST 379 22,3117 24 002 0
 0085 REF 40 LAST 379 22,3120 0 0002 0

TIMECHK EXTEND
 DCS TIME2
 DXCH TTEMP
 EXTEND
 DCA TM
 DAS TTEMP
 CCS TTEMP
 TC Q
 TCE +2
 TCF 2NDRETRN
 CCS TTEMP +1
 TC Q
 TCF MANUCFF
 COM
 MANUOFF AD ONESEK +1
 EXTEND
 BZMF 2NDRETRN
 INCR Q
 2NDRETRN INCR Q
 TC Q

0086 22,3121 03146 1

DT/TAU DEC .1

0087 22,3122 77776 1
 0088 22,3123 0 0006 1
 0089 REF 12 LAST 379 22,3124 3 0025 0

MANUSTAT EXIT
 EXTEND
 DCA TIME2

INITIALIZATION ROUTINE
 FOR AUTOMATIC MANEUVERS

L KALCMANU STEERING

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0090	REF	3	LAST	379	22,3125	21'732	1	DAS	TM	TM+T0	MANEUVER COMPLETION TIME
0091					22,3126	0 0006	1	EXTEND			
0092	REF	2	LAST	379	22,3127	4 3166	1	DCS	ONESEK		
0093	REF	4	LAST	380	22,3130	21'732	1	DAS	TM	(TM+T0)-1	
0094					22,3131	0 0004	0	INHINT			
0095	REF	15	LAST	378	22,3132	3 4752	0	CAF	TWO		
0096	REF	2	LAST	150	22,3133	55'677	1	RATEBIAS	TS	KSPNDX	
0097					22,3134	6 0000	1	DOUBLE			
0098	REF	2	LAST	150	22,3135	55'700	0	TS	KDPNDX		
0099	REF	99	LAST	378	22,3136	50 000	1	INDEX	A		
0100	REF	2	LAST	377	22,3137	3 1723	0	CA	8RATE		
0101	REF	3	LAST	380	22,3140	51'677	0	INDEX	KSPNDX	STORE MANEUVER RATE IN	
0102	REF	4	LAST	210	22,3141	55'641	1	TS	OMEGAPD	OMEGAPD, OMEGAQD, OMEGARD	
0103					22,3142	0 0006	1	EXTEND			
0104					22,3143	6 3145	1	BZMF	+2	COMPUTE ATTITUDE ERROR	
0105					22,3144	4 0000	0	COM		OFFSET = (WX)ABS(WX)/2AJX	
0106					22,3145	0 0006	1	EXTEND		WHERE AJX= 2-JET ACCELERATION	
0107	REF	1			22,3146	7 3167	0	MP	BIASCALE	= -1/16	
0108					22,3147	0 0006	1	EXTEND			
0109	REF	3	LAST	380	22,3150	5 1700	1	INDEX	KDPNDX		
0110	REF	3	LAST	380	22,3151	7 1723	1	MP	8RATE		
0111					22,3152	0 0006	1	EXTEND			
0112	REF	4	LAST	380	22,3153	5 1677	0	INDEX	KSPNDX		
0113	REF	5	LAST	148	22,3154	11'530	1	DV	1JACC	=AJX \$ 90 DEG/SEC-SEC	
0114	REF	5	LAST	380	22,3155	51'677	0	INDEX	KSPNDX		
0115	REF	1			22,3156	55'277	0	TS	DELPEROR	\$ 180 DEG	
0116	REF	6	LAST	380	22,3157	11'677	1	CCS	KSPNDX		
0117	REF	1			22,3160	1 3133	1	TCF	RATEBIAS		
0120	REF	3	LAST	347	22,3161	3 0025	0	CA	TIME1		
0121	REF	3	LAST	380	22,3162	6 3166	0	AD	ONESEK +1		
0122	REF	1			22,3163	57'704	0	XCH	NEXTIME		
0123	REF	2	LAST	379	22,3164	1 3034	1	TCF	INCRDCDU -1		
0124					22,3165	00000	1	ONESEK	DEC	0	
0125					22,3166	00144	0	DEC		100	
0126					22,3167	75777	1	BIASCALE	OCT	75777	= -1/16
0127	REF	4	LAST	380	22,3170	4 0025	1	CONTMANU	CS	TIME1	RESET FOR NEXT DCU UPDATE
0128	REF	2	LAST	380	22,3171	6 1704	0	AD	NEXTIME		
0129	REF	100	LAST	380	22,3172	10 000	0	CCS	A		
0130	REF	19	LAST	379	22,3173	6 4753	1	AD	ONE		
0131	REF	1			22,3174	1 3177	1	TCF	MANUCALL		
0132	REF	1			22,3175	6 4735	1	AD	NEGMAX		
0133					22,3176	4 0000	0	COM			
0134					22,3177	0 0004	0	MANUCALL	INHINT	CALL FOR NEXT UPDATE VIA WAITLIST	
0135	REF	14	LAST	379	22,3200	0 5203	0	TC	WAITLIST		
0136	REF	7	LAST	379	E6,1705			EBANK=	TTEMP		
0137	REF	1			22,3201	03206	0	2CADR	UPDTCALL		
0137	REF	1			22,3202	44066	1				

L KALCMANU STEERING

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0138	REF	4	LAST	380	22,3203	3 3166 0	CAF	ONESEK +1	INCREMENT TIME FOR NEXT UPDATE
0139	REF	3	LAST	380	22,3204	27'704 1	ADS	NEXTIME	
0140	REF	32	LAST	379	22,3205	1 5155 1	TCF	ENDOFJOB	

0141	REF	1			22,3206	3 7713 0	UPDCALL CAF	PRIC26	SATELLITE PROGRAM TO CALL FOR UPDATE
0142	REF	13	LAST	314	22,3207	0 5105 0	TC	FINDVAC	OF STEERING COMMANDS
0143	REF	8	LAST	380	E6,1705		EBANK=	ITEMP	
0144	REF	1			22,3210	03003 1	2CADR	NEWDELHI	
0144	REF	1			22,3211	44066 1			
0145	REF	5	LAST	297	22,3212	0 5261 1	TC	TASKOVER	

L KALCMANU STEERING

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P0146 ROUTINE FOR TERMINATING AUTOMATIC MANEUVERS

0147	REF	39	LAST	349	22,3213	3 4755	1	MANUSTOP	CAF	ZERO	ZERO MANEUVER RATES
0148	REF	1			22,3214	55'640	0		TS	DELDCOU2	
0149	REF	1			22,3215	55'643	0		TS	OMEGARD	
0150	REF	1			22,3216	55'301	0		TS	DELREOR	
0151	REF	1			22,3217	55'637	0		TS	DELDCOU1	
0152	REF	1			22,3220	55'642	1		TS	OMEGAQD	
0153	REF	1			22,3221	55'300	1		TS	DELQEROR	
0154	REF	2	LAST	364	22,3222	3 0323	0		CA	CPSI	SET DESIRED GIMBAL ANGLES TO
0155	REF	1			22,3223	55'635	1		TS	COUZD	DESIRED FINAL GIMBAL ANGLES
0156	REF	1			22,3224	3 0322	1		CA	CTHETA	
0157	REF	1			22,3225	55'634	0		TS	CDUYO	
0158	REF	4	LAST	365	22,3226	3 0321	1	ENDROLL	CA	CPHI	NO FINAL YAW
0159	REF	8	LAST	379	22,3227	55'633	1		TS	CDUXD	
0160	REF	40	LAST	382	22,3230	3 4755	1		CAF	ZERO	
0161	REF	5	LAST	380	22,3231	55'641	1		TS	OMEGAPO	I.E. MANEUVER DID NOT GO THRU
0162	REF	2	LAST	378	22,3232	55'636	1		TS	DELDCOU	GIMBAL LOCK ORIGINALLY
0163	REF	2	LAST	380	22,3233	55'277	0		TS	DELPEROR	
0164	REF	1			22,3234	3 1311	0	GOODMANU	CA	ATTPRIO	RESTORE USERS PRIO
0165	REF	2	LAST	247	22,3235	54 063	0		TS	NEWPRIO	
0166	REF	41	LAST	382	22,3236	3 4755	1		CA	ZERO	ZERO ATTCAOR
0167	REF	3	LAST	237	22,3237	53'310	0		OXCH	ATTCAOR	
0168	REF	2	LAST	247	22,3240	0 5116	1		TC	SPVAC	RETURN TO USER
0169	REF	6	LAST	381	22,3241	0 5261	1		TC	TASKOVER	

L SYSTEM TEST STANDARD LEAD INS

USER'S PAGE NO. 1 EO S3

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0001 REF 4 LAST 334 E5,1642 EBANK= XSM
0002 REF 1 33,2045 BANK 33
0003 04,2000 SETLOC E/PRDG
0004 04,2533 BANK

0005 REF 1 COUNT* $$/P07

R0006 SPECIAL PROGRAMS TO EASE THE PANGS OF ERASABLE MEMORY PROGRAMS.

R0007 E/BKCALL FOR DOING BANKCALLS FROM AND RETURNING TO ERASABLE.

R0008 THIS ROUTINE IS CALLABLE FROM ERASABLE OR FIXED. LIKE BANKCALL, HOWEVER, SWITCHING BETWEEN S3 AND S4
R0010 IS NOT POSSIBLE.

R0011 THE CALLING SEQUENCE IS:

A0012 TC BANKCALL
A0013 CADR E/BKCALL
A0014 CADR ROUTINE WHERE YOU WANT TO GO IN FIXED.
A0015 RETURN HERE FROM DISPLAY TERMINATE, BAD STALL OR TC Q.
A0016 RETURN HERE FROM DISPLAY PROCEED OR GOOD RETURN FROM STALL.
A0017 RETURN HERE FROM DISPLAY ENTER OR RECYCLE.

R0018 THIS ROUTINE REQUIRES TWO ERASABLES (EBUF2, +1) IN UNSWITCHED WHICH ARE UNSHARED BY INTERRUPTS AND
R0020 OTHER EMEMCRY PROGRAMS.

R0021 A + L ARE PRESERVED THROUGH BANKCALL AND E/BKCALL.

0022 REF 3 LAST 260 04,2533 52 134 0 E/BKCALL DXCH BUF2 SAVE A,L AND GET DP RETURN.
0023 REF 1 04,2534 53'170 1 DXCH EBUF2 SAVE DP RETURN.
0024 REF 2 LAST 383 04,2535 25'167 0 INCR EBUF2 RETURN +1 BECAUSE DOUBLE CADR.
0025 REF 10 LAST 169 04,2536 3 0006 1 CA BBANK
0026 REF 3 LAST 319 04,2537 7 5012 0 MASK LOW10 GET CURRENT EBANK. (SBANK SOMEDAY)
0027 REF 3 LAST 383 04,2540 27'170 1 ADS EBUF2 +1 FORM BBCON. (WAS FBANK)
0028 REF 4 LAST 383 04,2541 51'167 0 NDX EBUF2
0029 04,2542 2'7777 0 CA 0 -1 GET CADR OF ROUTINE.
0030 REF 2 LAST 232 04,2543 0 4622 0 TC SWCALL GO TO ROUTINE, SETTING Q TO SWRETURN
A0031 AND RESTORING A + L.
0032 04,2544 0 2550 0 TC +4 TX Q, V34, OR BAD STALL RETURN.
0033 04,2545 0 2547 0 TC +2 PROCEED OR GOOD STALL RETURN.
0034 REF 5 LAST 383 04,2546 25'167 0 INCR EBUF2 ENTER OR RECYCLE RETURN.
0035 REF 6 LAST 383 04,2547 25'167 0 INCR EBUF2
0036 REF 7 LAST 383 04,2550 53'170 1 E/SWITCH DXCH EBUF2
0037 04,2551 52 006 0 DTCB

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L SYSTEM TEST STANDARD LEAD INS

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P0038 E/CALL FOR CALLING A FIXED MEMORY INTERPRETIVE SUBROUTINE FROM ERASABLE AND RETURNING TO ERASABLE.

R0040 THE CALLING SEQUENCE IS...

A0041						RTB		
A0042							E/CALL	
A0043						CADR	ROUTINE	THE INTERPRETIVE SUBROUTINE YOU WANT.
A0044								RETURNS HERE IN INTERPRETIVE.
0045	REF	1			04,2552	22 164 1	E/CALL	
0046	REF	33	LAST	349	04,2553	50 001 0	LXCH	LOC
0047	REF	34	LAST	384	04,2554	3 0001 0	INDEX	L
0048	REF	35	LAST	384	04,2555	24 001 0	CA	L
0049	REF	36	LAST	384	04,2556	24 001 0		
0050	REF	8	LAST	383	04,2557	53'170 1	INCR	L
0051	RFF	17	LAST	378	04,2560	0 6036 1	INCR	L
0052					04,2561	77624 1	DXCH	EBUF2
0053	REF	9	LAST	384	04,2562	01167 0	TC	INTPRET
0054					04,2563	77776 1	CALL	
0055	REF	10	LAST	384	04,2564	23'170 0	EXIT	EBUF2
0056	REF	18	LAST	384	04,2565	1 6040 1	EBUF2 +1	INDIRECTLY EXECUTE ROUTINE. IT MUST
							INTPRET +2	LEAVE VIA RVQ OR EQUIVALENT.
								PICK UP RETURN.
								SET LOC AND RETURN TO CALLER.

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R0060 THE CALLING SEQUENCE IS:

A0061		INHINT	
A0062		.	
A0063		.	
A0064		CA	WAKEADR ADDRESS OF SLEEPING JOB
A0065		TC	IBNKCALL
A0066		CADR	E/JOBWAK
A0067		.	RETURNS HERE
A0068		.	
A0069		.	
A0070		RELINT	IF YOU DID AN INHINT.

0071					33,2045	BANK	33
0072	REF	2	LAST	383	04,2000	SFTLOC	E/PROG
0073					04,2566	BANK	

0074 REF 2 LAST 383 TO 385: 27 27* COUNT* \$\$/P 07

0075	REF	1			04,2566	0 5137 1	E/JOBWAK	TC	JOBWAKE	ARRIVE IWTH ADRES IN A.
0076	REF	18	LAST	270	04,2567	4 4741 0		CS	BIT11	
0077	REF	1			04,2570	50 064 0		NDX	LOCCTR	
0078	REF	2	LAST	384	04,2571	26 164 0		ADS	LOC	KNOCK FIXED MEMORY BIT OUT OF ADRES.
0079	REF	1			04,2572	0 0072 1		TC	RUPTREG3	RETURN

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R0001 NAME- IMU PERFORMANCE TESTS 2

R0002 DATE- MARCH 20,1967

R0003 BY- SYSTEM TEST GROUP 864-6900 EXT. 1274

R0004 MCDNO.- ZERO

R0005 FUNCTIONAL DESCRIPTION-

R0006 POSITIONING ROUTINES FOR THE IMU PERFORMANCE TESTS AS WELL AS SOME OF
 R0007 THE TESTS THEMSELVES. FOR A DESCRIPTION OF THESE SUBROUTINES AND THE
 R0008 OPERATING PROCEDURES (TYPICALLY) SEE STG MEMO 685.THEORETICAL REF.E-1973

0009				33,2045				BANK	33
0010	REF	2	LAST	59	37,2000			SETLOC	IMU2
0011					37,2002			BANK	
0012	REF	2	LAST	142	55,1416			EBANK=	POSITION
00121	REF	2	LAST	59 TO	59:	2	2*	COUNT*	\$/P07
00122	REF	1			37,2002	0 5311	1	REDD	TC
00124					37,2003	00007	0	MM	NEWMCDEX 07
0021	REF	1			37,2004	0 2325	1	GEOIMUTT	TC
0022	REF	42	LAST	382	37,2005	3 4755	1	IMUBACK	CA
0023	REF	2	LAST	142	37,2006	55*414	0		TS
0024	REF	1			37,2007	55*440	1		TS
0025	REF	2	LAST	386	37,2010	55*441	0		TS
00251	REF	1			37,2011	55*576	0		TS
0026	REF	1			37,2012	3 4361	1	NBPOSPL	CA
0027	REF	1			37,2013	55*571	1		TS
0028	REF	1			37,2014	3 2476	0		CA
0029	REF	1			37,2015	0 2367	1		TC
0030	REF	3	LAST	347	37,2016	3 4736	1		CA
0031	REF	1			37,2017	55*664	0		TS
0032	REF	19	LAST	384	37,2020	0 6036	1	GUESS	TC
0033					37,2021	62545	1	LATAZCHK	DLOAD
0034	REF	2	LAST	142	37,2022	02403	1		SL2
0035	REF	13	LAST	332	37,2023	15047	0	STODL	DSPTM1 +1
0036	REF	2	LAST	142	37,2024	02401	0		AZIMUTH
0037					37,2025	77434	1	RTB	EXIT
0038	REF	1			37,2026	21520	0		IST02S
0039	REF	66	LAST	370	37,2027	56 154	1	XCH	MPAC
0040	REF	14	LAST	386	37,2030	55*045	0	TS	DSPTM1
0041	REF	1			37,2031	3 2473	0	CAF	VNO641
0042	REF	66	LAST	378	37,2032	0 4616	1	TC	BANKCALL
0043	REF	4	LAST	353	37,2033	20351	1	CADR	GCFLASH
0044	REF	1			37,2034	0 2270	0	TC	ENDTEST1
0045					37,2035	0 2037	1	TC	+2
0046					37,2036	0 2031	1	TC	-5

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0047	REF	20	LAST	386	37,2037	0 6036 1	TC	INTPRET	
0048					37,2040	47135 0	SLOAD	RTB	
0049	REF	15	LAST	386	37,2041	01046 1		DSPTM1	
0050	REF	8	LAST	370	37,2042	21465 0		CDULOGIC	
0051	REF	3	LAST	386	37,2043	02401 0	STORF	AZIMUTH	
0052					37,2044	60535 1	SLOAD	SP2	
0053	REF	16	LAST	387	37,2045	01047 0		DSPTM1 +1	
0054	REF	3	LAST	386	37,2046	02403 1	STORE	LATITUDE	
0055					37,2047	57546 1	COS	DCOMP	
0056					37,2050	77752 1	SL1		
0057	REF	1			37,2051	16437 0	STODL	WANGI	
0058	REF	4	LAST	387	37,2052	02403 1		LATITUDE	
0059					37,2053	72556 1	SIN	SL1	
0060	REF	1			37,2054	16435 1	STODL	WANGO	
0061	REF	4	LAST	387	37,2055	02401 0		AZIMUTH	
0062					37,2056	73406 1	PUSH	SIN	
0063	REF	1			37,2057	02675 1	STORE	YNB +2	
0064	REF	1			37,2060	16705 1	STODL	ZNB +4	
0065					37,2061	77746 1	COS		
0066	REF	2	LAST	387	37,2062	02677 0	STORE	YNB +4	
0067					37,2063	77676 0	DCOMP		
0068	REF	2	LAST	387	37,2064	36703 0	POSGBL STCALL	ZNB +2	
0069	REF	1			37,2065	47255 0		CALCGA	
0070					37,2066	77776 1	EXIT		
0071	REF	67	LAST	386	37,2067	0 4616 1	TC	BANKCALL	
0072	REF	2	LAST	283	37,2070	16753 1	CADR	IMUCOARS	
0073	REF	35	LAST	308	37,2071	3 4736 1	CAF	BIT14	IF BIT14 SET, GIMBAL LOCK
0074	REF	9	LAST	295	37,2072	7 0077 0	MASK	FLAGWRD3	
0075					37,2073	0 0006 1	EXTEND		
0076					37,2074	1 2076 0	BZF	+2	
0077	REF	3	LAST	386	37,2075	25'414 1	INCR	NDXCTR	+1 IF IN GIMBAL LOCK, OTHERWISE 0
0078	REF	24	LAST	353	37,2076	0 5516 0	TC	DOWNFLAG	
0079	REF	1			37,2077	00056 1	ADRES	GLOKFAIL	RESET GIMBAL LOCK FLAG
0080	REF	1			37,2100	0 2315 1	TC	IMUSLLLG	
0081	REF	4	LAST	387	37,2101	11'414 0	CCS	NDXCTR	IF ONE GO AND DO A PIPA TEST ONLY
0082	REF	1			37,2102	0 2126 0	TC	PIPACK	ALIGN AND MEASURE VERTICAL PIPA RATE
0084	REF	1			37,2103	0 2320 1	TC	FINIMUDD	
0085					37,2104	0 0006 1	EXTEND		
00851	REF	1			37,2105	3 1575 1	DCA	PERFDLAY	
00852	REF	1			37,2106	0 5277 0	TC	LONGCALL	DELAY WHILE SUSPENSION STABILIZES
008525	REF	3	LAST	386	E5,1416		EBANK=	POSITION	
00853	REF	1			37,2107	02113 0	2CADR	GOESTIMS	
00853	REF	1			37,2110	76065 0			
00854	REF	1			37,2111	3 2116 0	CA	ESTICADR	
00855	REF	1			37,2112	0 5133 0	TC	JOBSLEEP	
00856	REF	2	LAST	387	37,2113	3 2116 0	GOESTIMS CA	ESTICADR	
00857	REF	2	LAST	385	37,2114	0 5137 1	TC	JOBWAKE	
00858	REF	7	LAST	382	37,2115	0 5261 1	TC	TASKOVER	
00859	REF	1			37,2116	76500 0	ESTICADR CADR	ESTIMS	
0086	REF	43	LAST	386	37,2117	3 4755 1	TORQUE CA	ZERO	

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0087	REF	7	LAST	332	37,2120	55'050 1	TS	DSPTM2	
0088	REF	1			37,2121	3 1504 1	CA	DRIFT1	
0089	REF	8	LAST	388	37,2122	55'051 0	TS	DSPTM2 +1	
0090	REF	4	LAST	387	37,2123	51'416 0	INDEX	POSITION	
0091	REF	2	LAST	142	37,2124	55'420 1	TS	SOUTHDR -1	
0092	REF	1			37,2125	0 2457 0	TC	SHOW	
0093	REF	5	LAST	387	37,2126	51'414 1	PIPACHK	INDEX	NDXCTR
0094					37,2127	0 2130 1	TC	+1	PIPA TEST
0095	REF	1			37,2130	0 2447 1	TC	EARTH*	
0096	REF	2	LAST	386	37,2131	3 4361 1	CA	DFC17	ALLOW PIP COUNTER TO OVERFLOW 17 TIMES
0097	REF	1			37,2132	55'476 1	TS	DATAPL +4	IN THE ALLOTTED TIME INTERVAL
0098	REF	1			37,2133	3 2474 1	CA	DEC58	
0099	REF	2	LAST	142	37,2134	55'412 0	TS	LENGTHOT	
0100	REF	20	LAST	380	37,2135	3 4753 1	CA	ONE	
0101	REF	1			37,2136	55'537 0	TS	RESULTCT	
0102	REF	44	LAST	387	37,2137	3 4755 1	CA	ZERO	
0103	REF	2	LAST	142	37,2140	51'415 0	INDEX	PIPINDEX	
0104	REF	2	LAST	320	37,2141	54 037 1	TS	PIPAX	
0105	REF	2	LAST	388	37,2142	55'472 0	TS	DATAPL	
0106	REF	1			37,2143	0 2332 1	TC	CHECKG	
0107					37,2144	0 0004 0	INHINT		
0108	REF	16	LAST	380	37,2145	3 4752 0	CAF	TWO	
0109	REF	1			37,2146	0 5173 1	TC	TWIDDLE	
0110	REF	5	LAST	383	E5,1642		EBANK=	XSM	
0111	REF	1			37,2147	02151 0	ADRES	PIPATASK	
0112	REF	33	LAST	381	37,2150	0 5155 0	TC	ENDOFJOB	
0113					37,2151	0 0006 1	PIPATASK	EXTEND	
0114	REF	3	LAST	388	37,2152	27'412 0	DIM	LENGTHOT	
0115	REF	4	LAST	388	37,2153	3 1412 1	CA	LENGTHOT	
0116					37,2154	0 0006 1	EXTEND		
0117	REF	1			37,2155	6 2161 0	8ZMF	STARTPIP	
0118	REF	19	LAST	347	37,2156	3 4742 1	CAF	8IT10	
0119	REF	2	LAST	388	37,2157	0 5173 1	TC	TWIDDLE	
0120	REF	6	LAST	388	E5,1642		EBANK=	XSM	
0121	REF	2	LAST	388	37,2160	02151 0	ADRES	PIPATASK	
0122	REF	2	LAST	284	37,2161	3 4736 1	CAF	PRIC20	
0123	REF	14	LAST	381	37,2162	0 5105 0	TC	FINDVAC	
0124	REF	7	LAST	388	E5,1642		EBANK=	XSM	
0125	REF	1			37,2163	02166 1	2CADR	PIPJCBB	
0125	REF	1			37,2164	76065 0			
0126	REF	8	LAST	387	37,2165	0 5261 1	TC	TASKOVER	
0127	REF	6	LAST	388	37,2166	51'414 1	PIPJO88	INDEX	NDXCTR
0128					37,2167	0 2170 0	TC	+1	
0129	REF	2	LAST	388	37,2170	0 2447 1	TC	EARTH*	
0130	REF	5	LAST	388	37,2171	3 1412 1	CA	LENGTHOT	

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0131					37,2172	0 0006	1		EXTEND		
0132					37,2173	6 2175	0		BZMF	+2	
0133	REF	34	LAST	388	37,2174	0 5155	0		TC	ENDOFJOB	
0134	REF	7	LAST	276	37,2175	3 4756	1		CA	FIVE	
0135	REF	2	LAST	388	37,2176	55'537	0		TS	RESULTCT	
0136	REF	2	LAST	388	37,2177	0 2332	1		TC	CHECKG	
0137	REF	3	LAST	388	37,2200	11'473	1		CCS	DATAPL +1	
0138					37,2201	0 2205	1		TC	+4	
0139	REF	1			37,2202	0 5677	1		TC	CCSHOLE	
0140	REF	4	LAST	389	37,2203	4 1476	1		CS	DATAPL +4	
0141	REF	5	LAST	389	37,2204	55'476	1		TS	DATAPL +4	
0142					37,2205	0 0006	1		EXTEND		
0143	REF	6	LAST	389	37,2206	4 1473	1		DCS	DATAPL	
0144	REF	7	LAST	389	37,2207	21'477	0		DAS	DATAPL +4	
0145	REF	21	LAST	387	37,2210	0 6036	1		TC	INTPRET	
0146					37,2211	45345	1		DLOAD	DSU	
0147	REF	8	LAST	389	37,2212	02501	1			DATAPL +6	
0148	REF	9	LAST	389	37,2213	02475	0			DATAPL +2	
0149					37,2214	45044	0		BPL	CALL	
0150	REF	1			37,2215	76217	1			AINGOTN	
0151	REF	1			37,2216	76275	0			OVERFFIX	
0152					37,2217	56325	0	AINGOTN	PDDL	DOV	
0153	REF	10	LAST	389	37,2220	02477	1			DATAPL +4	
0154					37,2221	47075	0		DMPR	RTB	
0155	REF	1			37,2222	37056	0			DEC585	DEC585 HAS BEEN REDEFINED FOR LFM
0156	REF	1			37,2223	21516	0			SGNAGREE	
0157	REF	9	LAST	388	37,2224	01051	1		STORE	DSPTM2	
0158					37,2225	77776	1		EXIT		
0159	REF	7	LAST	388	37,2226	11'414	0		CCS	NDXCTR	
0160	REF	1			37,2227	0 2301	1		TC	COALIGN	TAKE PLATFORM OUT OF GIMBAL LOCK
0161	REF	2	LAST	388	37,2230	0 2457	0		TC	SHOW	
0162	REF	1			37,2231	3 2471	1	VERTDRFT	CA	3990DEC	ABOUT 1 HOUR VERTICAL DRIFT TEST
0163	REF	6	LAST	388	37,2232	55'412	0		TS	LENGTHOT	
0164	REF	5	LAST	388	37,2233	51'416	0		INDEX	POSITION	
0165	REF	3	LAST	388	37,2234	4 1417	0		CS	SOUTHDR -2	
0166	REF	1			37,2235	55'442	0		TS	DRIFTT	
01661	REF	3	LAST	388	37,2236	11'415	1		CCS	PIPINDEX	OFFSET PLATFORM TO MISS PIP DEAD-ZONES
01662	REF	1			37,2237	1 2245	1		TCF	PON4	Z UP IN POS 4
01663	REF	17	LAST	315	37,2240	4 4747	0	PON2	CS	BIT5	X UP
01664	REF	1			37,2241	27'565	1		ADS	ERCOMP +2	
01665	REF	18	LAST	389	37,2242	3 4747	1		CA	BIT5	
01666	REF	2	LAST	389	37,2243	27'567	0		ADS	ERCOMP +4	
01667	REF	1			37,2244	1 2251	1		TCF	PON	
01668	REF	19	LAST	389	37,2245	4 4747	0	PON4	CS	BIT5	
01669	REF	3	LAST	389	37,2246	27'565	1		ADS	ERCOMP +2	
016691	REF	20	LAST	389	37,2247	3 4747	1		CA	BIT5	
016692	REF	4	LAST	389	37,2250	27'563	1		ADS	ERCOMP	
0167	REF	3	LAST	388	37,2251	0 2447	1	PON	TC	EARTH*	

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0168	REF	45	LAST	388	37,2252	3 4755 1	CA	ZERO	ALLOW ONLY SOUTH GYRO EARTH RATE COMPENS
0169	REF	2	LAST	142	37,2253	55'404 1	TS	ERVECTOR	
0170	REF	3	LAST	390	37,2254	55'405 0	TS	ERVECTOR +1	
0171	REF	5	LAST	287	37,2255	3 4733 1	GUESS1 CAF	POSMAX	
0172	REF	3	LAST	386	37,2256	55'440 1	TS	TORQNDX	
0173	REF	4	LAST	390	37,2257	55'441 0	TS	TORQNDX +1	
0174	REF	8	LAST	370	37,2260	3 0032 0	CA	CDUX	
0175	REE	2	LAST	142	37,2261	55'413 1	TS	LOSVEC	
0176	REE	2	LAST	387	37,2262	0 2500 0	TC	ESTIMS	
0177	REE	1			37,2263	3 1502 1	VALMIS CA	DRIFTO	
0178	REF	10	LAST	389	37,2264	55'051 0	TS	DSPTM2 +1	
0179	REE	46	LAST	390	37,2265	3 4755 1	CA	ZERO	
0180	REE	11	LAST	390	37,2266	55'050 1	TS	DSPTM2	
0181	REF	3	LAST	389	37,2267	0 2457 0	TC	SHOW	
0182	REF	25	LAST	387	37,2270	0 5516 0	ENDTEST1 TC	DOWNFLAG	
0183	REE	3	LAST	302	37,2271	00007 0	ADRES	IMUSE	
0184	REF	47	LAST	390	37,2272	4 4755 0	CS	ZERO	
0185	REE	2	LAST	247	37,2273	0 5314 1	TC	NEWMODEA	
0186	REE	29	LAST	353	37,2274	0 5472 0	TC	ENDEXT	

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0187				37,2275	43215	0	OVERFFIX	DAD	DAD
0188	REF	3	LAST	315	37,2276	06432	1		DPPOS MAX
0189	REF	1			37,2277	37064	1		ONED PP
0190					37,2300	77616	0	RVQ	

0191					37,2301	0 0006	1	COAALIGN	EXTEND	COARSE ALIGN SUBROUTINE
0192	REF	2	LAST	386	37,2302	23'571	0		QXCH	ZERONDX
0193	REF	48	LAST	390	37,2303	3 4755	1		CA	ZERO
0194	REF	7	LAST	320	37,2304	54 321	0		TS	THETAD
0195	REF	8	LAST	391	37,2305	54 322	0		TS	THETAD +1
0196	REF	9	LAST	391	37,2306	54 323	1		TS	THETAD +2
0197	REF	68	LAST	387	37,2307	0 4616	1		TC	BANKCALL
0198	REF	3	LAST	387	37,2310	16753	1		CADR	IMUCOARS
0199	REF	69	LAST	391	37,2311	0 4616	1	ALIGNCOA	TC	BANKCALL
0200	REF	7	LAST	346	37,2312	17671	1		CADR	IMUSTALL
0201	REF	1			37,2313	0 3047	1		TC	SOMFRR2
0202	REF	3	LAST	391	37,2314	0 1571	0		TC	ZERONDX

0203					37,2315	0 0006	1	IMUSLLLG	EXTEND	
0204	REF	4	LAST	391	37,2316	23'571	0		QXCH	ZERONDX
0205	REF	1			37,2317	0 2311	0		TC	ALIGNCOA

0206					37,2320	0 0006	1	FINIMUDD	EXTEND	
0207	REF	5	LAST	391	37,2321	23'571	0		QXCH	ZERONDX
0208	REF	70	LAST	391	37,2322	0 4616	1		TC	BANKCALL
0209	REF	2	LAST	288	37,2323	17163	0		CADR	IMUFIN
0210	REF	2	LAST	391	37,2324	0 2311	0		TC	ALIGNCOA

0211					37,2325	0 0006	1	IMUZERR	EXTEND	
0212	REF	6	LAST	391	37,2326	23'571	0		QXCH	ZERONDX
0213	REF	71	LAST	391	37,2327	0 4616	1		TC	BANKCALL
0214	REF	3	LAST	280	37,2330	16667	1		CADR	IMUZERO
0215	REF	3	LAST	391	37,2331	0 2311	0		TC	ALIGNCOA

0216					37,2332	0 0006	1	CHECKG	EXTEND	PIP PULSE CATCHING ROUTINE
0217	REF	4	LAST	305	37,2333	23'417	1		QXCH	QPLACE
0218					37,2334	0 2342	0		TC	+6
0219					37,2335	0 0003	1	CHECKG1	RELINT	
0220	REF	2	LAST	236	37,2336	3 0067	0		CA	NEWJOB
0221					37,2337	0 0006	1		EXTEND	
0222					37,2340	6 2346	1		BZMF	+6
0223	REF	1			37,2341	0 5122	0		TC	CHANG1
0224					37,2342	0 0004	0		INHINT	
0225	REF	4	LAST	389	37,2343	51'415	0		INDEX	PIPINDEX
0226	REF	3	LAST	388	37,2344	4 0037	1		CS	PIPAX
0227	REF	7	LAST	391	37,2345	55'571	1		TS	ZERONDX
0228					37,2346	0 0004	0		INHINT	

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0229	REF	5	LAST	391	37,2347	51'415 0	INDEX	PIPINDEX
0230	REF	4	LAST	391	37,2350	3 0037 0	CA	PIPAX
0231	REF	8	LAST	391	37,2351	6 1571 0	AD	ZERONDX
0232					37,2352	0 0006 1	EXTEND	
0233	REF	1			37,2353	1 2335 1	BZF	CHECKG1
0234	REF	6	LAST	392	37,2354	51'415 0	INDEX	PIPINDEX
0235	REF	5	LAST	392	37,2355	3 0037 0	CA	PIPAX
0236	REF	3	LAST	389	37,2356	51'537 1	INDEX	RESULTCT
0237	REF	11	LAST	389	37,2357	55'472 0	TS	DATAPL
0238	REF	1			37,2360	0 4102 0	TC	FINE TIME
0239	REF	4	LAST	392	37,2361	51'537 1	INDEX	RESULTCT
0240	REF	12	LAST	392	37,2362	55'473 1	TS	DATAPL +1
0241	REF	5	LAST	392	37,2363	51'537 1	INDEX	RESULTCT
0242	REF	13	LAST	392	37,2364	23'474 1	LXCH	DATAPL +2
0243					37,2365	0 0003 1	RELINT	
0244	REF	5	LAST	391	37,2366	0 1417 1	ENDCHKG TC	QPLACE
0245	REF	37	LAST	384	37,2367	54 001 1	ZEROING TS	L
0246					37,2370	1 2372 1	TCF	+2
0247	REF	9	LAST	392	37,2371	55'571 1	ZEROING1 TS	ZERONDX
0248	REF	49	LAST	391	37,2372	3 4755 1	CAF	ZERO
0249	REF	38	LAST	392	37,2373	50 001 0	INDEX	L
0250					37,2374	54 000 0	TS	0
0251	REF	39	LAST	392	37,2375	24 001 0	INCR	L
0252	REF	10	LAST	392	37,2376	11'571 1	CCS	ZERONDX
0253	REF	1			37,2377	1 2371 1	TCF	ZEROING1
0254	REF	41	LAST	379	37,2400	0 0002 0	TC	Q

L IMU PERFORMANCE TESTS 2

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0258				37,2401	65345 0	ERTHRVSE	DLOAD	PDDL			
0259	REF	1		37,2402	37057 1			SCHZEROS		PO24 = (SIN	-COS 0)(OMEG/MS)
0260	REF	5	LAST	387	37,2403			LATITUDE			
0261					37,2404			DCOMP			
0262					37,2405			SIN			
0263	REF	6	LAST	393	37,2406			LATITUDE			
0264					37,2407			VXSC			
0265	REF	1			37,2410			OMEG/MS			
0266	REF	4	LAST	390	37,2411			ERVECTOR			
0267					37,2412			RTB			
0268	REF	3	LAST	352	37,2413			LOADTIME			
0269	REF	2	LAST	142	37,2414			TMARK			
0270	REF	2	LAST	393	37,2415			SCHZEROS			
0271	REF	5	LAST	389	37,2416			ERCOMP			
0272					37,2417			RVQ			
0276					37,2420	47020 0	EARTH	ITA	RTB		
0277	REF	3	LAST	337	37,2421	00051 0			S2		
0278	REF	4	LAST	393	37,2422	21462 1			LCADTIME		
0279	REF	2	LAST	142	37,2423	02431 0			TEMPTIME		
0280					37,2424	51025 1			BPL		
0281	REF	3	LAST	393	37,2425	02433 1			TMARK		
0282	REF	1			37,2426	76431 0			ERTHR		
0283					37,2427	77624 1			CALL		
0284	REF	2	LAST	389	37,2430	76275 0			OVERFFIX		
0285					37,2431	74261 1	ERTHR	SL	VXSC		
0286					37,2432	20212 1			90		
0287	REF	5	LAST	393	37,2433	02405 1			ERVECTOR		
0288					37,2434	53321 1			VAD		
0289	REF	8	LAST	388	37,2435	02643 1			XSM		
0290	REF	6	LAST	393	37,2436	02564 1			ERCOMP		
0291	REF	7	LAST	393	37,2437	16564 1			ERCOMP		
0292	REF	3	LAST	393	37,2440	02431 0			TEMPTIME		
0293	REF	4	LAST	393	37,2441	02433 1			TMARK		
0294					37,2442	47170 1			AXT,1	RTB	
0295	REF	8	LAST	393	37,2443	02563 0			ECAOR	ERCOMP	
0296	REF	1			37,2444	21625 0			PULSEIMU		
0297					37,2445	77650 1			GOTO		
0298	REF	4	LAST	393	37,2446	00051 0			S2		
02991					37,2447	0 0006 1	EAPTHR*	EXTEND			
02992	REF	2	LAST	142	37,2450	231420 0			QXCH	QPLACES	
02993	REF	22	LAST	389	37,2451	0 6036 1			TC	INTPRET	
02994					37,2452	77624 1			CALL		
02995	REF	1			37,2453	76420 0			EARTH		
02996					37,2454	77776 1			EXIT		
02997	REF	2	LAST	387	37,2455	0 2315 1			TC	IMUSLLL	
02998	REF	3	LAST	393	37,2456	0 1420 0			TC	QPLACES	
0300					37,2457	0 0006 1	SHOW	EXTEND			

L IMU PERFORMANCE TESTS 2

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0301	REF	6	LAST	392	37,2460	23'417 1	SHOW1	QXCH	QPLACE	
0302	REF	6	LAST	389	37,2461	3 1416 0		CA	POSITION	
0303	REF	12	LAST	390	37,2462	55'052 0		TS	DSPTM2 +2	
0304	REF	1			37,2463	3 2472 1		CA	VB06N98	
0305	REF	72	LAST	391	37,2464	0 4616 1	TC	BANKCALL		
0306	REF	5	LAST	386	37,2465	20351 1	CADR	GOFLASH		
0307	REF	2	LAST	386	37,2466	0 2270 0	TC	ENDTEST1	V 34	
0308	REF	7	LAST	394	37,2467	0 1417 1	TC	QPLACE	V33	
0309	REF	1			37,2470	1 2461 1	TCF	SHOW1		
0311					37,2471	07626 1	3990DEC	DEC	3990	
0312					37,2472	01542 0	VB06N98	VN	0698	
0313					37,2473	01451 0	VN0641	VN	0641	
0315	REF	1			4361		DEC17	=	ND1	
0316					37,2474	00072 1	DEC58	DEC	58	
0317	REF	9	LAST	332	37,2475	02737 0	OGCPL	ECADR	OGC	
0318	REF	3	LAST	315	4777		ISECX	=	ISEC	
0319	REF	2	LAST	386	37,2476	01664 1	XNBADR	GENADR	XNB	
0320	REF	9	LAST	393	37,2477	01642 0	XSMADR	GENADR	XSM	
0322					4102			BLOCK	2	
0323	REF	1						COUNT*	\$/P07	
0324					4102	0 0004 0	FINETIME	INHINT		RETURNS WITH INTERRUPT INHIBITED
0325					4103	0 0006 1		EXTEND		
0326	REF	1			4104	00 004 0		READ	LOSCALAR	
0327	REF	40	LAST	392	4105	54 001 1		TS	L	
0328					4106	0 0006 1		EXTEND		
0329	REF	2	LAST	394	4107	06 004 0		RXOR	LOSCALAR	
0330					4110	0 0006 1		EXTEND		
0331					4111	1 4115 1		BZF	+4	
0332					4112	0 0006 1		EXTEND		
0333	REF	3	LAST	394	4113	00 004 0		READ	LOSCALAR	
0334	REF	41	LAST	394	4114	54 001 1		TS	L	
0335	REF	6	LAST	390	4115	4 4733 0	+4	CS	POS MAX	
0336	REF	42	LAST	394	4116	6 0001 0		AD	L	
0337					4117	0 0006 1		EXTEND		
0338	REF	2	LAST	392	4120	1 4103 0		BZF	FINETIME +1	
0339					4121	0 0006 1		EXTEND		
0340	REF	1			4122	00 003 1		READ	HISCALAR	
0341	REF	42	LAST	392	4123	0 0002 0		TC	Q	

L IMU PERFORMANCE TESTS 4

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R0001 PROGRAM-IMU PERFORMANCE TESTS 4
R0002 DATE-NOV 15,1966
R0003 BY- GEORGE SCHMIDT IL7-146 EXT 1126
R0004 MCD NC-ZERO

R0005 FUNCTIONAL DESCRIPTION

R0006 THIS SECTION CONSISTS OF THE FILTER FOR THE GYRO DRIFT TESTS. NO COMPASS
R0007 IS DONE IN LEM. FOR A DESCRIPTION OF THE FILTER SEE E-1973. THIS
R0008 SECTION IS ENTERED FROM IMU 2. IT RETURNS THERE AT END OF TEST.

R0009 EARTH,OGC ZERO,ERTHRVSE

R0010 NORMAL EXIT

R0011 LENGTH OF GCES TO ZERO-RETURN TO IMU PERF TESTS 2 CONTROL

R0012 ALARMS

R0013 1600 CVERFLOW IN DRIFT TEST
R0014 1601 BAD IMU MODING IN ANY ROUTINE THAT USES IMUSTALL
R0015 OUTPUT

R0016 FLASHING DISPLAY OF RESULTS-CONTROLLED IN IMU PERF TESTS 2

R0017 DEBRIS

R0018 ALL CENTRALS-ALL OF EBANK XSM

L IMU PERFORMANCE TESTS 4

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0019					33,2045				BANK	33	
0020	REF	1			37,2000				SETLOC	IMU4	
0021					37,2500				BANK		
0022	REF	3	LAST	386	TO 394:	318	320*		COUNT*	\$/P07	
0023	REF	10	LAST	394	E5,1642				EBANK=	XSM	
0024					37,2500	0 0004	0	ESTIMS	INHINT		
0025	REF	1			37,2501	31'572	0		CAE	1SECXT	
0026	REF	3	LAST	388	37,2502	0 5173	1		TC	TWIDDLE	
0027	REF	11	LAST	396	E5,1642				EBANK=	XSM	
0028	REF	1			37,2503	02536	0		ADRES	ALLOOP	
0029	REF	50	LAST	392	37,2504	3 4755	1		CAF	ZERO	ZERO THE PIPAS
0030	REF	6	LAST	392	37,2505	54 037	1		TS	PIPAZ	
0031	REF	1			37,2506	54 040	1		TS	PIPAY	
0032	REF	1			37,2507	54 041	0		TS	PIPAZ	
0033					37,2510	0 0003	1		RELINT		
0034	REF	1			37,2511	3 3075	0		CA	77DECML	
0035	REF	11	LAST	392	37,2512	55'571	1		TS	ZERONDX	
0036	REF	1			37,2513	3 3076	0		CA	ALXXZ	
0037	REF	2	LAST	386	37,2514	0 2367	1		TC	ZEROING	
0038	REF	23	LAST	393	37,2515	0 6036	1		TC	INTPRET	
0039					37,2516	77735	0		SLOAD		
0040	REF	3	LAST	393	37,2517	37057	1			SCHZEROS	
0041	REF	10	LAST	349	37,2520	25477	1		STOVL	GCOMP SW -1	
0042	REF	1			37,2521	37070	1			INTVAL +2	
0043	REF	1			37,2522	26445	0		STOVL	ALXIS	
0044	REF	4	LAST	396	37,2523	37057	1			SCHZEROS	
0045	REF	6	LAST	342	37,2524	00325	0		STORE	DELVX	
0046	REF	23	LAST	350	37,2525	01472	1		STORE	GCOMP	
00461					37,2526	77735	0		SLOAD		
00462	REF	5	LAST	390	37,2527	02441	1			TORQNDX	
00463					37,2530	50076	0		DCOMP	BMN	
00464	REF	1			37,2531	76534	1			VERTSKIP	
0047					37,2532	77624	1		CALL		
00471	REF	1			37,2533	76401	0			ERTHRVSE	
00472					37,2534	77776	1	VERTSKIP	EXIT		
0048	REF	1			37,2535	0 3035	1		TC	SLEEPIE +1	

L IMU PERFORMANCE TESTS 4

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00481	REF	2	LAST	386	37,2536	3 1576	1	ALLOOP	CA	OVSFLOWCK
004815					37,2537	0 0006	1		EXTEND	
00482					37,2540	1 2542	1		BZF	+2
00483	REF	9	LAST	388	37,2541	0 5261	1		TC	TASKOVER
0049	REF	1			37,2542	11'530	1		CCS	ALTIM
0050	REF	101	LAST	380	37,2543	3 0000	1		CA	A
0051	REF	1			37,2544	55'531	0		TS	ALTIMS
0052	REF	102	LAST	397	37,2545	4 0000	0		CS	A
0053	REF	2	LAST	397	37,2546	55'530	1		TS	ALTIM
00531	REF	21	LAST	388	37,2547	4 4753	0		CS	ONE
00532	REF	1			37,2550	6 1562	1		AD	GEOCOMPS
00533					37,2551	0 0006	1		EXTEND	
00534					37,2552	1 2556	1		BZF	+4
0054	REF	7	LAST	389	37,2553	3 1412	1		CA	LFNGTHOT
0055					37,2554	0 0006	1		EXTEND	
0056					37,2555	6 2562	1		BZMF	+5
0057	REF	2	LAST	396	37,2556	31'572	0		CAE	1SECXT
0058	REF	4	LAST	396	37,2557	0 5173	1		TC	TWIDDLE
0059	REF	12	LAST	396	E5,1642				FBANK=	XSM
0060	REF	2	LAST	396	37,2560	02536	0		ADRES	ALLOOP
0061	REF	51	LAST	396	37,2561	3 4755	1		CAF	ZERO
0062	REF	7	LAST	396	37,2562	56 037	0		XCH	PIPAZ
0063	REF	7	LAST	396	37,2563	54 324	0		TS	DELVX
0064	REF	52	LAST	397	37,2564	3 4755	1		CAF	ZERO
0065	REF	2	LAST	396	37,2565	56 040	0		XCH	PIPAY
0066	REF	4	LAST	342	37,2566	54 326	1		TS	DELVY
0067	REF	53	LAST	397	37,2567	3 4755	1		CAF	ZERO
0068	REF	2	LAST	396	37,2570	56 041	1		XCH	PIPAZ
0069	REF	3	LAST	343	37,2571	54 330	0		TS	DELVZ
0070	REF	3	LAST	388	37,2572	3 4736	1	SPECSTS	CAF	PRIQ20
0071	REF	15	LAST	388	37,2573	0 5105	0		TC	FINDVAC
0072	REF	13	LAST	397	E5,1642				EBANK=	XSM
0073	REF	1			37,2574	02577	0		2CADR	ALFLT
0073	REF	1			37,2575	76065	0			
0074	REF	10	LAST	397	37,2576	0 5261	1		TC	TASKOVER

SHOULD NEVER HIT THIS LOCATION

START THE JOB

L IMU PERFORMANCE TESTS 4

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0075	REF	2	LAST	397	37,2577	11'562	0	ALFLT	CCS	GECCMPS
0076					37,2600	0 2602	1		TC	+2
00761	REF	1			37,2601	0 2604	1		TC	NORMLOP
0077	REF	73	LAST	394	37,2602	0 4616	1		TC	8ANKCALL
0078	REF	1			37,2603	15263	1		CAOR	1/PIPA
0079	REF	24	LAST	396	37,2604	0 6036	1	NORMLOP	TC	INTPRET
0080					37,2605	77745	1		DLDAO	
0081	REF	2	LAST	396	37,2606	37066	0			INTVAL
0082	REF	5	LAST	375	37,2607	24051	0		STOVL	S1
00821	REF	8	LAST	397	37,2610	00325	0			DELVX
00822					37,2611	76505	0		VXM	VSL1
008231	REF	14	LAST	397	37,2612	02643	1			XSM
008232					37,2613	57545	1		OLOAO	DCDMP
008233	REF	67	LAST	386	37,2614	00160	0			MPAC +3
008234	REF	1			37,2615	16523	1		STODL	DPIPAY
008235	REF	68	LAST	398	37,2616	00162	1			MPAC +5
008236	REF	1			37,2617	02527	0		STORE	OPIPAZ
008237					37,2620	76001	1		SETPD	AXT,1
00824					37,2621	00001	0			0
00825					37,2622	00010	0			8D
00826					37,2623	57535	0		SLOAO	OCDMP
00827	REF	3	LAST	398	37,2624	02563	0			GECCMPS
00828					37,2625	77640	0		BMN	
00829	REF	1			37,2626	76772	1			PERFERAS
0083					37,2627	50135	0	ALCGKK	SLOAD	BMN
0084	REF	2	LAST	397	37,2630	02532	1			ALTIMS
0085	REF	1			37,2631	76644	0			ALFLT3
0086					37,2632	72174	0	ALKCG	AXT,2	LXA,1
0087					37,2633	00014	1			12D
0088	REF	2	LAST	396	37,2634	02444	1			ALX1S
0089					37,2635	62143	0	ALKCG2	DLOAD*	INCR,1
0090	REF	1			37,2636	02243	0			ALFDK +144D,1
0091					37,2637	77775	1		OEC	-2
0092	REF	1			37,2640	12545	0		STORE	ALDK +100,2
0093					37,2641	66104	1		TIX,2	SXA,1
0094	REF	1			37,2642	76635	0			ALKCG2
0095	REF	3	LAST	398	37,2643	02444	1			ALX1S
01074					37,2644	77770	1	ALFLT3	AXT,1	
01075					37,2645	00010	0			8D
0108					37,2646	41343	0	OELMLP	DLOAD*	DMP
0109	REF	2	LAST	398	37,2647	02533	0			OPIPAY +8D,1
0110	REF	1			37,2650	37100	1			PIPASC
0111					37,2651	43661	1		SLR	BDSU*
0112					37,2652	21212	0			90
0113	REF	1			37,2653	02501	1			INTY +80,1
0114	REF	2	LAST	398	37,2654	06501	0		STORE	INTY +8D,1
0115					37,2655	40725	0		PDOL	DMP*
0116	REF	1			37,2656	37102	0			VELSC

LOAOS SLOPES AND TIME CONSTANTS AT RQST

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0117	REF	1			37,2657	02521	0			VLAUN +8D,1
0118					37,2660	77732	1		SL2R	
0119					37,2661	45425	0		DSU	STADR
0120	REF	1			37,2662	71216	1		STORE	DELM +8D,1
0121	REF	2	LAST	399	37,2663	06563	1		STORE	DELM +10D,1
0122					37,2664	77100	0		TIX,1	AXT,2
0123	REF	1			37,2665	76646	1			DELM LP
0124					37,2666	00004	0			4
0125					37,2667	56743	1	ALILP	DLOAD*	DMPR*
0126	REF	2	LAST	143	37,2670	75324	0			ALK +4,2
0127	REF	2	LAST	398	37,2671	75240	0			ALDK +4,2
0128	REF	3	LAST	399	37,2672	12453	0		STORE	ALK +4,2
0129					37,2673	77104	1		TIX,2	AXT,2
0130	REF	1			37,2674	76667	1			ALILP
0131					37,2675	00010	0			8D
0132					37,2676	66140	1	ALKLP	LXC,1	SXA,1
0133	REF	1			37,2677	02445	0			CMPX1
0134	REF	2	LAST	399	37,2700	02445	0			CMPX1
0135					37,2701	56743	1		DLOAD*	DMPR*
0136	REF	4	LAST	399	37,2702	02450	1			ALK +1,1
0137	REF	3	LAST	399	37,2703	75216	0			DELM +8D,2
0138					37,2704	77613	0		DAD*	
0139	REF	3	LAST	398	37,2705	75276	0			INTY +8D,2
0140	REF	4	LAST	399	37,2706	12501	0		STORE	INTY +8D,2
0141					37,2707	42743	1		DLOAD*	DAD*
0142	REF	5	LAST	399	37,2710	75314	0			ALK +12D,2
0143	REF	3	LAST	399	37,2711	75230	1			ALDK +12D,2
0144	REF	6	LAST	399	37,2712	12463	0		STORE	ALK +12D,2
0145					37,2713	42673	0		DMPR*	DAD*
0146	REF	4	LAST	399	37,2714	75216	0			DELM +8D,2
0147	REF	5	LAST	399	37,2715	75266	1			INTY +16D,2
0148	REF	6	LAST	399	37,2716	12511	1		STORE	INTY +16D,2
0149					37,2717	40743	0		DLOAD*	DMP*
0150	REF	1			37,2720	37105	1			ALSK +1,1
0151	REF	5	LAST	399	37,2721	75216	0			DELM +8D,2
0152					37,2722	42772	0		SL1R	DAD*
0153	REF	2	LAST	399	37,2723	75256	1			VLAUN +8D,2
0154	REF	3	LAST	399	37,2724	12521	1		STORE	VLAUN +8D,2
0155					37,2725	76104	0		TIX,2	AXT,1
0156	REF	1			37,2726	76676	1			ALKLP
0157					37,2727	00010	0			8D
0158					37,2730	64743	0	LOOSE	DLOAD*	PDDL*
0159	REF	1			37,2731	02523	1			ACCND +8D,1
0160	REF	4	LAST	399	37,2732	02521	0			VLAUN +8D,1
0161					37,2733	55523	0		PDDL*	VDEF
0162	REF	1			37,2734	02531	1			POS NV +8D,1
0163					37,2735	76521	0		MXV	VSL1
0164	REF	2	LAST	133	37,2736	02001	1			TRANS M1

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0165				37,2737	77745 1	OLOAD	
0166	REF	69	LAST	398	37,2740	00155 0	MPAC
0167	REF	2	LAST	399	37,2741	06531 0	STORE POSNV +80,1
0168					37,2742	77745 1	OLOAD
0169	REF	70	LAST	400	37,2743	00160 0	MPAC +3
0170	REF	5	LAST	399	37,2744	06521 1	STORE VLAUN +8D,1
0171					37,2745	77745 1	OLOAD
0172	REF	71	LAST	400	37,2746	00162 1	MPAC +5
0173	RFF	2	LAST	399	37,2747	06523 0	STORE ACCWD +8D,1
0174					37,2750	77700 0	TIX,1
0175	REF	1			37,2751	76730 1	LOOSE

0176					37,2752	76174 1	AXT,2	AXT,1	EVALUATE SINES AND COSINES
0177					37,2753	00006 1		6	
0178					37,2754	00002 0		2	
0179					37,2755	57343 1	800P	DLOAD*	DMPR
0180	REF	1			37,2756	02503 0			ANGX +2,1
0181	REF	1			37,2757	37110 0			GEORGEJ
0182					37,2760	77722 0		SR2R	
0183					37,2761	73406 1		PUSH	SIN
0184					37,2762	56072 1		SL3R	XAD,1
0185	REF	2	LAST	267	37,2763	00046 0			X1
0186					37,2764	10021 0		STORE	160,2
0187					37,2765	77745 1		DLOAD	
0188					37,2766	77746 1		COS	
0189					37,2767	10027 0		STORE	22D,2
0190					37,2770	77704 1		TIX,2	COSINES
0191	REF	1			37,2771	76755 1			BOOP

0192					37,2772	77776 1	PERFERAS	EXIT	
0193	REF	2	LAST	287	37,2773	3 5016 0		CA	E8ANK7
0194	REF	12	LAST	349	37,2774	54 003 0		TS	E8ANK
0195	REF	1			E7,1400			E8ANK=	ATIGINC
0196	REF	2	LAST	400	37,2775	0 1400 1		TC	ATIGINC

GOTO ERASABLE TO CALCULATE ONLY TO RETN

R0197 CAUTION

R0198 THE ERASABLE PROGRAM THAT DOES THE CALCULATIONS MUST BE LOADED
 R0199 BEFORE ANY ATTEMPT IS MADE TO RUN THE IMU PERFORMANCE TEST

01995	REF	5	LAST	387	E5,1400		E8ANK=	AZIMUTH
0290	REF	8	LAST	397	37,2776	11'412 0	CCS	LENGTHOT
0291	REF	2	LAST	396	37,2777	0-3034 0	TC	SLEEPIE
0292	REF	6	LAST	396	37,3000	11'440 1	CCS	TORONOX
0293					37,3001	1 3003 0	TCF	+2
0294	RFF	1			37,3002	0 3005 1	TC	SETUPER1
0295	REF	9	LAST	390	37,3003	3 0032 0	CA	COUX
0296	REF	3	LAST	390	37,3004	55'414 0	TS	LOSVEC +1

FOR TROUBLESHOOTING VO POSNS 254

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0297	REF	25	LAST	398	37,3005	0 6036 1	SETUPER1	TC	INTPRET
0298					37,3006	65345 0		DLOAD	PDDL
0299	REF	1			37,3007	02473 0			ANGZ
0300	REF	1			37,3010	02477 1			ANGY
0301					37,3011	55525 0		PDDL	VDEF
0302	REF	2	LAST	400	37,3012	02501 1			ANGX
0303					37,3013	74276 1		VCOMP	VXSC
0304	REF	2	LAST	400	37,3014	37110 0			GEORGEJ
0305					37,3015	74521 1		MXV	VSRI
0306	REF	15	LAST	398	37,3016	02643 1			XSM
0307	REF	10	LAST	394	37,3017	02740 0		STORE	OGC
0308					37,3020	77776 1		EXIT	

ANGLES FROM DRIFT TEST ONLY

0309	REF	1			37,3021	3 2475 0		CA	OGCPL
0310	REF	74	LAST	398	37,3022	0 4616 1		TC	BANKCALL
0311	REF	3	LAST	346	37,3023	17276 1		CADR	IMUPULSE
0312	REF	3	LAST	393	37,3024	0 2315 1		TC	IMUSLLG
0313	REF	7	LAST	400	37,3025	11'440 1	GEOSTRT4	CCS	TCRQNDX
0314	REF	1			37,3026	0 2263 1		TC	VALMIS
0315	REF	26	LAST	401	37,3027	0 6036 1		TC	INTPRET
03151					37,3030	77624 1		CALL	
03152	REF	2	LAST	396	37,3031	76401 0			ERTHRVSE
03153					37,3032	77776 1		EXIT	
0316	REF	1			37,3033	0 2117 1		TC	TORQUE

ONLY POSITIVE IF IN VERTICAL DRIFT TEST

0317	REF	9	LAST	400	37,3034	55'412 0	SLEEPIF	TS	LENGTHOT
0318	REF	8	LAST	401	37,3035	11'440 1		CCS	TORQNDX
0319	REF	4	LAST	389	37,3036	0 2447 1		TC	EARTH*
0320	REF	35	LAST	389	37,3037	0 5155 0		TC	ENDOFJOB

TEST NOT OVER-DECREMENT LENGTHOT
ARE WE DOING VERTDRIFT

0321	REF	1			37,3040	3 5014 1	SOMEERRR	CA	EBANK5
03211	REF	13	LAST	400	37,3041	54 003 0		TS	EBANK
03212	REF	22	LAST	397	37,3042	3 4753 1		CA	ONE
03213	REF	3	LAST	397	37,3043	55'576 0		TS	OVFLOWCK
03214	REF	20	LAST	376	37,3044	0 5567 0		TC	ALARM
0322					37,3045	01600 0		OCT	1600
0323	REF	3	LAST	394	37,3046	0 2270 0		TC	ENDTEST1
0324	REF	1			37,3047	3 3054 0	SOMERR2	CAF	OCT1601
0325	REF	2	LAST	195	37,3050	0 5735 0		TC	VARALARM
0330	REF	26	LAST	390	37,3051	0 5516 0		TC	DOWNFLAG
0331	REF	4	LAST	390	37,3052	00007 0		ADRES	IMUSF
0332	REF	36	LAST	401	37,3053	0 5155 0		TC	ENDOFJOB

STOP ALLOOP FROM CALLING ITSELF

0333					37,3054	01601 1	OCT1601	OCT	01601
0334					37,3055	06200 0	DEC585	OCT	06200
0335					37,3056	00000 1	SCHZEROS	2DEC	.00000000
0335					37,3057	00000 1			

3200 B+14 ORDER IS IMPORTANT

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0336		37,3060	00000 1		2DEC	.00000000	
0336		37,3061	00000 1				
0337		37,3062	00000 1		OCT	00000	
0338		37,3063	00000 1	ONEDPP	OCT	00000	ORDER IS IMPORTANT
0339		37,3064	00001 0		OCT	00001	
0340		37,3065	00004 0	INTVAL	OCT	4	
0341		37,3066	00002 0		OCT	2	
0342		37,3067	00220 1		DEC	144	
0343		37,3070	77776 1		DEC	-1	
0344		37,3071	35730 0	SOUPLY	2DEC	.93505870	INITIAL GAINS FOR PIP OUTPUTS
0344		37,3072	00035 1				
0345		37,3073	10317 0		2DEC	.26266423	INITIAL GAINS/4 FOR ERECTION ANGLES
0345		37,3074	17550 1				
0346		37,3075	00115 1	77DECML	DEC	77	
0347	REF 4 LAST 398	37,3076	01443 0	ALXXXZ	GENADR	ALX1S -1	
0348		37,3077	04133 1	PIPASC	2DEC	.13055869	
0348		37,3100	02265 1				
0349		37,3101	57223 0	VELSC	2DEC	-.52223476	512/980.402
0349		37,3102	66451 1				
0350		37,3103	05427 0	ALSK	2DEC	.17329931	SSWAY VEL GAIN X 980.402/4096
0350		37,3104	12577 1				
0351		37,3105	77567 0		2DEC	-.00835370	SSWAY ACCEL GAIN X 980.402/4096
0351		37,3106	44202 1				
0352		37,3107	24276 1	GEORGEJ	2DEC	.63661977	
0352		37,3110	14066 1				
0353		37,3111	23073 1	GEORGEK	2DEC	.59737013	
0353		37,3112	11773 1				

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R0001 PROGPAM NAME - KEYBOARD AND DISPLAY PROGRAM
R0002 MOD NC - 4 DATE - 27 APRIL 1967 ASSEMBLY - PINDANCE REV 18
R0003 MOD BY - FILENE
R0004 LOG SECTION - PINBALL GAME BUTTONS AND LIGHTS

R0009 FUNCTIONAL DESCRIPTION-

R0010 THE KEYBOARD AND DISPLAY SYSTEM PROGRAM OPERATES UNDER EXECUTIVE
R0011 CONTROL AND PROCESSES INFORMATION EXCHANGED BETWEEN THE AGC AND THE
R0012 COMPUTER OPERATOR. THE INPUTS TO THE PROGRAM ARE FROM THE KEYBOARD,
R0013 FROM INTERNAL PROGRAMS, AND FROM THE UPLINK.
R0014 THE LANGUAGE OF COMMUNICATION WITH THE PROGRAM IS A PAIR OF WORDS
R0015 KNOWN AS VERB AND NOUN. EACH OF THESE IS REPRESENTED BY A 2 CHARACTER
R0016 DECIMAL NUMBER. THE VERB CODE INDICATES WHAT ACTION IS TO BE TAKEN, THE
R0017 NOUN CODE INDICATES TO WHAT THIS ACTION IS APPLIED. NOUNS USUALLY
R0018 REFER TO A GROUP OF ERASABLE REGISTERS.

R0020 VERBS ARE GROUPED INTO DISPLAYS, LOADS, MONITORS (DISPLAYS THAT ARE
R0021 UPDATED ONCE PER SECOND), SPECIAL FUNCTIONS, AND EXTENDED VERBS (THESE
R0022 ARE OUTSIDE OF THE DOMAIN OF PINBALL AND CAN BE FOUND UNDER LOG SECTION
R0023 :EXTENDED VERBS:).
R0024 A LIST OF VERBS AND NOUNS IS GIVEN IN LOG SECTION :ASSEMBLY AND
R0025 OPERATION INFORMATION:.

R0026 CALLING SEQUENCES-

R0027 KEYBOARD:
R0028 EACH DEPRESSION OF A KEYBOARD BUTTON ACTIVATES INTERRUPT KEYRUPT1
R0029 AND PLACES THE 5 BIT KEY CODE INTO CHANNEL 15. KEYRUPT1 PLACES THE KEY
R0030 CODE INTO MPAC, ENTERS AN EXECUTIVE REQUEST FOR THE KEYBOARD AND DISPLAY
R0031 PROGRAM (AT :CHARIN:), AND EXECUTES A RESUME.

R0032 UPLINK:
R0033 EACH WORD RECEIVED BY THE UPLINK ACTIVATES INTERRUPT UPRUPT WHICH
R0034 PLACES THE 5 BIT KEY CODE INTO MPAC, ENTERS AN EXECUTIVE REQUEST FOR THE
R0035 KEYBOARD AND DISPLAY PROGRAM (AT:CHARIN:) AND EXECUTES A RESUME.

R0036 INTERNAL PROGRAMS:
R0037 INTERNAL PROGRAMS CALL PINBALL AT :NVSUB: WITH THE DESIRED VERB/NOUN
R0038 CODE IN A (LOW 7 BITS FOR NOUN, NEXT 7 BITS FOR VERB). DETAILS
R0039 DESCRIBED ON REMARKS CARDS JUST BEFORE :NVSUB: AND :NVSBWAIT: (SEE
R0040 SYMBOL TABLE FOR PAGE NUMBERS).

R0045 NCPMAL EXIT MODES-

R0046 IF PINBALL WAS CALLED BY EXTERNAL ACTION, THERE ARE FOUR EXITS:
R004605 1) ALL BUT (2), (3), AND (4) EXIT DIRECTLY TO ENDOFJOB.
R00461 2) EXTENDED VERBS GO TO THE EXTENDED VERB FAN AS PART OF THE

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R004615 PINBALL EXECUTIVE JOB WITH PRIORITY 30000. IT IS THE
R00462 RESPONSIBILITY OF THE EXTENDED VERB CALLED TO EVENTUALLY
R00463 CHANGE PRIORITY (IF NECESSARY) AND DO AN ENDJOB.
R004635 ALSO PINBALL IS A NOVAC JOB. EBANK SET FOR COMMON.
R00464 3) VERB 37. CHANGE OF PROGRAM (MAJOR MODE) CALLS :V37: IN THE
R00465 SERVICE ROUTINES AS PART OF THE PINBALL EXEC JOB WITH Prio
R00466 30000. THE NEW PROGRAM CODE (MAJOR MODE) IS LEFT IN A.
R00467 4) KEY RELEASE BUTTON CALLS :PINBRNCH: IN THE DISPLAY INTERFACE
R00468 ROUTINES AS PART OF THE PINBALL EXEC JOB WITH Prio 30000 IF
R00469 THE KEY RELEASE LIGHT IS OFF AND :CADRSTOR: IS NOT +0.

R0047 IF PINBALL WAS CALLED BY INTERNAL PROGRAMS, EXIT FROM PINBALL IS BACK
R0048 TO CALLING ROUTINE. DETAILS DESCRIBED IN REMARKS CARDS JUST BEFORE
R0049 :NVSUB: AND :NVSBWAIT: (SEE SYMBOL TABLE FOR PAGE NUMBERS).

R0050 ALARM OR ABORT EXIT MODES-

R0051 EXTERNAL INITIATION:
R0052 IF SOME IMPROPER SEQUENCE OF KEY CODES IS DETECTED, THE OPERATOR
R0053 ERROR LIGHT IS TURNED ON AND EXIT IS TO :ENDJOB:.

R0054 INTERNAL PROGRAM INITIATION:
R0055 IF AN ILLEGAL V/N COMBINATION IS ATTEMPTED, AN ABORT IS CAUSED
R0056 (WITH OCTAL 01501).
R00561 IF A SECOND ATTEMPT IS MADE TO GO TO SLEEP IN PINBALL, AN ABORT IS
R00562 CAUSED (WITH OCTAL 01206). THERE ARE TWO WAYS TO GO TO SLEEP IN PINBALL:
R00563 1) ENDIDLE OR DATAWAIT.
R00564 2) NVSBWAIT, PRENVBSY, OR NVSUBUSY.

R0057 CONDITIONS LEADING TO THE ABOVE ARE DESCRIBED IN FORTHCOMING MIT/IL
R0058 E-REPCRT DESCRIBING KEYBOARD AND DISPLAY OPERATION FOR 278.

R0059 OUTPUT-

R0060 INFORMATION TO BE SENT TO THE DISPLAY PANEL IS LEFT IN THE :DSPTAB:
R0061 BUFFERS REGISTERS (UNDER EXEC CONTROL). :DSPOUT: (A PART OF T4RUPT)
R0062 HANDLES THE PLACING OF THE :DSPTAB: INFORMATION INTO OUTPUT CHANNEL 10
R0063 IN INTERRUPT.

R0064 ERASABLE INITIALIZATION-

R0065 FRESH START AND RESTART INITIALIZE THE NECESSARY E REGISTERS FOR
R0066 PINBALL IN :STARTSUB:. REGISTERS ARE: DSPTAB BUFFER, CADRSTOR,
R0067 REQRET, CLPASS, DSPLOCK, MONSAVE, MONSAVE1, VERBREG, NOUNPFG, DSPLIST,
R0068 DSPCOUNT, NOUT.

R0069 A COMPLETE LIST OF ALL THE ERASABLES (BOTH RESERVED AND TEMPORARIES) FOR

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R0070 PINBALL IS GIVEN BELOW.

R0071 THE FOLLOWING ARE OF GENERAL INTEREST-

R0072 REMARKS CARDS PRECEDE THE REFERENCED SYMBOL DEFINITION. SEE SYMBOL
R0073 TABLE TO FIND APPROPRIATE PAGE NUMBERS.

R0074 NVSUB CALLING POINT FOR INTERNAL USE OF PINBALL.
R0075 OF RELATED INTEREST NVSBWAIT
R0076 NVSUBUSY
R0077 PRENVBSY

R0083 ENCDILE ROUTINE FOR INTERNAL PROGRAMS WISHING TO GO TO SLEEP WHILE
R0084 AWAITING OPERATORS RESPONSE.

R00851 DSPMM ROUTINE BY WHICH AN INTERNAL PROGRAM MAY DISPLAY A DECIMAL
R00852 PROGRAM CODE (MAJOR MODE) IN THE PROGRAM (MAJOR MODE) LIGHTS.
R008525 (DSPMM DOES NOT DISPLAY DIRECTLY BUT ENTERS EXEC REQUEST
R008527 FOR DSPMMJB WITH Prio 30000 AND RETURNS TO CALLER.)

R00853 BLANKSUB ROUTINE BY WHICH AN INTERNAL PROGRAM MAY BLANK ANY
R00854 COMBINATION OF THE DISPLAY REGISTERS R1, R2, R3.

R00855 JAMTERM ROUTINES BY WHICH AN INTERNAL PROGRAM MAY PERFORM THE
R00856 JAMPROC TERMINATE (V 34) OR PROCEED (V 33) FUNCTION.

R0086 MONITOR VERBS FOR PERIODIC (1 PER SEC) DISPLAY.

R00861 PLEASE PERFORM, PLEASE MARK SITUATIONS
R00862 REMARKS DESCRIBING HOW AN INTERNAL ROUTINE SHOULD HANDLE
R00863 THESE SITUATIONS CAN BE FOUND JUST BEFORE :NVSUB: (SEE
R00864 SYMBOL TABLE FOR PAGE NUMBER).

R0087 THE NOUN TABLE FORMAT IS DESCRIBED ON A PAGE OF REMARKS CARDS JUST
R0088 BEFORE :DSPABC: (SEE SYMBOL TABLE FOR PAGE NUMBER).

R0089 THE NOUN TABLES THEMSELVES ARE FOUND IN LOG SECTION :PINBALL NOUN
R00891 TABLES:.

R0090 FOR FURTHER DETAILS ABOUT OPERATION OF THE KEYBOARD AND DISPLAY SYSTEM
R0091 PROGRAM, SEE THE MISSION PLAN AND/OR MIT/IL E-2129
R0092 DESCRIBING KEYBOARD AND DISPLAY OPERATION FOR 278.

R0150 THE FOLLOWING QUOTATION IS PROVIDED THROUGH THE COURTESY OF THE AUTHORS.

R0151 ::IT WILL BE PROVED TO THY FACE THAT THOU HAST MEN ABOUT THEE THAT
R0152 USUALLY TALK OF A NOUN AND A VERB, AND SUCH ABOMINABLE WORDS AS NO

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R0153 CHRISTIAN EAR CAN ENDURE TO HEAR.::

R0154 HENRY 6, ACT 2, SCENE 4

R0155 THE FOLLOWING ASSIGNMENTS FOR PINBALL ARE MADE ELSEWHERE

R0156 RESERVED FOR PINBALL EXECUTIVE ACTION

R0157	DSPCOUNT	ERASE		DISPLAY POSITION INDICATOR
R0158	DECBRNCH	ERASE		+DEC, - DEC, OCT INDICATOR
R0159	VERBREG	ERASE		VERB CODE
R0160	NCUNREG	ERASE		NOUN CODE
R0161	XREG	ERASE		R1 INPUT BUFFER
R0162	YREG	ERASE		R2 INPUT BUFFER
R0163	ZREG	ERASE		R3 INPUT BUFFER
R0164	XREGLP	ERASE		LO PART OF XREG (FOR DEC CONV ONLY)
R0165	YREGLP	ERASE		LO PART OF YREG (FOR DEC CONV ONLY)
R0166	HITEMOUT	=	YREGLP	TEMP FOR DISPLAY OF HRS, MIN, SEC
R0167				MUST = LOTEMOUT-1.
R0168	ZREGLP	ERASE		LO PART OF ZREG (FOR DEC CONV ONLY)
R0169	LOTEMOUT	=	ZREGLP	TEMP FOR DISPLAY OF HRS, MIN, SEC
R0170				MUST = HITEMOUT+1.
R0171	MODREG	ERASE		MODE CODE
R0172	DSPLOCK	ERASE		KEYBOARD/SUBROUTINE CALL INTERLOCK
R0173	REGRET	ERASE		RETURN REGISTER FOR LOAD
R0174	LOADSTAT	ERASE		STATUS INDICATOR FOR LOADTST
R0175	CLPASS	ERASE		PASS INDICATOR CLEAR
R0176	NOUT	ERASE		ACTIVITY COUNTER FOR DSPTAB
R0177	NCUNCADR	ERASE		MACHINE CADR FOR NOUN
R0178	MCNSAVE	ERASE		N/V CODE FOR MONITOR. (= MONSAVE1-1)
R0179	MCNSAVE1	ERASE		NOUNCADR FOR MONITOR(MATBS) =MONSAVE +1
R01795	MCNSAVE2	ERASE		NVMONOPT OPTIONS
R0180	DSPTAB	ERASE	+13D	0-10, DISPLAY PANEL BUFFER.11-13,C RELAYS
R0181	CADRSTOR	ERASE		ENDIDLE STORAGE
R0182	NVQTEM	ERASE		NVSUB STORAGE FOR CALLING ADDRESS
R0183				MUST = NVBNKTEM-1
R0184	NVBAKTEM	ERASE		NVSUB STORAGE FOR CALLING BANK
R0185				MUST = NVQTEM+1
R0186	VERPSAVE	ERASE		NEEDED FOR RECYCLE
R0187	DSPLIST	ERASE		WAITING REG FOR DSP SYST INTERNAL USE.
R0188	EXTVBACT	ERASE		EXTENDED VERB ACTIVITY INTERLOCK
R0189	DSPTM1	ERASE	+2	BUFFER STORAGE AREA 1 (MOSTLY FOR TIME)
R0190	DSPTM2	ERASE	+2	BUFFER STORAGE AREA 2 (MOSTLY FOR DEG)
R0191	END OF ERASABLES RESERVED FOR PINBALL EXECUTIVE ACTION			

R0192 TEMPORARIES FOR PINBALL EXECUTIVE ACTION

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R0193	DSEXIT	=	INTB15+	RETURN FOR DSPIN
R0194	EXITEM	=	INTB15+	RETURN FOR SCALE FACTOR ROUTINE SELECT
R0195	BLANKRET	=	INTB15+	RETURN FOR 2BLANK
R0196	WRDRET	=	INTBIT15	RETURN FOR 5BLANK
R0197	WDRET	=	INTBIT15	RETURN FOR DSPWD
R0198	DECRET	=	INTBIT15	RETURN FOR PUTCOM(DEC LOAD)
R0199	21/22REG	=	INTBIT15	TEMP FOR CHARIN
R0200	UPCATRFT	=	POLISH	RETURN FOR UPDATNN, UPDATVB
R0201	CHAR	=	POLISH	TEMP FOR CHARIN
R0202	ERCNT	=	POLISH	COUNTER FOR ERROR LIGHT RESET
R0203	DECOUNT	=	POLISH	COUNTER FOR SCALING AND DISPLAY (DEC)
R0204	SGACN	=	VBUF	TEMP FOR +,- ON
R0205	NCLNTEM	=	VBUF	COUNTER FOR MIXNOUN FETCH
R0206	DISTEM	=	VBUF	COUNTER FOR OCTAL DISPLAY VERBS
R0207	DECTEM	=	VBUF	COUNTER FOR FETCH (DEC DISPLAY VERBS)
R0208	SGNOFF	=	VBUF +1	TEMP FOR +,- ON
R0209	NVTEMP	=	VBUF +1	TEMP FOR NVSUB
R0210	SFTEMP1	=	VBUF +1	STORAGE FOR SF CONST HI PART(=SFTEMP2-1)
R0211	HITEMIN	=	VBUF +1	TEMP FOR LOAD OF HRS, MIN, SEC
R0212				MUST = LOTEMIN-1.
R0213	CCODE	=	VBUF +2	FOR DSPIN
R0214	SFTEMP2	=	VBUF +2	STORAGE FOR SF CONST LO PART(=SFTEMP1+1)
R0215	LCTEMIN	=	VBUF +2	TEMP FOR LOAD OF HRS, MIN, SEC
R0216				MUST = HITEMIN+1.
R0217	MIXTEMP	=	VBUF +3	FOR MIXNOUN DATA
R0218	SICNRET	=	VBUF +3	RETURN FOR +,- ON
R0219	ALSO MIXTEMP+1 = VBUF+4, MIXTEMP+2 = VBUF+5.			
R0220	ENTRET	=	DOTINC	EXIT FROM ENTER
R0221	WDCNT	=	DOTRET	CHAR COUNTER FOR DSPWD
R0222	INREL	=	DOTRET	INPUT BUFFER SELECTOR (x,Y,Z, PFG)
R0223	DSPMMTEM	=	MATING	DSPCOUNT SAVE FOR DSPMM
R0224	MIXBR	=	MATING	INDICATOR FOR MIXED OR NORMAL NOUN
R0225	TEM1	=	FRASE	EXEC TEMP
R0226	DSREL	=	TEM1	REL ADDRESS FOR DSPIN
R0227	TEM2	=	ERASE	EXEC TEMP
R0228	DSMAG	=	TEM2	MAGNITUDE STORE FOR DSPIN
R0229	ICADDTEM	=	TEM2	MIXNOUN INDIRECT ADDRESS STORAGE
R0230	TEM3	=	ERASE	EXEC TEMP
R0231	CCUNT	=	TEM3	FOR DSPIN

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R0232 TEM4 ERASE EXEC TEMP
R0233 LSTPTR = TEM4 LIST POINTER FOR GRABUSY
R0234 RELRET = TEM4 RETURN FOR RELDSP
R0235 FREERET = TEM4 RETURN FOR FREEDSP
R0236 DSPWDRET = TEM4 RETURN FOR DSPSIGN
R0237 SEPSCRET = TEM4 RETURN FOR SEPSEC
R0238 SEPMNRET = TEM4 RETURN FOR SEPMIN

R0239 TEM5 ERASE EXEC TEMP
R0240 NOUNADD = TEM5 TEMP STORAGE FOR NOUN ADDRESS

R0241 NNADTEM ERASE TEMP FOR NOUN ADDRESS TABLE ENTRY
R0242 NNTYPTM ERASE TEMP FOR NOUN TYPE TABLE ENTRY
R0243 ICADITEM ERASE TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN)
R0244 MUST = IDAD2TEM-1, = IDAD3TEM-2.
R0245 ICAD2TEM ERASE TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN)
R0246 MUST = IDADITEM+1, = IDAD3TEM-1.
R0247 ICAD3TEM ERASE TEMP FOR INDIR ADDRESS TABLE ENTRY(MIXNN)
R0248 MUST = IDADITEM+2, = IDAD2TEM+1.
R0249 RUTMXTEM ERASE TEMP FOR SF ROUT TABLE ENTRY(MIXNN ONLY)
R0250 END OF TEMPORARIES FOR PINBALL EXECUTIVE ACTION

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R02501 ADDITIONAL TEMPORARIES FOR PINBALL EXECUTIVE ACTION

```

R02502 MPAC, THRU MPAC +6
R02503 BUF, +1, +2
R02504 BUF2, +1, +2
R02506 MPTEMP
R02507 ADERWD
R02509 END OF ADDITIONAL TEMPS FOR PINBALL EXEC ACTION

```

R0251 RESERVED FOR PINBALL INTERRUPT ACTION

```

R0252 DSPCNT ERASE COUNTER FOR DSPOUT
R0253 UPLCK ERASE BIT1 = UPLINK INTERLOCK (ACTIVATED BY

```

RECEPTION OF A BAD MESSAGE IN UPLINK)

R0255 END OF ERASABLES RESERVED FOR PINBALL INTERRUPT ACTION

R0256 TEMPORARIES FOR PINBALL INTERRUPT ACTION

```

R0257 KEYTEMP1 = WAITEXIT TEMP FOR KEYRUPT, UPRUPT
R0258 DSRUPTM = WAITEXIT TEMP FOR DSPOUT
R0259 KEYTEMP2 = RUPTAGN TEMP FOR KEYRUPT, UPRUPT
R0260 END OF TEMPORARIES FOR PINBALL INTERRUPT ACTION

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R0261 THE INPUT CODES ASSUMED FOR THE KEYBOARD ARE,
 R0262 0 10000
 R0263 1 00001
 R0264 9 01001
 R0265 VERB 10001
 R0266 ERROR RES10010
 R0267 KEY RLSE 11001
 R0268 + 11010
 R0269 - 11011
 R0270 ENTER 11100
 R0271 CLEAR 11110
 R0272 NCUN 11111

R0273 OUTPUT FORMAT FOR DISPLAY PANEL. SET OUTO TO AAAABCCCCDDDDDD.
 R0274 A-S SELECT A RELAYWORD. THIS DETERMINES WHICH PAIR OF CHARACTERS ARE
 R0275 ENERGIZED.
 R0276 B FOR SPECIAL RELAYS SUCH AS SIGNS ETC.
 R0277 C-S 5 BIT RELAY CODE FOR LEFT CHAR OF PAIR SELECTED BY RELAYWORD
 R0278 D-S 5 BIT RELAY CODE FOR RIGHTCHAR OF PAIR SELECTED BY RELAYWORD.

R0279 THE PANEL APPEARS AS FOLLOWS,
 R0280 MD1 MD2 {MAJOR MODE}
 R0281 VD1 VD2 {VERB} ND1 ND2 {NOUN}
 R0282 R1D1 R1D2 R1D3 R1D4 R1D5 {R1}
 R0283 R2D1 R2D2 R2D3 R2D4 R2D5 {R2}
 R0284 R3D1 R3D2 R3D3 R3D4 R3D5 {R3}

R0285 EACH OF THESE IS GIVEN A DSPCOUNT NUMBER FOR USE WITHIN COMPUTATION ONLY
 R0286 MD1 25 R2D1 11 ALL ARE OCTAL
 R0287 MD2 24 R2D2 10
 R0288 VD1 23 R2D3 7
 R0289 VD2 22 R2D4 6
 R0290 ND1 21 R2D5 5
 R0291 ND2 20 R3D1 4
 R0292 R1D1 16 R3D2 3
 R0293 R1D2 15 R3D3 2
 R0294 R1D3 14 R3D4 1
 R0295 R1D4 13 R3D5 0
 R0296 R1D5 12

R0297 THERE IS AN 11 REGISTER TABLE (DSPTAB) FOR THE DISPLAY PANEL.

R0298	DSPTAB RELAYWD	BIT11	BITS 10-6	BITS 5-1
R0299	RELADC			
R0300	10 1011		MD1 {25}	MD2 {24}
R0301	9 1010		VD1 {23}	VD2 {22}
R0302	8 1001		ND1 {21}	ND2 {20}
R0303	7 1000			R1D1 {16}

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R0304	6	0111	+R1	R1D2 (15)	R1D3 (14)
R0305	5	0110	-R1	R1D4 (13)	R1D5 (12)
R0306	4	0101	+R2	R2D1 (11)	R2D2 (10)
R0307	3	0100	-R2	R2D3 (7)	R2D4 (6)
R0308	2	0011		R2D5 (5)	R3D1 (4)
R0309	1	0010	+R3	R3D2 (3)	R3D3 (2)
R0310	0	0001	-R3	R3D4 (1)	R3D5 (0)
R0311		0000	NO RELAYWORD		

R0312 THE 5 BIT OUTPUT RELAY CODES ARE:

R0313	BLANK	00000
R0314	0	10101
R0315	1	00011
R0316	2	11001
R0317	3	11011
R0318	4	01111
R0319	5	11110
R0320	6	11100
R0321	7	10011
R0322	8	11101
R0323	9	11111

R03231 OUTPUT BITS USED BY PINBALL:

R03232	KEY-RELEASE LIGHT	- BIT 5 OF CHANNEL 11
R03233	VERB/NCUN FLASH	- BIT 6 OF CHANNEL 11
R03234	OPERATOR ERROR LIGHT	- BIT 7 OF CHANNEL 11

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P0324 START OF EXECUTIVE SECTION OF PINBALL

0325				40,2077			BANK 40		
032501	REF	2	LAST	314	40,2000		SFTLOC PINBALL1		
032502					40,2077		BANK		
03258	REF	1					COUNT* \$\$/PIN		
0330	REF	23	LAST	401	40,2077	3 4753 1	CAE ONE		BLOCK DISPLAY SYST
0331	REF	2	LAST	237	40,2100	57'012 0	XCH DSPLOCK		MAKE DSP SYST BUSY, BUT SAVE OLD
0332	REF	1			40,2101	54 115 0	TS 21/22REG		C(DSPLOCK) FOR ERROR LIGHT RESET.
03321	REF	2	LAST	237	40,2102	11'042 1	CCS CADRSTOR		ALL KEYS EXCEPT ER TURN ON KR LITE IE
03322					40,2103	0 2105 1	TC +2		CADRSTOR IS EULL. THIS REMINDS OPERATOR
03323	REF	1			40,2104	0 2112 1	TC CHARIN2		TO RE-ESTABLISH A FLASHING DISPLAY
03324	REF	1			40,2105	4 2156 0	CS ELFCODE1		WHICH HE HAS OBSCURED WITH DISPLAYS OF
03325	REF	72	LAST	400	40,2106	6 0154 1	AD MPAC		HIS OWN (SEE REMARKS PRECEDING ROUTINE
03326					40,2107	0 0006 1	EXTEND		VBRELDSP).
03327	REF	2	LAST	411	40,2110	1 2112 0	BZF CHARIN2		
03328	REF	1			40,2111	0 4374 0	TC RELDSPON		
0333	REF	73	LAST	411	40,2112	56 154 1	CHARIN2 XCH MPAC		
0334	REF	1			40,2113	54 117 1	TS CHAR		
0335	REF	103	LAST	397	40,2114	50 000 1	INDEX A		
0336					40,2115	0 2116 0	TC +1		INPUT CODE FUNCTION
0337	REF	1			40,2116	0 3432 1	TC CHARALRM		0
0338	REF	1			40,2117	0 2175 0	TC NUM		1
0339	REF	2	LAST	411	40,2120	0 2175 0	TC NUM		2
0340	REF	3	LAST	411	40,2121	0 2175 0	TC NUM		3
0341	REF	4	LAST	411	40,2122	0 2175 0	TC NUM		4
0342	REF	5	LAST	411	40,2123	0 2175 0	TC NUM		5
0343	REF	6	LAST	411	40,2124	0 2175 0	TC NUM		6
0344	REF	7	LAST	411	40,2125	0 2175 0	TC NUM		7
0345	REF	1			40,2126	0 2161 0	TC 89TEST		10 8
0346	REF	2	LAST	411	40,2127	0 2161 0	TC 89TEST		11 9
0347	REF	2	LAST	411	40,2130	0 3432 1	TC CHARALRM		12
0348	REF	3	LAST	411	40,2131	0 3432 1	TC CHARALRM		13
0349	REF	4	LAST	411	40,2132	0 3432 1	TC CHARALRM		14
0350	REF	5	LAST	411	40,2133	0 3432 1	TC CHARALRM		15
0351	REF	6	LAST	411	40,2134	0 3432 1	TC CHARALRM		16
0352	REF	7	LAST	411	40,2135	0 3432 1	TC CHARALRM		17
0353	REF	8	LAST	411	40,2136	0 2173 0	TC NUM -2		20 0
0354	REF	1			40,2137	0 2354 1	TC VERB		21 VERB
0355	REF	1			40,2140	0 3601 0	TC ERROR		22 ERROR LIGHT RESET
0356	REF	8	LAST	411	40,2141	0 3432 1	TC CHARALRM		23
0357	REF	9	LAST	411	40,2142	0 3432 1	TC CHARALRM		24
0358	REF	10	LAST	411	40,2143	0 3432 1	TC CHARALRM		25
0359	REF	11	LAST	411	40,2144	0 3432 1	TC CHARALRM		26
0360	REF	12	LAST	411	40,2145	0 3432 1	TC CHARALRM		27
0361	REF	13	LAST	411	40,2146	0 3432 1	TC CHARALRM		30
0362	REF	1			40,2147	0 3457 1	TC VBRELDSP		31 KEY RELEASE
0363	REF	1			40,2150	0 2407 0	TC POSGN		32 +

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0364	REF	1		40,2151	0 2374	0	TC	NESSGN	33	-
0365	REF	1		40,2152	0 2157	0	TC	ENTERJMP	34	ENTER
0366	REF	14	LAST 411	40,2153	0 3432	1	TC	CHARALRM	35	
0367	REF	1		40,2154	0 2467	0	TC	CLEAR	36	CLEAR
0368	REF	1		40,2155	0 2370	1	TC	NOUN	37	NOUN
03685				40,2156	00022	1	ELRCODE1	OCT	22	
0369	REF	17	LAST 314	40,2157	0 4635	0	ENTERJMP	TC	POSTJUMP	
0370	REF	1		40,2160	62002	1	CADR		ENTER	
0371	REF	3	LAST 237	40,2161	10 777	1	89TEST	CCS	DSPCCOUNT	
0372				40,2162	0 2166	1	TC	+4	+	
0373				40,2163	0 2166	1	TC	+3	+0	
0374	REF	37	LAST 401	40,2164	0 5155	0	TC	ENDOFJOB	-	BLOCK DATA IN IF DSPCCOUNT IS - OR -0
0375	REF	38	LAST 412	40,2165	0 5155	0	TC	ENDOFJOB	-0	
0376	REF	4	LAST 352	40,2166	3 6244	0	CAF	THREE		
0377	REF	1		40,2167	7 1000	1	MASK	DECBRNCH		
0378	REF	104	LAST 411	40,2170	10 000	0	CCS	A		
0379	REF	9	LAST 411	40,2171	0 2175	0	TC	NUM		IF DECBRNCH IS +, 8 OR 9 OK
0380	REF	15	LAST 412	40,2172	0 3432	1	TC	CHARALRM		IF DECBRNCH IS +0, REJECT 8 OR 9

R0381 NUM ASSEMBLES OCTAL 3 BITS AT A TIME. FOR DECIMAL IT CONVERTS INCOMING
 R0382 WORD AS A FRACTION, KEEPING RESULTS TO DP.
 R0383 OCTAL RESULTS ARE LEFT IN XREG, YREG, OR ZREG. HI PART OF DEC IN XREG,
 R0384 YREG, ZREG. THE LOW PARTS IN XREGLP, YREGLP, OR ZREGLP)
 R0385 DECBRNCH IS LEFT AT +0 FOR OCT, +1 FOR + DEC, +2 FOR - DEC.
 R0386 IF DSPCCOUNT WAS LEFT -, NO MORE DATA IS ACCEPTED.

0387	REF	54	LAST 397	40,2173	3 4755	1	CAF	ZERO		
0388	REF	2	LAST 411	40,2174	54 117	1	TS	CHAR		
0389	REF	4	LAST 412	40,2175	10 777	1	CCS	DSPCCOUNT		
0390				40,2176	0 2202	0	TC	+4	+	
0391				40,2177	0 2202	0	TC	+3	+0	
0392				40,2200	0 2201	0	TC	+1	-	BLOCK DATA IN IF DSPCCOUNT IS -
0393	REF	39	LAST 412	40,2201	0 5155	0	TC	ENDOFJOB	-0	
0394	REF	1		40,2202	0 2324	0	TC	GETINREL		
0395	REF	2	LAST 237	40,2203	11 015	0	CCS	CLPASS		IF CLPASS IS + OR +0, MAKE IT +0.
0396	REF	55	LAST 412	40,2204	3 4755	1	CAF	ZERC		
0397	REF	3	LAST 412	40,2205	55 015	0	TS	CLPASS		
0398				40,2206	0 2207	0	TC	+1		
0399	REF	3	LAST 412	40,2207	50 117	0	INDEX	CHAP		
0400	REF	2	LAST 172	40,2210	3 4066	0	CAF	RELTAB		
0401	REF	1		40,2211	7 4346	0	MASK	LCW5		
0402	REF	1		40,2212	54 124	1	TS	CODE		
0403	REF	5	LAST 412	40,2213	3 0777	0	CA	DSPCCOUNT		
0404	REF	1		40,2214	54 143	0	TS	CCOUNT		
0405	REF	1		40,2215	0 3322	1	TC	DSPIN		
0406	REF	5	LAST 412	40,2216	3 6244	0	CAF	THREE		

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0407	REF	2	LAST	412	40,2217	7 1000	1	MASK	DFCBRNCH	
0408	REF	105	LAST	412	40,2220	10 000	0	CCS	A	+0, OCTAL. +1, + DEC. +2, - DEC.
0409	RFF	1			40,2221	0 2232	0	TC	DECTOBIN	+
0410	RFF	1			40,2222	50 137	1	INDEX	INRFL	+0 OCTAL
0411	REF	2	LAST	237	40,2223	57'001	1	XCH	VERBREG	
0412	REF	1			40,2224	54 022	0	TS	CYL	
0413	REF	2	LAST	413	40,2225	4 0022	0	CS	CYL	
0414	RFF	3	LAST	413	40,2226	4 0022	0	CS	CYL	
0415	RFF	4	LAST	413	40,2227	56 022	1	XCH	CYL	
0416	REF	4	LAST	412	40,2230	6 0117	0	AD	CHAR	
0417	RFF	1			40,2231	0 2247	1	TC	ENDNMTST	
0418	RFF	2	LAST	413	40,2232	50 137	1	DECTOBIN INDEX	INREL	
0419	REF	3	LAST	413	40,2233	57'001	1	XCH	VERBREG	
0420	RFF	74	LAST	411	40,2234	54 154	0	TS	MPAC	SUM X 2EXP-14 IN MPAC
0421	RFF	56	LAST	412	40,2235	3 4755	1	CAF	ZERO	
0422	REF	75	LAST	413	40,2236	54 155	1	TS	MPAC	+1
0423	RFF	4	LAST	236	40,2237	3 4363	0	CAF	TFN	10 X 2EXP-14
0424	REF	1			40,2240	0 7306	0	TC	SHORTMP	10SUM X 2EXP-28 IN MPAC, MPAC+1
0425	RFF	76	LAST	413	40,2241	56 155	0	XCH	MPAC	+1
0426	REF	5	LAST	413	40,2242	6 0117	0	AD	CHAR	
0427	REF	77	LAST	413	40,2243	54 155	1	TS	MPAC	+1
0428	RFF	2	LAST	413	40,2244	0 2247	1	TC	ENDNMTST	NO OF
0429	REF	78	LAST	413	40,2245	26 154	0	ADS	MPAC	OF MUST BE 5TH CHAR
0430	RFF	1			40,2246	0 2265	1	TC	DECEND	
0431	REF	3	LAST	413	40,2247	50 137	1	ENDNMTST INDEX	INREL	
0432	REF	4	LAST	413	40,2250	55'001	0	TS	VERBREG	
0433	REF	6	LAST	412	40,2251	4 0777	1	CS	DSPCOUNT	
0434	RFF	4	LAST	413	40,2252	50 137	1	INDEX	INREL	
0435	REF	1			40,2253	6 2315	1	AD	CRITCON	
0436					40,2254	0 0006	1	EXTEND		
0437	REF	1			40,2255	1 2257	1	BZF	ENDNUM	-0, DSPCOUNT = CRITCON
0438	RFF	1			40,2256	0 2312	0	TC	MORNUM	- , DSPCOUNT G/ CRITCON
0439	REF	6	LAST	412	40,2257	3 6244	0	ENDNUM	CAF	THREE
0440	REF	3	LAST	413	40,2260	7 1000	1	MASK	DFCBRNCH	
0441	REF	106	LAST	413	40,2261	10 000	0	CCS	A	
0442	REF	2	LAST	413	40,2262	0 2265	1	TC	DECEND	
0443	RFF	7	LAST	413	40,2263	4 0777	1	ENDALL	CS	DSPCOUNT
0444	REF	2	LAST	413	40,2264	0 2313	1	TC	MORNUM	+1
0445	REF	24	LAST	411	40,2265	4 4753	0	DECEND	CS	DNE
0446	REF	5	LAST	413	40,2266	6 0137	1	AD	INREL	
0447					40,2267	0 0006	1	EXTEND		
0448	REF	1			40,2270	6 2263	1	BZMF	ENDALL	IF INREL=0,1(VBREG,NNREG), LEAVE WHOLE
0449	REF	1			40,2271	0 7102	0	TC	DMP	IF INREL=2,3,4(R1,R2,R3), CONVERT TO FRAC
A0450										MULT SUM X 2EXP-28 IN MPAC, MPAC+1 BY
0451	REF	1			40,2272	02322	0	ADRES	DECON	2FXP14/10FXP5. GIVES(SUM/10EXP5)X2FXP-14
0452	REF	7	LAST	413	40,2273	3 6244	0	CAF	THREE	IN MPAC, +1, +2.
0453	REF	4	LAST	413	40,2274	7 1000	1	MASK	DFCBRNCH	
0454	REF	107	LAST	413	40,2275	50 000	1	INDEX	A	
0455					40,2276	0 2276	0	TC	+0	
0456	REF	1			40,2277	0 2303	0	TC	+DECSGN	

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0457				40,2300	0 0006 1		EXTEND		- CASE
0458	REF	79	LAST	413	40,2301	4 0156 1	DCS	MPAC	+1
0459	REF	80	LAST	414	40,2302	52 156 1	DXCH	MPAC	+1
0460	REF	81	LAST	414	40,2303	56 156 0	+DECSGN	XCH	MPAC
0461	REF	6	LAST	413	40,2304	50 137 1		INDEX	INREL
0462	REF	1			40,2305	55 004 0		TS	XREGLP
0463	REF	82	LAST	414	40,2306	56 155 0		XCH	MPAC
0464	REF	7	LAST	414	40,2307	50 137 1		INDEX	INREL
0465	REF	5	LAST	413	40,2310	55 001 0		TS	VERBREG
0466	REF	2	LAST	413	40,2311	0 2263 1		TC	ENDALL
0467	REF	8	LAST	413	40,2312	10 777 1	MORNUM	CCS	DSPCOUNT
0468	REF	9	LAST	414	40,2313	54 777 1		TS	DSPCOUNT
0469	RFF	40	LAST	412	40,2314	0 5155 0		TC	ENDOFJOB

0470				40,2315	00022 1	CRITCON	OCT	22	{DEC 18}
0471				40,2316	00020 0		OCT	20	{DEC 16}
0472				40,2317	00012 1		OCT	12	{DEC 10}
0473				40,2320	00005 1		OCT	5	
0474				40,2321	00000 1		OCT	0	

0475				40,2322	05174 0	DECON	2DEC	E-5 B14	2EXP14/10EXP5 = .163B4 DEC
0475				40,2323	13261 0				

R0476 GETINREL GETS PROPER DATA REG REL ADDRESS FOR CURRENT C(DSPCOUNT) AND
 P0477 PUTS IN INTO INREL. +0 VERBREG, 1 NOUNREG, 2 XREG, 3 YREG, 4 ZREG.

0478	REF	10	LAST	414	40,2324	50 777 0	GETINREL	INDEX	DSPCOUNT
0479	REF	1			40,2325	3 2330 0		CAF	INRELTAB
0480	REF	8	LAST	414	40,2326	54 137 0		TS	INREL
0481	REF	43	LAST	394	40,2327	0 0002 0		TC	Q

0482				40,2330	00004 0	INRELTAB	OCT	4	R3D5 (DSPCOUNT = 0)
0483				40,2331	00004 0		OCT	4	R3D4 = (1)
0484				40,2332	00004 0		OCT	4	R3D3 = (2)
0485				40,2333	00004 0		OCT	4	R3D2 = (3)
0486				40,2334	00004 0		OCT	4	R3D1 = (4)
0487				40,2335	00003 1		OCT	3	R2D5 = (5)
0488				40,2336	00003 1		OCT	3	R2D4 = (6)
0489				40,2337	00003 1		OCT	3	R2D3 = (7)
0490				40,2340	00003 1		OCT	3	R2D2 = (8D)
0491				40,2341	00003 1		OCT	3	R2D1 = (9D)
0492				40,2342	00002 0		OCT	2	R1D5 = (10D)
0493				40,2343	00002 0		OCT	2	R1D4 = (11D)
0494				40,2344	00002 0		OCT	2	R1D3 = (12D)
0495				40,2345	00002 0		OCT	2	R1D2 = (13D)
0496				40,2346	00002 0		OCT	2	R1D1 = (14D)
0497	REF	2	LAST	389	40,2347	0 5677 1	TC	CCSHOLE	NO DSPCOUNT NUMBER = 15D
0498				40,2350	00001 0		OCT	1	ND2 = (16D)
0499				40,2351	00001 0		OCT	1	ND1 = (17D)

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0500				40,2352	00000	1		OCT	0	VD2	=(18D)
0501				40,2353	00000	1		OCT	0	VD1	=(19D)
0502	REF	57	LAST	413	40,2354	3 4755	1	VERB	CAF	ZERO	
0503	REF	6	LAST	414	40,2355	55'001	0		TS	VERBREG	
0504	REF	2	LAST	237	40,2356	3 4360	0		CAF	VD1	
0505	REF	11	LAST	414	40,2357	54 777	1	NVCOM	TS	DSPCOUNT	
0506	REF	1			40,2360	0 2601	1		TC	2BLANK	
0507	REF	25	LAST	413	40,2361	3 4753	1		CAF	ONE	
0508	REF	5	LAST	413	40,2362	55'000	1		TS	DECBRNCH	SET FOR DEC V/N CODE
0509	REF	58	LAST	415	40,2363	3 4755	1		CAF	ZERO	
0510	REF	2	LAST	237	40,2364	55'013	0		TS	REGRET	SET FOR ENTPASO
0511	REF	1			40,2365	3 4217	1		CAF	ENDINST	IF DSPALARM OCCURS BEFORE FIRST ENTPASO
0512	REF	1			40,2366	54 136	1		TS	ENTRET	OR NVSUB, ENTRET MUST ALREADY BE SET
A0513											TO TC ENDOFJOB
0514	REF	41	LAST	414	40,2367	0 5155	0		TC	ENDOFJOB	
0515	REF	59	LAST	415	40,2370	3 4755	1	NOUN	CAF	ZERO	
0516	REF	7	LAST	319	40,2371	55'002	0		TS	NOUNREG	
0517	REF	2	LAST	394	40,2372	3 4361	1		CAF	ND1	ND1, OCT 21 (DEC 17)
0518	REF	1			40,2373	0 2357	1		TC	NVCOM	
0519	REF	1			40,2374	0 2446	0	NEGSGN	TC	SIGNTEST	
0520	REF	1			40,2375	0 2433	1		TC	-ON	
0521	REF	17	LAST	388	40,2376	3 4752	0		CAF	TWO	
0522	REF	9	LAST	414	40,2377	50 137	1	BOTHSGN	INDEX	INREL	SET DEC COMP BIT TO 1 (IN DECBRNCH)
0523	REF	21	LAST	206	40,2400	6 4745	0		AD	BIT7	BIT 5 FOR R1, BIT 4 FOR R2,
0524	REF	6	LAST	415	40,2401	27'000	1		ADS	DFCBRNCH	BIT 3 FOR R3.
0525	REF	4	LAST	412	40,2402	11'015	0	FIXCLPAS	CCS	CLPASS	IF CLPASS IS + OR +0, MAKE IT +0.
0526	REF	60	LAST	415	40,2403	3 4755	1		CAF	ZERO	
0527	REF	5	LAST	415	40,2404	55'015	0		TS	CLPASS	
0528					40,2405	0 2406	1		TC	+1	
0529	REF	42	LAST	415	40,2406	0 5155	0		TC	ENDOFJOB	
0530	REF	2	LAST	415	40,2407	0 2446	0	POSGN	TC	SIGNTEST	
0531	REF	1			40,2410	0 2413	0		TC	+ON	
0532	REF	26	LAST	415	40,2411	3 4753	1		CAF	ONE	
0533	REF	1			40,2412	0 2377	0		TC	BOTHSGN	
0534	REF	44	LAST	414	40,2413	22 002	0	+ON	LXCH	0	
0535	REF	2	LAST	412	40,2414	0 2324	0		TC	GETINREL	
0536	REF	10	LAST	415	40,2415	50 137	1		INDEX	INREL	
0537	REF	1			40,2416	3 2441	1		CAF	SGNTAB -2	
0538	REF	1			40,2417	54 123	0		TS	SGNOFF	
0539	REF	27	LAST	415	40,2420	6 4753	1		AD	ONE	
0540	REF	1			40,2421	54 122	1		TS	SGNON	
0541	REF	61	LAST	415	40,2422	3 4755	1	SGNCOM	CAF	ZERO	
0542	REF	2	LAST	412	40,2423	54 124	1		TS	CODE	
0543	REF	2	LAST	415	40,2424	56 123	1		XCH	SGNOFF	

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0544	REF	1		40,2425	0 3404	1	TC	11DSPIN	
0545	REF	19	LAST	385	40,2426	3 4741	1	CAF	BIT11
0546	REF	3	LAST	415	40,2427	54 124	1	TS	CODE
0547	REF	2	LAST	415	40,2430	56 122	0	XCH	SGNON
0548	REF	2	LAST	416	40,2431	0 3404	1	TC	11DSPIN
0549	REF	43	LAST	394	40,2432	0 0001	0	TC	L
0550	REF	45	LAST	415	40,2433	22 002	0	-ON LXCH	Q
0551	REF	3	LAST	415	40,2434	0 2324	0	TC	GETINREL
0552	REF	11	LAST	415	40,2435	50 137	1	INDEX	INREL
0553	REF	2	LAST	415	40,2436	3 2441	1	CAF	SGNTAB -2
0554	REF	3	LAST	416	40,2437	54 122	1	TS	SGNON
0555	REF	28	LAST	415	40,2440	6 4753	1	AD	DNE
0556	REF	3	LAST	415	40,2441	54 123	0	TS	SGNOFF
0557	REF	1			40,2442	0 2422	1	TC	SGNCOM

0558				40,2443	00005	1	SGNTAB	OCT	5	-R1
0559				40,2444	00003	1		OCT	3	-R2
0560				40,2445	00000	1		OCT	0	-R3

0561	REF	46	LAST	416	40,2446	22 002	0	SIGNTST	LXCH	Q	ALLOWS +,- ONLY WHEN DSPCOUNT=R1D1,
0562	REF	8	LAST	413	40,2447	3 6244	0	CAF	THREE		R2D1, OR R3D1. ALLOWS ONLY FIRST OF
0563	REF	7	LAST	415	40,2450	7 1000	1	MASK	DECBRNCH		CONSECUTIVE +/- CHARACTERS.
0564	REF	108	LAST	413	40,2451	10 000	0	CCS	A		IF LOW2 BITS OF DECBRNCH NOT= 0, SIGN
0565	REF	43	LAST	415	40,2452	0 5155	0	TC	ENDOFJOB		FOR THIS WORD ALREADY IN. REJECT.
0566	REF	1			40,2453	4 4317	1	CS	R1D1		
0567	REF	1			40,2454	0 2462	0	TC	SGNTST1		
0568	REF	1			40,2455	4 4320	0	CS	R2D1		
0569	REF	2	LAST	416	40,2456	0 2462	0	TC	SGNTST1		
0570	REF	1			40,2457	4 4321	1	CS	R3D1		
0571	REF	3	LAST	416	40,2460	0 2462	0	TC	SGNTST1		
0572	REF	44	LAST	416	40,2461	0 5155	0	TC	ENDOFJOB		NO MATCH FOUND. SIGN ILLEGAL
0573	REF	12	LAST	415	40,2462	6 0777	0	SGNTST1	AD	DSPCOUNT	
0574					40,2463	0 0006	1	EXTEND			
0575					40,2464	1 2466	0	BZF	+2		MATCH FOUND
0576	REF	47	LAST	416	40,2465	0 0002	0	TC	Q		
0577	REF	44	LAST	416	40,2466	0 0001	0	TC	L		SIGN LEGAL

R0578 CLEAR BLANKS WHICH R1, R2, R3 IS CURRENT OR LAST TO BE DISPLAYED(PERTINE
 R0579 NT XREG,YREG,ZREG IS CLEARED). SUCCESSIVE CLEARS TAKE CARE OF EACH RX
 R0580 L/ RC UNTIL R1 IS DONE. THEN NO FURTHER ACTION

R0581 THE SINGLE COMPONENT LOAD VERBS ALLOW ONLY THE SINGLE RC THAT IS
 R0582 APPROPRIATE TO BE CLEARED.

R0583 CLPASS +O PASSO, CAN BE BACKED UP
 R0584 +NZ HIPASS, CAN BE BACKED UP
 R0585 -NZ PASSO, CANNOT BE BACKED UP

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0586	REF	13	LAST	416	40,2467	10 777 1	CLEAR	CCS	DSPCOUNT	
0587	REF	29	LAST	416	40,2470	6 4753 1		AD	ONE	
0588					40,2471	0 2473 0		TC	+2	
0589	REF	30	LAST	417	40,2472	6 4753 1		AD	ONE	
0590	REF	109	LAST	416	40,2473	50 000 1		INDEX	A	DO NOT CHANGE DSPCOUNT BECAUSE MAY LATER
0591	REF	2	LAST	414	40,2474	3 2330 0		CAF	INRELTAB	FAIL LEGALTST.
0592	REF	12	LAST	416	40,2475	54 137 0		TS	INREL	MUST SET INREL, EVEN FOR HIPASS.
0593	REF	6	LAST	415	40,2476	11*015 0		CCS	CLPASS	
0594	REF	1			40,2477	0 2505 0		TC	CLPASHI	+
0595					40,2500	0 2502 1		TC	+2	+0 IF CLPASS IS +0 OR -, IT IS PASSO
0596					40,2501	0 2502 1		TC	+1	-
0597	REF	13	LAST	417	40,2502	3 0137 1		CA	INREL	
0598	REF	1			40,2503	0 2527 0		TC	LEGALTST	
0599	REF	1			40,2504	0 2522 0		TC	CLEAR1	
0600	REF	14	LAST	417	40,2505	10 137 0	CLPASHI	CCS	INREL	
0601	REF	15	LAST	417	40,2506	54 137 0		TS	INREL	
0602	REF	2	LAST	417	40,2507	0 2527 0		TC	LEGALTST	
0603	REF	1			40,2510	3 2577 0		CAF	DOUBLK +2	+3 TO - NUMBER. BACKS DATA REQUESTS.
0604	REF	3	LAST	415	40,2511	27*013 0		ADS	REQRET	
0605	REF	16	LAST	417	40,2512	3 0137 1		CA	INREL	
0606	REF	1			40,2513	54 125 0		TS	MIXTEMP	TEMP STORAGE FOR INREL
0607					40,2514	0 0006 1		EXTEND		
0608	REF	7	LAST	415	40,2515	27*001 0		DIM	VERBPEG	DECREMENT VERB AND RE-DISPLAY
0609	REF	75	LAST	401	40,2516	0 4616 1		TC	BANKCALL	
0610	REF	1			40,2517	62340 1		CADR	UPDATVB	
0611	REF	2	LAST	417	40,2520	3 0125 1		CA	MIXTEMP	
0612	REF	17	LAST	417	40,2521	54 137 0		TS	INREL	RESTORE INREL
0613	REF	1			40,2522	0 2525 1	CLEAR1	TC	CLR5	
0614	REF	7	LAST	417	40,2523	25*015 1		INCR	CLPASS	ONLY IF CLPASS IS + OR +0,
0615	REF	45	LAST	416	40,2524	0 5155 0		TC	ENDOFJOB	SET FOR HIGHER PASS.
0616	REF	48	LAST	416	40,2525	22 002 0	CLR5	LXCH	Q	USES 5BLANK BUT AVOIDS ITS TC GETINREL
0617	REF	1			40,2526	0 2540 1		TC	5BLANK +2	
0618	REF	2	LAST	245	40,2527	6 7745 0	LEGALTST	AD	NEG2	
0619	REF	110	LAST	417	40,2530	10 000 0		CCS	A	
0620	REF	49	LAST	417	40,2531	0 0002 0		TC	Q	LEGAL INREL G/ 2
0621	REF	3	LAST	414	40,2532	0 5677 1		TC	CCSHOLE	
0622	REF	46	LAST	417	40,2533	0 5155 0		TC	ENDOFJOB	ILLEGAL INREL = 0,1
0623	REF	50	LAST	417	40,2534	0 0002 0		TC	Q	LEGAL INREL = 2

R0624 5BLANK BLANKS 5 CHAR DISPLAY WORD IN R1, R2, OR R3. IT ALSO ZEROES XREG,
 R0625 YREG, OR ZREG.PLACE ANY + DSPCOUNT NUMBER FOR PERTINENT RC INTO DSPCOUNT
 R0626 DSPCOUNT IS LEFT SET TO LEFT MOST DSP NUMB FOR RC JUST BLANKED.

0627	REF	14	LAST	417	40,2535	54 777 1		TS	DSPCOUNT	NEEDED FOR BLANKSUB
0628	REF	51	LAST	417	40,2536	22 002 0	5BLANK	LXCH	Q	
0629	REF	4	LAST	416	40,2537	0 2324 0		TC	GETINREL	
0630	REF	62	LAST	415	40,2540	3 4755 1		CAF	ZFRD	
0631	REF	18	LAST	417	40,2541	50 137 1		INDEX	INREL	
0632	REF	8	LAST	417	40,2542	55*001 0		TS	VERBPEG	ZERO X, Y, Z RFG.

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0633	REF	19	LAST	417	40,2543	50 137 1		INDEX	INREL	
0634	REF	2	LAST	414	40,2544	55'004 0		TS	XREGLP	-2
0635	REF	4	LAST	416	40,2545	54 124 1		TS	CODE	
0636	REF	20	LAST	418	40,2546	50 137 1		INDEX	INREL	
0637	REF	22	LAST	415	40,2547	4 4745 1		CS	BIT7	
0638	REF	8	LAST	416	40,2550	7 1000 1		MASK	DECBRNCH	
0639	REF	1			40,2551	7 2600 1		MASK	BRNCHCON	ZERO LOW 2 BITS.
0640	REF	9	LAST	418	40,2552	55'000 1		TS	DECBRNCH	
0641	REF	21	LAST	418	40,2553	50 137 1		INDEX	INREL	
0642	REF	1			40,2554	3 2570 1		CAF	SINBLANK	-2
0643	REF	2	LAST	412	40,2555	54 143 0		TS	COUNT	BLANK ISOLATED CHAR SEPARATELY
0644	REF	2	LAST	412	40,2556	0 3322 1		TC	DSPIN	
0645	REF	22	LAST	418	40,2557	50 137 1	5BLANK1	INDEX	INREL	
0646	REF	2	LAST	417	40,2560	3 2573 1		CAF	DOUBLK	-2
0647	REF	15	LAST	417	40,2561	54 777 1		TS	DSPCOUNT	
0648	REF	2	LAST	415	40,2562	0 2601 1		TC	2BLANK	
0649	REF	18	LAST	415	40,2563	4 4752 1		CS	TWO	
0650	REF	16	LAST	418	40,2564	26 777 1		ADS	DSPCOUNT	
0651	REF	3	LAST	418	40,2565	0 2601 1		TC	2BLANK	
0652	REF	23	LAST	418	40,2566	50 137 1		INDEX	INREL	
0653	REF	2	LAST	416	40,2567	3 4315 1		CAF	R1D1	-2
0654	REF	17	LAST	418	40,2570	54 777 1		TS	DSPCOUNT	SET DSPCOUNT TO LEFT MOST DSP NUMBER
0655	REF	45	LAST	416	40,2571	0 0001 0		TC	L	OF REG. JUST BLANKED
0656					40,2572	00016 0	SINBLANK	OCT	16	DEC 14
0657					40,2573	00005 1		OCT	5	
0658					40,2574	00004 0		OCT	4	
0659					40,2575	00015 0	DOUBLK	OCT	15	DEC 13
0660					40,2576	00011 1		OCT	11	DEC 9
0661					40,2577	00003 1		OCT	3	
0662					40,2600	77774 0	BRNCHCON	OCT	77774	
R0663	2BLANK BLANKS TWO CHAR. PLACE DSP NUMBER OF LEFT CHAR OF THE PAIR INTO									
R0664	DSPCOUNT. THIS NUMBER IS LEFT IN DSPCOUNT									
0665	REF	18	LAST	418	40,2601	3 0777 0	2BLANK	CA	DSPCOUNT	
0666	REF	1			40,2602	54 021 0		TS	SR	
0667	REF	1			40,2603	4 2614 1		CS	BLANKCON	
0668					40,2604	0 0004 0		INHINT		
0669	REF	2	LAST	418	40,2605	50 021 1		INDEX	SR	
0670	REF	23	LAST	236	40,2606	57'023 1		XCH	DSPTAB	
0671					40,2607	0 0006 1		EXTEND		
0672					40,2610	6 2612 0		BZMF	+2	IF OLD CONTENTS -, NOUT OK
0673	REF	6	LAST	237	40,2611	25'016 1		INCR	NOUT	IF OLD CONTENTS +, +1 TO NOUT
0674					40,2612	0 0003 1		RELINT		IF -,NOUT OK
0675	REF	52	LAST	417	40,2613	0 0002 0		TC	Q	
0676					40,2614	04000 0	BLANKCON	OCT	4000	

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P0677 ENTER PASS 0 IS THE EXECUTE FUNCTION. HIGHER ORDER ENTERS ARE TO LOAD
 R0678 DATA. THE SIGN OF REQRET DETERMINES THE PASS, + FOR PASS 0,- FOR HIGHER
 R0679 PASSES.

R0680 MACHINE CADR TO BE SPECIFIED (MCTBS) NOUNS DESIRE AN ECADR TO BE LOADED
 R0681 WHEN USED WITH LOAD VERBS, MONITOR VERBS, OR DISPLAY VERBS (EXCEPT
 R0682 VERB = FIXED MEMORY DISPLAY, WHICH REQUIRES AN FCADR).

0683				41,2000			BANK	41		
068301	REF	1		41,2000			SETLOC	PINBALL2		
068302				41,2000			BANK			
06835	REF	1					COUNT*	\$\$/PIN		
0684	REF	1		41,2000	0	3544	1	NVSUBB	TC	NVSUB1
0685	REF	1		41,2001	0	2775	0	LOADLV1	TC	LOADLV
A0686										END OF STANDARD LEAD INS.

0687	REF	63	LAST	417	41,2002	3	4755	1	ENTER	CAF	ZERO	
0688	REF	8	LAST	417	41,2003	55	015	0		TS	CLPASS	
0689	REF	2	LAST	415	41,2004	3	4217	1		CAF	ENDINST	
0690	REF	2	LAST	415	41,2005	54	136	1		TS	ENTRET	
0691	REF	4	LAST	417	41,2006	11	013	0		CCS	REQRET	
0692	REF	1			41,2007	0	2035	0		TC	ENTPASO	IF +, PASS 0
0693	REF	2	LAST	419	41,2010	0	2035	0		TC	ENTPASO	IF +, PASS 0
0694					41,2011	0	2012	0		TC	+1	IF -, NOT PASS 0
0695	REF	1			41,2012	3	2033	0	ENTPASHI	CAF	MMADREF	
0696	REF	5	LAST	419	41,2013	6	1013	1		AD	REQRET	IF L/ 2 CHAR IN FOR MM CODE, ALARM
0697					41,2014	0	0006	1		EXTEND		AND RECYCLE(DECIDE AT MMCHANG+1).
0698	REF	1			41,2015	1	2027	1		BZF	ACCEPTWD	
0699	REF	9	LAST	416	41,2016	3	6244	0		CAF	THREE	IF DEC, ALARM IF L/ 5 CHAR IN FOR DATA,
0700	REF	10	LAST	418	41,2017	7	1000	1		MASK	DECBRNCH	BUT LEAVE REQRET - AND FLASH ON, SO
0701	REF	111	LAST	417	41,2020	10	000	0		CCS	A	OPERATOR CAN SUPPLY MISSING NUMERICAL
0702					41,2021	0	2023	1		TC	+2	CHARACTERS AND CONTINUE.
0703	REF	2	LAST	419	41,2022	0	2027	0		TC	ACCEPTWD	OCTAL. ANY NUMBER OF CHAR OK.
0704	REF	19	LAST	418	41,2023	10	777	1		CCS	DSPCOUNT	
0705	REF	1			41,2024	0	2351	1		TC	GODSPALM	LESS THAN 5 CHAR DEC(DSPCOUNT IS +)
0706	REF	2	LAST	419	41,2025	0	2351	1		TC	GODSPALM	LESS THAN 5 CHAR DEC(DSPCOUNT IS +)
0707					41,2026	0	2027	0		TC	+1	5 CHAR IN (DSPCOUNT IS -)
0708	REF	6	LAST	419	41,2027	4	1013	0	ACCEPTWD	CS	REQRET	5 CHAR IN (DSPCOUNT IS -)
0709	REF	7	LAST	419	41,2030	55	013	0		TS	REQRET	SET REQRET +.
0710	REF	2	LAST	289	41,2031	0	4433	1		TC	FLASHOFF	
0711	REF	8	LAST	419	41,2032	0	1013	1		TC	REQRET	
0712	REF	3	LAST	419	0136				ENTEXIT	=	ENTRET	
0713	REF	1			41,2033	03431	1		MMADREF	ADRES	MMCHANG +1	ASSUMES TC REQMM AT MMCHANG.

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0714				41,2034	00034 0	LOWVERB	DEC	2B	LOWER VERB THAT AVOIDS NOUN TEST.
0715	REF	64	LAST	419	41,2035 3 4755 1	ENTPASO	CAF	ZERO	NOUN VERB SUB ENTERS HERE
0716	REF	11	LAST	419	41,2036 55'000 1		TS	DECBRNCH	
0717	REF	3	LAST	415	41,2037 4 4360 1		CS	VD1	BLOCK FURTHER NUM CHAR, SO THAT STRAY
0718	REF	20	LAST	419	41,2040 54 777 1		TS	DSPC COUNT	CHAR DO NOT GET INTO VERB OR NOUN LTS.
0719	REF	9	LAST	417	41,2041 4 1001 0	TESTVB	CS	VERBREG	IF VERB IS G/E LOWVB, SKIP NOUN TEST.
0720	REF	1			41,2042 55'041 1		TS	VERBSAVE	SAVE VERB FOR POSSIBLE RECYCLE.
0721	REF	1			41,2043 6 2034 1		AD	LOWVERB	LOWVERB - VB
0722					41,2044 0 0006 1		EXTEND		
0723	REF	1			41,2045 6 2133 1		BZMF	VERBFAN	VERB G/E LOWVERB
0724					41,2046 0 0006 1	TESTNN	EXTEND		VERB L/ LOWVERB
0725	REF	1			41,2047 3 2114 1		DCA	LODNNLOC	SWITCH BANKS TO NOUN TABLE READING
0726	REF	3	LAST	320	41,2050 52 006 0		DXCH	Z	ROUTINE.
0727	REF	3	LAST	319	41,2051 50 140 1		INDEX	MIXBR	
0728					41,2052 0 2052 1		TC	+0	
0729					41,2053 0 2055 0		TC	+2	NORMAL
0730	REF	1			41,2054 0 2221 1		TC	MIXNOUN	MIXED
0731	REF	3	LAST	319	41,2055 10 146 0		CCS	NNADTEM	NORMAL
0732	REF	2	LAST	420	41,2056 0 2131 0		TC	VERBFAN -2	NORMAL IF +
0733	REF	3	LAST	419	41,2057 0 2351 1		TC	GDSPALM	NOT IN USE IF +0
0734	REF	1			41,2060 0 2064 1		TC	REQADD	SPECIFY MACHINE CADR IF -
0735	REF	1			41,2061 25'017 0		INCR	NOUNCADR	AUGMENT MACHINE CADR IF -0
0736	REF	1			41,2062 0 4311 0		TC	SETNADD	ECADR FROM NOUNCADR. SETS EB, NOUNADD.
0737	REF	1			41,2063 0 2120 0		TC	INTMCTBS +2	
0738	REF	21	LAST	308	41,2064 3 4735 1	REQADD	CAF	BIT15	SET CLPASS FOR PASSO ONLY
0739	REF	9	LAST	419	41,2065 55'015 0		TS	CLPASS	
0740	REF	3	LAST	419	41,2066 4 4217 0		CS	ENDINST	TEST IF REACHED HERE FROM INTERNAL OR
0741	REF	1			41,2067 6 0136 0		AD	ENTEXIT	FROM EXTERNAL
0742					41,2070 0 0006 1		EXTEND		
0743					41,2071 1 2073 0		BZF	+2	EXTERNAL MACH CADR TO BE SPECIFIED
0744	REF	2	LAST	420	41,2072 0 2116 0		TC	INTMCTBS	
0745	REF	1			41,2073 0 2307 1		TC	REQDATZ	EXTERNAL MACH CADR TO BE SPECIFIED
0746	REF	12	LAST	420	41,2074 11'000 1		CCS	DECBPNCH	ALARM AND RECYCLE IF DECIMAL USED
0747	REF	1			41,2075 0 4145 0		TC	ALMCYCLE	FOR MCTBS.
0748	REF	4	LAST	420	41,2076 4 4360 1		CS	VD1	OCTAL USED OK
0749	REF	21	LAST	420	41,2077 54 777 1		TS	DSPC COUNT	BLOCK NUM CHAR IN
0750	REF	3	LAST	411	41,2100 11'042 1		CCS	CADRSTOR	
0751					41,2101 0 2104 0		TC	+3	EXTERNAL MCTBS DISPLAY WILL LEAVE FLASH
0752	REF	1			41,2102 0 2105 1		TC	USEADD	ON IF ENDIDLE NOT = +0.
0753					41,2103 0 2104 0		TC	+1	
0754	REF	1			41,2104 0 4427 1		TC	FLASHON	
0755	REF	1			41,2105 57'005 0	USEADD	XCH	ZREG	
0756	REF	1			41,2106 0 4303 0		TC	SETNCADR	ECADR INTO NOUNCADR. SET EB, NOUNADD.
0757					41,2107 0 0006 1		EXTEND		
0758	REF	2	LAST	420	41,2110 3 2114 1		DCA	LODNNLOC	SWITCH BANKS TO NOUN TABLE READING
0759	REF	4	LAST	420	41,2111 52 006 0		DXCH	Z	ROUTINE.
0760	REF	3	LAST	420	41,2112 0 2133 1		TC	VERBFAN	
0761	REF	22	LAST	420	0777			EBANK=	DSPC COUNT

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0762	REF	1		41,2113	02103	1	LODNNLOC	2CADR	LODNNTAB		
0762	REF	1		41,2114	64101	0					
0763				41,2115	77772	0	NEG5	OCT	77772		
0764	REF	83	LAST	414	41,2116	3 0156	0	INTMCTBS	CA	MPAC +2	INTERNAL MACH CADR TO BE SPECIFIED.
0765	REF	2	LAST	420	41,2117	0 4303	0		TC	SETNCADR	ECADR INTO NOUNCADR. SFT FB, NOUNADD.
0766	REF	8	LAST	389	41,2120	4 4756	0		CS	FIVE	NV SUB CALL LEFT CADR IN MPAC+2 FOR MACH
0767	REF	10	LAST	420	41,2121	6 1001	1		AD	VERBREG	CADR TO BE SPECIFIED.
0768					41,2122	0 0006	1			EXTEND	
0769	REF	4	LAST	420	41,2123	1 2133	0		BZF	VERBFAN	DONT DISPLAY CADR IF VB = 05.
0770	REF	2	LAST	416	41,2124	3 4321	0		CAF	R3D1	VB NOT = 05. DISPLAY CADR.
0771	REF	23	LAST	420	41,2125	54 777	1		TS	DSPCOUNT	
0772	REF	2	LAST	420	41,2126	3 1017	0		CA	NOUNCADR	
0773	REF	1			41,2127	0 3363	1		TC	DSPCCTWD	
0774	REF	5	LAST	421	41,2130	0 2133	1		TC	VERBFAN	
0775	REF	31	LAST	417	41,2131	6 4753	1		AD	ONE	
0776	REF	3	LAST	421	41,2132	0 4303	0		TC	SETNCADR	ECADR INTO NOUNCADR. SETS EB, NOUNADD.
0777	REF	1			41,2133	4 2145	1	VERBFAN	CS	LST2CON	
0778	REF	11	LAST	421	41,2134	6 1001	1		AD	VERBREG	VERB-LST2CON
0779	REF	112	LAST	419	41,2135	10 000	0		CCS	A	
0780	REF	32	LAST	421	41,2136	6 4753	1		AD	ONE	VERB G/ LST2CON
0781					41,2137	0 2141	1		TC	+2	
0782	REF	1			41,2140	0 2146	0		TC	VBFANDIR	VERB L/ LST2CON
0783	REF	84	LAST	421	41,2141	54 154	0		TS	MPAC	
0784	REF	4	LAST	247	41,2142	0 4457	0		TC	RELDSP	RELEASE DISPLAY SYST
0785	REF	18	LAST	412	41,2143	0 4635	0		TC	POSTJUMP	GO TO GOEXTVB WITH VB-40 IN MPAC.
0786	REF	1			41,2144	66000	1		CADR	GOEXTVB	
0788					41,2145	00050	1	LST2CON	DEC	40	FIRST LIST2 VFRB (EXTENDED VERB)
0790	REF	12	LAST	421	41,2146	51'001	1	VBFANDIR	INDEX	VERBREG	
0791	REF	1			41,2147	3 2151	0		CAF	VERBTAB	
0792	REF	2	LAST	286	41,2150	0 4640	1		TC	BANK JUMP	
0793	REF	4	LAST	420	41,2151	62351	1	VERBTAB	CADR	GODSPALM	VB00 ILLEGAL
0794	REF	1			41,2152	62365	0		CADR	DSPA	VB01 DISPLAY OCT COMP 1 (R1)
0795	REF	1			41,2153	62373	1		CADR	DSPF	VB02 DISPLAY OCT COMP 2 (R1)
0796	REF	1			41,2154	62400	1		CADR	DSPC	VB03 DISPLAY OCT COMP 3 (R1)
0797	REF	1			41,2155	62360	0		CADR	DSPAB	VB04 DISPLAY OCT COMP 1,2 (R1,R2)
0798	REF	1			41,2156	62353	0		CADR	DSPABC	VB05 DISPLAY OCT COMP 1,2,3 (R1,R2,R3)
0799	REF	1			41,2157	62523	1		CADR	DECDSP	VB06 DECIMAL DISPLAY
0800	REF	1			41,2160	60771	0		CADR	DSPDPDEC	VB07 DP DECIMAL DISPLAY (R1,R2)
0801	REF	5	LAST	421	41,2161	62351	1		CADR	GODSPALM	VB08 SPARF
0802	REF	6	LAST	421	41,2162	62351	1		CADR	GODSPALM	VB09 SPARE
0803	REF	1			41,2163	61420	0		CADR	DSPALARM	VB10 SPARE
0804	REF	1			41,2164	63230	0		CADR	MONITOR	VB11 MONITOR OCT COMP 1 (R1)
0805	REF	2	LAST	421	41,2165	63230	0		CADR	MONITOR	VB12 MONITOR OCT COMP 2 (R1)
0806	REF	3	LAST	421	41,2166	63230	0		CADR	MONITOR	VB13 MONITOR OCT COMP 3 (R1)
0807	REF	4	LAST	421	41,2167	63230	0		CADR	MONITOR	VB14 MONITOR OCT COMP 1,2 (R1,R2)

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0808	REF	5	LAST	421	41,2170	63230	0	CADR	MONITOR	VB15	MONITOR OCT COMP 1,2,3 (R1,R2,R3)	
0809	REF	6	LAST	422	41,2171	63230	0	CADR	MONITOR	VB16	MONITOR DECIMAL	
0810	REF	7	LAST	422	41,2172	63230	0	CADR	MONITOR	VB17	MONITOR DP DEC (R1,R2)	
0811	REF	7	LAST	421	41,2173	62351	1	CADR	GODSPALM	VB18	SPARE	
0812	REF	8	LAST	422	41,2174	62351	1	CADR	GODSPALM	VB19	SPARE	
0813	REF	9	LAST	422	41,2175	62351	1	CADR	GODSPALM	VB20	SPARE	
0814	REF	1			41,2176	62732	0	CADR	ALOAD	VB21	LOAD COMP 1 (R1)	
0815	REF	1			41,2177	62743	0	CADR	BLOAD	VB22	LOAD COMP 2 (R2)	
0816	REF	1			41,2200	62760	1	CADR	CLoad	VB23	LOAD COMP 3 (R3)	
0817	REF	1			41,2201	62703	1	CADR	ABLOAD	VB24	LOAD COMP 1,2 (R1,R2)	
0818	REF	1			41,2202	62616	1	CADR	ABCLoad	VB25	LOAD COMP 1,2,3 (R1,R2,R3)	
0819	REF	10	LAST	422	41,2203	62351	1	CADR	GODSPALM	VB26	SPARE	
0820	REF	1			41,2204	63353	1	CADR	DSPFMEM	VB27	FIXED MEMORY DISPLAY	
A0821											THE FOLLOWING VERBS MAKE NO NOUN TEST	
0822	REF	11	LAST	422	41,2205	62351	1	CADR	GODSPALM	VB28	SPARE	
0823	REF	12	LAST	422	41,2206	62351	1	CADR	GODSPALM	VB29	SPARE	
0824	REF	1			41,2207	63466	0	REQEXLOC	CADR	VBROEXEC	VB30	REQUEST EXECUTIVE
0825	REF	1			41,2210	63512	1	CADR	VBROWAIT	VB31	REQUEST WAITLIST	
0826	REF	1			41,2211	61455	1	CADR	VBRESEQ	VB32	RESEQUENCE	
0827	REF	1			41,2212	61440	0	CADR	VBPROC	VB33	PROCEED WITHOUT DATA	
0828	REF	1			41,2213	61446	0	CADR	VBTERM	VB34	TERMINATE CURRENT TEST OR LOAD REQ	
0829	REF	1			41,2214	63613	0	CADR	VBSTLTS	VB35	TEST LIGHTS	
0830	REF	1			41,2215	12447	0	CADR	SLAP1	VB36	FRESH START	
0831	REF	2	LAST	419	41,2216	63430	0	CADR	MMCHANG	VB37	CHANGE MAJOR MODE	
0832	REF	13	LAST	422	41,2217	62351	1	CADR	GODSPALM	VB38	SPARE	
0833	REF	14	LAST	422	41,2220	62351	1	CADR	GODSPALM	VB39	SPARE	

R0834 THE LIST2 VERBFAN IS LOCATED IN THE EXTENDED VERB BANK.

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R0835 NNACTAB CONTAINS A RELATIVE ADDRESS, IDAADREL(IN LOW 10 BITS), REFERRING
 R0836 TO WHERE 3 CONSECUTIVE ADDRESSES ARE STORED (IN IDA00TAB).
 R0837 MIXNOUN GETS DATA AND STORES IN MIXTEMP,+1,+2. IT SETS NOUNADD FOR
 R0838 MIXTEMP.

0839	REF	4	LAST	420	41,2221	10 146 0	MIXNOUN	CCS	NNADTEM	
0840					41,2222	0 2226 0		TC	+4	+ IN USE
0841	REF	15	LAST	422	41,2223	0 2351 1		TC	GODSPALM	+0 NOT IN USE
0842					41,2224	0 2226 0		TC	+2	- IN USE
0843					41,2225	0 2226 0		TC	+1	-0 IN USE
0844	REF	10	LAST	294	41,2226	4 6241 1		CS	SIX	
0845	REF	13	LAST	421	41,2227	6 1001 1		AO	VERBREG	
0846					41,2230	0 0006 1		EXTEND		
0847					41,2231	6 2233 1		BZMF	+2	VERB L/E 6
0848	REF	6	LAST	421	41,2232	0 2133 1		TC	VERBFAN	AVOID MIXNOUN SWAP IF VB NOT = DISPLAY
0849	REF	19	LAST	418	41,2233	3 4752 0		CAF	TWO	
0850	REF	1			41,2234	54 117 1	MIXNN1	TS	OECCOUNT	
0851	REF	1			41,2235	6 2260 1		AO	MIXAD	
0852	REF	1			41,2236	54 145 0		TS	NOUNADO	SET NOUNADO TO MIXTEMP + K
0853	REF	2	LAST	423	41,2237	50 117 0		INDEX	DECCOUNT	GET IOADDIAB ENTRY FOR COMPONENT K
0854	REF	2	LAST	319	41,2240	3 0150 0		CA	IOAOITEM	OF NOUN.
0855	REF	1			41,2241	54 122 1		TS	NOUNTEM	
A0856										TEST FOR OP(FOR OCT DISPLAY). IF SO, GET
A0857										MINOR PART ONLY.
0858	REF	1			41,2242	0 3034 0		TC	SFRUTMIX	GET SF ROUT NUMBER IN A
0859	REF	1			41,2243	0 2261 0		TC	DPTEST	
0860	REF	1			41,2244	0 2246 0		TC	MIXNN2	NO DP
0861	REF	2	LAST	423	41,2245	24 122 0		INCR	NOUNTEM	OP GET MINOR PART
0862	REF	3	LAST	423	41,2246	3 0122 0	MIXNN2	CA	NOUNTEM	
0863	REF	3	LAST	172	41,2247	7 4356 1		MASK	LOW11	ESUBK (NO OP) OR (ESUBK)+1 FOR DP
0864	REF	1			41,2250	0 4313 1		TC	SETEBANK	SET EBANK, LEAVE EADRES IN A.
0865	REF	113	LAST	421	41,2251	50 000 1		INOEX	A	PICK UP C(ESUBK) NOT OP
0866					41,2252	3 0000 1		CA	0	OR C((ESUBK)+1) FOR OP MINOR PART
0867	REF	2	LAST	423	41,2253	50 145 1		INOEX	NOUNADO	
0868					41,2254	56 000 1		XCH	0	STORE IN MIXTEM + K
0869	REF	3	LAST	423	41,2255	10 117 1		CCS	DECCOUNT	
0870	REF	1			41,2256	0 2234 0		TC	MIXNN1	
0871	REF	7	LAST	423	41,2257	0 2133 1		TC	VERBFAN	
0872	REF	3	LAST	417	41,2260	0 0125 1	MIXAO	TC	MIXTEMP	

R0873 OPTEST ENTER WITH SF ROUT NUMBER IN A.
 R0874 RETURNS TO L+1 IF NO OP.
 R0875 RETURNS TO L+2 IF OP.

0876	REF	114	LAST	423	41,2261	50 000 1	OPTEST	INOEX	A	
0877					41,2262	1 2263 0		ICF	+1	
0878	REF	53	LAST	418	41,2263	0 0002 0		TC	Q	OCTAL ONLY NO OP
0879	REF	54	LAST	423	41,2264	0 0002 0		TC	Q	FRACT NO OP

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0880	REF	55	LAST	423	41,2265	0 0002 0		TC	Q	DEG NO DP
0881	REF	56	LAST	424	41,2266	0 0002 0		TC	Q	ARITH NO DP
0882	REF	1			41,2267	1 2301 0		TCF	DPTEST1	DP1OUT
0883	REF	2	LAST	424	41,2270	1 2301 0		TCF	DPTEST1	DP2OUT
0884	REF	57	LAST	424	41,2271	0 0002 0		TC	Q	LRPOSOUT NO DP (DATA IN CHANNEL 33)
0885	REF	3	LAST	424	41,2272	1 2301 0		TCF	DPTEST1	DP3OUT
0886	REF	58	LAST	424	41,2273	0 0002 0		TC	Q	HMS NO DP
0887	REF	59	LAST	424	41,2274	0 0002 0		TC	Q	M/S NO DP
0888	REF	4	LAST	424	41,2275	1 2301 0		TCF	DPTEST1	DP4OUT
08881	REF	60	LAST	424	41,2276	0 0002 0		TC	Q	ARITH1 NO DP
08882	REF	61	LAST	424	41,2277	0 0002 0		TC	Q	2INTOUT NO DP TO GET HI PART IN MPAC
08883	REF	62	LAST	424	41,2300	0 0002 0		TC	Q	360-CDU NO DP
0889	REF	63	LAST	424	41,2301	50 002 0	DPTEST1	INDEX	Q	
0890					41,2302	0 0001 0		TC	1	RETURN TO L+2
0891	REF	3	LAST	418	41,2303	3 4317 0	REQDATX	CAF	R1D1	
0892	REF	1			41,2304	1 2310 0		TCF	REQCOM	
0893	REF	2	LAST	416	41,2305	3 4320 1	REQDATY	CAF	R2D1	
0894	REF	2	LAST	424	41,2306	1 2310 0		TCF	REQCOM	
0895	REF	3	LAST	421	41,2307	3 4321 0	REQDATZ	CAF	R3D1	
0896	REF	24	LAST	421	41,2310	54 777 1	REQCOM	TS	DSPCOUNT	
0897	REF	64	LAST	424	41,2311	4 0002 1		CS	Q	
0898	REF	9	LAST	419	41,2312	55 013 0		TS	REQRET	
0899	REF	76	LAST	417	41,2313	0 4616 1		TC	BANKCALL	
0900	REF	2	LAST	417	41,2314	60536 1		CADR	5BLANK	
0901	REF	2	LAST	420	41,2315	0 4427 1		TC	FLASHON	
0902	REF	2	LAST	420	41,2316	0 0136 0	ENDRQDAT	TC	ENTEXIT	
0903	REF	8	LAST	415	41,2317	55 002 0		TS	NOUNREG	
0904	REF	65	LAST	424	41,2320	56 002 0	UPDATNN	XCH	Q	
0905	REF	1			41,2321	54 117 1		TS	UPDATRET	
0906					41,2322	0 0006 1		EXTEND		
0907	REF	3	LAST	420	41,2323	3 2114 1		DCA	LODNLOC	SWITCH BANKS TO NOUN TABLE READING
0908	REF	5	LAST	420	41,2324	52 006 0		DXCH	Z	ROUTINE.
0909	REF	5	LAST	423	41,2325	10 146 0		CCS	NNADTEM	
0910	REF	33	LAST	421	41,2326	6 4753 1		AD	DNE	NORMAL
0911	REF	1			41,2327	1 2332 0		TCF	PUTADD	
0912	REF	2	LAST	424	41,2330	1 2333 1		TCF	PUTADD +1	MCTBS DONT CHANGE NOUNADD
0913	REF	3	LAST	424	41,2331	1 2333 1		TCF	PUTADD +1	MCTBI DONT CHANGE NOUNADD
0914	REF	4	LAST	421	41,2332	0 4303 0	PUTADD	TC	SETNCADR	ECADR INTO NOUNCADR. SETS EB, NOUNADD.
0915	REF	3	LAST	415	41,2333	3 4361 1		CAF	ND1	
0916	REF	25	LAST	424	41,2334	54 777 1		TS	DSPCOUNT	
0917	REF	9	LAST	424	41,2335	3 1002 1		CA	NOUNREG	
0918	REF	1			41,2336	1 2345 0		TCF	UPDAT1	
0919	REF	14	LAST	423	41,2337	55 001 0		TS	VERBREG	
0920	REF	66	LAST	424	41,2340	56 002 0	UPDATVB	XCH	Q	
0921	REF	2	LAST	424	41,2341	54 117 1		TS	UPDATRET	
0922	REF	5	LAST	420	41,2342	3 4360 0		CAF	VD1	

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0923	REF	26	LAST	424	41,2343	54 777 1		TS	DSPCOUNT
0924	REF	15	LAST	424	41,2344	3 1001 1		CA	VERBREG
0925	REF	19	LAST	421	41,2345	0 4635 0	UPDAT1	TC	POSTJUMP
0926	REE	1			41,2346	61317 0		CADR	GOVNUPDT
0927	REF	3	LAST	424	41,2347	0 0117 0		TC	UPDATRET

CANT USE SWCALL TO GO TO DSPDECVN, SINCE
UPDATVB CAN ITSELF BE CALLED BY SWCALL.

0928	REF	2	LAST	420	41,2350	0 4145 0	GOALMCYC	TC	ALMCYCLE
------	-----	---	------	-----	---------	----------	----------	----	----------

NEEDED BECAUSE BANKJUMP CANT HANDLE F/F.

0929	REE	20	LAST	425	41,2351	0 4635 0	GODSPALM	TC	POSTJUMP
0930	REF	2	LAST	421	41,2352	61420 0		CADR	DSPALARM

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R0931 NCUN TABLES
R0932 NOUN CODE L/40, NORMAL NOUN CASE. NOUN CODE G/E 40, MIXED NOUN CASE.
R0933 FOR NORMAL CASE, NNAOTAB CONTAINS ONE ECAOR FOR EACH NOUN.
R0934 +0 INDICATES NOUN NOT USED. - ENTRY INDICATES MACHINE CAOR (E OR F) TO
R0935 BE SPECIFIED. -1 INDICATES CHANNEL TO BE SPECIFIED. -0 INDICATES AUGMENT
R0936 OF LAST MACHINE CAOR SUPPLIED.

R0937 FOR MIXED CASE, NNAOTAB CONTAINS ONE INDIRECT ADDRESS (IOADOREL) IN LOW
R0938 10 BITS, AND THE COMPONENT CODE NUMBER IN THE HIGH 5 BITS.

R0939 NNTYPTAB IS A PACKED TABLE OF THE FORM MMMMMNNNNPPPPP.

R0940 FOR THE NORMAL CASE, M-S ARE THE COMPONENT CODE NUMBER.
R0941 N-S ARE THE SF ROUTINE CODE NUMBER.
R0942 P-S ARE THE SF CONSTANT CODE NUMBER.

R0943 MIXED CASE, M-S ARE THE SF CONSTANT3 CODE NUMBER 3 COMPONENT CASE
R0944 N-S ARE THE SF CONSTANT2 CODE NUMBER
R0945 P-S ARE THE SF CONSTANT1 CODE NUMBER
R0946 N-S ARE THE SF CONSTANT2 CODE NUMBER 2 COMPONENT CASE
R0947 P-S ARE THE SF CONSTANT1 CODE NUMBER
R0948 P-S ARE THE SF CONSTANT1 CODE NUMBER 1 COMPONENT CASE

R0949 THERE IS ALSO AN INDIRECT ADDRESS TABLE (IOADDTAB) FOR MIXED CASE ONLY.
R0950 EACH ENTRY CONTAINS ONE ECADR. IOADOREL IS THE RELATIVE ADDRESS OF
R0951 THE FIRST OF THESE ENTRIES.
R0952 THERE IS ONE ENTRY IN THIS TABLE FOR EACH COMPONENT OF A MIXED NOUN
R0953 THEY ARE LISTED IN ORDER OF ASCENDING K.

R0954 THERE IS ALSO A SCALE FACTOR ROUTINE NUMBER TABLE (RUTMXTAB) FOR MIXED
R0955 CASE ONLY. THERE IS ONE ENTRY PER MIXED NOUN. THE FORM IS,
R0956 CQQQRRRRSSSSS
R0957 Q-S ARE THE SF ROUTINE 3 CODE NUMBER 3 COMPONENT CASE
R0958 R-S ARE THE SF ROUTINE 2 CODE NUMBER
R0959 S-S ARE THE SF ROUTINE 1 CODE NUMBER
R0960 R-S ARE THE SF ROUTINE 2 CODE NUMBER 2 COMPONENT CASE
R0961 S-S ARE THE SF ROUTINE 1 CODE NUMBER

R0962 IN OCTAL DISPLAY AND LOAD (OCT OR DEC) VERBS, EXCLUDE USE OF VERBS WHOSE
R0963 COMPONENT NUMBER IS GREATER THAN THE NUMBER OF COMPONENTS IN NOUN.
R0964 (ALL MACHINE ADDRESS TO BE SPECIFIED NOUNS ARE 3 COMPONENT.)

R0967 IN MULTI-COMPONENT LOAD VERBS, NO MIXING OF OCTAL AND DECIMAL DATA
R0968 COMPONENT WORDS IS ALLOWED. ALARM IF VIOLATION.

R0969 IN DECIMAL LOADS OF DATA, 5 NUMERICAL CHARACTERS MUST BE KEYED IN
R0970 BEFORE EACH ENTER. IF NOT, ALARM.

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P0971 DISPLAY VERBS

[illegible]

A	B	C	AB	ABC	
-1	-0	+1	+2	+3	IN A
+0	+0	+0	+1	+2	IN A AFTER CCS

+0,+1,+2 INTO DISTEM

```
R1013  CCMPTST ALARMS IF COMPONENT NUMBER OF VERB(LOAD OR OCT DISPLAY) IS
R1014  GREATER THAN THE HIGHEST COMPONENT NUMBER OF NOUN.
```

1016	REF	4	LAST	320	41,2424	54 123 0	COMPTST	TS	SFTEMP1	- VERB COMP
1017	REF	67	LAST	424	41,2425	22 002 0		LXCH	Q	
1022	REF	1			41,2426	0 2515 1	COMPTST1	TC	GETCOMP	
1023	REF	1			41,2427	0 4331 1		TC	LEFT5	
1024	REF	10	LAST	419	41,2430	7 6244 1		MASK	THREE	NOUN COMP

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1025	REF	5	LAST	427	41,2431	6 0123 1	AD	SFTEMP1	NOUN COMP - VERB COMP
1026	REF	117	LAST	427	41,2432	10 000 0	CCS	A	
1027	REF	46	LAST	418	41,2433	0 0001 0	TC	L	NOUN COMP G/ VERB COMP
1028	REF	4	LAST	417	41,2434	0 5677 1	TC	CCSHOLE	
1029	REF	16	LAST	423	41,2435	0 2351 1	TC	GODSPALM	NOUN COMP L/ VERB COMP
1030	REF	47	LAST	428	41,2436	0 0001 0	NDCMPTST TC	L	NOUN COMP = VERB COMP

R1031 DCCMPTST ALARMS IF DECIMAL ONLY BIT (BIT4 OF COMP CODE NUMBER) = 1.

R1032 IF NOT, IT PERFORMS REGULAR COMPTST.

1033	REF	6	LAST	428	41,2437	54 123 0	DCCMPTST TS	SFTEMP1	- VERB COMP
1034	REF	68	LAST	427	41,2440	22 002 0	LXCH	Q	
1035	REF	2	LAST	427	41,2441	0 2443 0	TC	DECTEST	
1036	REF	1			41,2442	0 2426 0	TC	COMPTST1	

1037					41,2443	0 0006 1	DECTEST	EXTEND	ALARMS IF DEC ONLY BIT = 1 (BIT4 OF COMP CODE NUMBER). RETURNS IF NOT.
1038	REF	85	LAST	421	41,2444	22 156 0	QXCH	MPAC +2	
1039	REF	2	LAST	427	41,2445	0 2515 1	TC	GETCOMP	
1040	REF	36	LAST	387	41,2446	7 4736 0	MASK	BIT14	
1041	REF	118	LAST	428	41,2447	10 000 0	CCS	A	
1042	REF	17	LAST	428	41,2450	0 2351 1	TC	GODSPALM	
1043	REF	86	LAST	428	41,2451	0 0156 0	TC	MPAC +2	

1044	REF	69	LAST	428	41,2452	22 002 0	DCTSTCYC	LXCH	Q	ALARMS AND RECYCLES IF DEC ONLY BIT = 1 (BIT4 OF COMP CODE NUMBER). RETURNS IF NOT. USED BY LOAD VERBS.
1045	REF	3	LAST	428	41,2453	0 2515 1	TC	GETCOMP		
1046	REF	37	LAST	428	41,2454	7 4736 0	MASK	BIT14		
1047	REF	119	LAST	428	41,2455	10 000 0	CCS	A		
1048	REF	3	LAST	425	41,2456	0 4145 0	TC	ALMCYCLE		
1049	REF	48	LAST	428	41,2457	0 0001 0	TC	L		

R1050 NOUNTEST ALARMS IF NO-LOAD BIT (BIT5 OF COMP CODE NUMBER) = 1.

R1051 IF NOT, IT RETURNS.

1052	REF	70	LAST	428	41,2460	22 002 0	NOUNTEST	LXCH	Q
1053	REF	4	LAST	428	41,2461	0 2515 1	TC	GETCOMP	
1054	REF	120	LAST	428	41,2462	10 000 0	CCS	A	
1055	REF	49	LAST	428	41,2463	0 0001 0	TC	L	
1056	REF	50	LAST	428	41,2464	0 0001 0	TC	L	
1057	REF	18	LAST	428	41,2465	0 2351 1	TC	GODSPALM	

1058	REF	71	LAST	428	41,2466	22 002 0	TSTFORDP	LXCH	Q	TEST FOR DP. IF SO, GET MINOR PART ONLY.
1059	REF	6	LAST	424	41,2467	3 0146 1	CA	NNADTEM		
1060	REF	36	LAST	427	41,2470	6 4753 1	AD	ONE		IF NNADTEM = -1, CHANNEL TO BE SPECIFIED
1061					41,2471	0 0006 1		EXTEND		
1062	REF	1			41,2472	1 2504 0	BZF	CHANDSP		
1063	REF	4	LAST	420	41,2473	50 140 1	INDEX	MIXBR		
1064					41,2474	0 2474 1	TC	+0		
1065					41,2475	0 2477 1	TC	+2		NORMAL

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1066 RFF 51 LAST 428 41,2476 0 0001 0
 1067 REF 1 41,2477 0 3026 0
 1068 REF 2 LAST 423 41,2500 0 2261 0
 1069 REF 52 LAST 429 41,2501 0 0001 0
 1070 RFF 8 LAST 427 41,2502 24 145 1
 1071 REF 53 LAST 429 41,2503 0 0001 0

TC L
 TC SFRUTNOR
 TC DPTEST
 TC L
 INCR NOUNADD
 TC L

MIXED CASE ALREADY HANDLED IN MIXNOUN

NO DP

DP E+1 INTO NOUNADD FOR MINOR PART.

1072 RFF 3 LAST 421 41,2504 3 1017 0
 1073 REF 6 LAST 284 41,2505 7 5004 1
 10731 41,2506 0 0006 1
 10732 REF 121 LAST 428 41,2507 5 0000 1
 1074 41,2510 00 000 1
 1075 REF 122 LAST 429 41,2511 4 0000 0
 1076 RFF 3 LAST 427 41,2512 1 2371 1

CHANDSP CA NOUNCADR
 MASK LOW9
 EXTEND
 INDEX A
 READ 0
 CS A
 TCF DSPCOM1

1077 REF 2 LAST 319 41,2513 00147 0
 1078 REF 7 LAST 428 41,2514 00146 1

COMPICK ADRES NNTYPTM
 ADRES NNADTEM

1079 RFF 5 LAST 428 41,2515 50 140 1
 1080 REF 1 41,2516 3 2512 0
 1081 REF 123 LAST 429 41,2517 50 000 1
 1082 41,2520 3 0000 1
 1083 REF 4 LAST 247 41,2521 7 4350 1
 1084 REF 72 LAST 428 41,2522 0 0002 0

GETCOMP INDEX MIXBR
 CAF COMPICK -1
 INDEX A
 CA 0
 MASK H15
 TC Q

NORMAL

MIXED

ADRES NNTYPTM

ADRES NNADTEM

C(NNTYPTM)

C(NNADTEM)

GET H15 OF NNTYPTAB(NORM)OF NNADTAB(MIX)

1085 REF 5 LAST 428 41,2523 0 2515 1
 1086 REF 2 LAST 427 41,2524 0 4331 1
 1087 REF 11 LAST 427 41,2525 7 6244 1
 1088 REF 4 LAST 423 41,2526 54 117 1
 1089 REF 1 41,2527 54 122 1
 1090 REF 9 LAST 429 41,2530 6 0145 1
 1091 REF 124 LAST 429 41,2531 50 000 1
 1092 41,2532 4 0000 0
 1093 RFF 2 LAST 429 41,2533 50 122 0
 1094 REF 2 LAST 320 41,2534 57 003 0
 1095 REF 3 LAST 429 41,2535 10 122 1
 1096 REF 1 41,2536 0 2527 0
 1097 REF 65 LAST 420 41,2537 3 4755 1
 1098 REF 87 LAST 428 41,2540 54 155 1
 1099 REF 88 LAST 429 41,2541 54 156 1
 1100 RFF 5 LAST 429 41,2542 50 117 0
 1101 REF 5 LAST 427 41,2543 3 4317 0
 1102 REF 28 LAST 427 41,2544 54 777 1
 1103 REF 6 LAST 429 41,2545 50 117 0
 1104 REF 3 LAST 429 41,2546 4 1003 1
 1105 REF 89 LAST 429 41,2547 54 154 0
 1106 REF 1 41,2550 0 3047 1

DECDSP TC GETCCMP
 TC LEFT5
 MASK THRF
 TS DECOUNT
 DSDPCGET DECTEM
 AD NOUNADD
 INDEX A
 CS 0
 INDEX DECTEM
 XCH XREG
 CCS DECTEM
 TC DSPDCGET
 DSDPCPUT CAF ZERO
 TS MPAC +1
 TS MPAC +2
 INDFX DECOUNT
 CAF PID1
 TS DSPCOUNT
 INDEX DECOUNT
 CS XREG
 TS MPAC
 TC SFCONUM

COMP NUMBER INTO DECOUNT

PICKS UP DATA

DECTEM 1COMP +0, 2COMP +1, 3COMP +2

CANT USE BUF SINCE DMP USES IT.

MORE TO GET

DISPLAYS DATA

DECOUNT 1COMP +0, 2COMP +1, 3COMP +2

2X(SF CON NUMB) IN A

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1107	REF	7	LAST	428	41,2551	54 123 0		TS	SFTEMP1	
1108					41,2552	0 0006 1		EXTEND		
1109	REF	1			41,2553	3 2565 0		OCA	GTSFOUTL	SWITCH BANKS TO SF CONSTANT TABLE
1110	REF	6	LAST	424	41,2554	52 006 0		OXCH	Z	READING ROUTINE.
1111	REF	6	LAST	429	41,2555	50 140 1		INDEX	MIXBR	LOADS SFTEMP1, SFTEMP2.
1112					41,2556	0 2556 0		TC	+0	
1113	REF	1			41,2557	0 2562 1		TC	DSPSFNOR	
1114	REF	2	LAST	423	41,2560	0 3034 0		TC	SFRUTMIX	
1115	REF	1			41,2561	0 2575 1		TC	DEC DSP3	
1116	REF	2	LAST	429	41,2562	0 3026 0	OSPSFNOR	TC	SFRUTNOR	
1117	REF	2	LAST	430	41,2563	0 2575 1		TC	DEC DSP3	
1118	REF	29	LAST	429	0777			EBANK=	DSPCOUNT	
1119	REF	1			41,2564	02141 1	GTSFOUTL	2CADR	GTSFOUT	
1119	REF	1			41,2565	64101 0				
1120	REF	77	LAST	424	41,2566	0 4616 1	OSPDCE	TC	BANKCALL	ALL SFOUT ROUTINES END HERE
1121	REF	1			41,2567	61226 0		CADR	DSPDECWO	
1122	REF	7	LAST	429	41,2570	10 117 1		CCS	DECOUNT	
1123					41,2571	0 2573 1		TC	+2	
1124	REF	4	LAST	427	41,2572	0 0136 0		TC	ENTEXIT	
1125	REF	8	LAST	430	41,2573	54 117 1		TS	DECOUNT	
1126	REF	1			41,2574	0 2537 1		TC	DSPOCPUT	MORE TO DISPLAY
1127	REF	125	LAST	429	41,2575	50 000 1	DEC DSP3	INDEX	A	
1128	REF	1			41,2576	3 2600 0		CAF	SFOUTABR	
1129	REF	3	LAST	421	41,2577	0 4640 1		TC	BANK JUMP	
1130	REF	1			41,2600	61416 0	SFOUTABR	CADR	PREDSPAL	ALARM IF DEC OISP WITH OCTAL ONLY NOUN
1131	REF	1			41,2601	62566 0		CADR	DSPDCENO	
1132	REF	1			41,2602	60615 0		CADR	DEGOUTSF	
1133	REF	1			41,2603	60677 1		CADR	ARTOUTSF	
1134	REF	1			41,2604	60710 1		CADR	DP1OUTSF	
1135	REF	1			41,2605	60715 1		CADR	DP2OUTSF	
1136	REF	1			41,2606	60635 1		CAOR	LRPO SOUT	
1137	REF	1			41,2607	60717 0		CADR	DP3OUTSF	
1138	REF	1			41,2610	65224 0		CADR	HMSOUT	
1139	REF	1			41,2611	65277 0		CADR	M/SOUT	
1140	REF	2	LAST	430	41,2612	60715 1		CADR	DP2OUTSF	
11401	REF	1			41,2613	60704 1		CAOR	AROUTISF	
11402	REF	1			41,2614	60732 1		CAOR	2INTOUT	
11403	REF	1			41,2615	60623 0		CAOR	360-CDUO	
1141					41,2616					ENORTOUT EQUALS

R1142 THE FOLLOWING IS ATYPICAL SF ROUTINE . IT USES MPAC. LEAVES RESU
 R1143 LTS IN MPAC, MPAC+1. ENDS WITH TC OSPDCENO

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1144 REF 2 LAST 418 40,2615 SETLOC BLANKCON +1

11445 REF 2 LAST 411 TO 419: 334 334* COUNT* \$\$/PIN

R1145 DEGOUTSF SCALES BY .18 THE LOW 14 BITS OF ANGLE, ADDING .18 FOR

R1146 NUMBERS IN THE NEGATIVE (AGC) RANGE.

1147 REF 66 LAST 429 40,2615 3 4755 1 DEGOUTSF CAF ZERO

1148 REF 90 LAST 429 40,2616 54 156 1 TS MPAC +2 SET INDEX FOR FULL SCALE

1149 REF 1 40,2617 0 2652 1 TC FIXRANGE

1150 40,2620 0 2622 0 TC +2 NO AUGMENT NEEDED (SFTEMP1 AND 2 ARE 0)

1151 REF 1 40,2621 0 2645 1 TC SETAUG SET AUGMENTER ACCORDING TO C(MPAC +2)

11511 REF 1 40,2622 0 2663 0 TC DEGCOM

R1152 360-CDUO COMPUTES 360 - CDU ANGLE IN MPAC, STORES RESULT IN MPAC AND

R11521 GOES TO DEGOUTSF.

11522 REF 1 40,2623 0 2625 1 360-CDUO TC 360-CDU

11523 REF 2 LAST 430 40,2624 0 2615 1 TC DEGOUTSF

11524 REF 91 LAST 431 40,2625 3 0154 1 360-CDU CA MPAC

11525 REF 7 LAST 394 40,2626 7 4733 0 MASK POSMAX IF ANGLE IS 0 OR 180 DEGREES, DO NOTHING

11526 40,2627 0 0006 1 EXTEND

11527 REF 1 40,2630 1 2634 0 BZF 360-CDUE

11528 REF 92 LAST 431 40,2631 4 0154 0 CS MPAC COMPUTE 360 DEGREES MINUS ANGLE

11529 REF 37 LAST 428 40,2632 6 4753 1 AD ONE

115291 REF 93 LAST 431 40,2633 54 154 0 TS MPAC

115292 REF 73 LAST 429 40,2634 0 0002 0 360-CDUE TC Q

R1153 LRPOSOUT DISPLAYS +0,1,2,OR 3 (WHOLE) FOR CHANNEL 33,BITS 7-6 = 11,10,

R1154 01,00 RESPECTIVELY.

1155 40,2635 0 0006 1 LRPOSOUT EXTEND

1156 REF 6 LAST 292 40,2636 00 033 1 READ CHAN33

1157 40,2637 0 0006 1 EXTEND

1158 REF 20 LAST 388 40,2640 7 4742 0 MP BIT10 BITS 7-6 TO BITS 2-1

1159 40,2641 4 0000 0 COM

1160 REF 12 LAST 429 40,2642 7 6244 1 MASK THREE

1161 REF 94 LAST 431 40,2643 54 154 0 TS MPAC

1162 REF 2 LAST 430 40,2644 0 2677 0 TC APTOUTSF DISPLAY AS WHOLE

1174 40,2645 0 0006 1 SETAUG EXTEND

1175 REF 95 LAST 431 40,2646 5 0156 0 INDEX MPAC +2 LOADS SFTEMP1 AND SFTEMP2 WITH THE

1176 REF 1 40,2647 3 2674 0 DCA DEGTAB DP AUGMENTER CONSTANT

1177 REF 8 LAST 430 40,2650 52 124 1 DXCH SFTEMP1

1178 REF 74 LAST 431 40,2651 0 0002 0 TC Q

1179 REF 96 LAST 431 40,2652 10 154 0 FIXRANGE CCS MPAC IF MPAC IS + RETURN TO L+1

1180 REF 75 LAST 431 40,2653 0 0002 0 TC Q IF MPAC IS - RETURN TO L+2 AFTER

1181 REF 76 LAST 431 40,2654 0 0002 0 TC Q MASKING OUT THE SIGN BIT

1182 40,2655 1 2656 1 TCF +1

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1183	REF	22	LAST	420	40,2656	4 4735 0		CS	BIT15		
1184	REF	97	LAST	431	40,2657	7 0154 0		MASK	MPAC		
1185	REF	98	LAST	432	40,2660	54 154 0		TS	MPAC		
1186	REF	77	LAST	431	40,2661	50 002 0		INDEX	Q		
1187					40,2662	0 0001 0		TC	1		
1188					40,2663	0 0006 1	DEGCOM	EXTEND			LOADS MULTIPLIER, DOES SHORTMP, AND
1189	REF	99	LAST	432	40,2664	5 0156 0		INDEX	MPAC	+2	ADDS AUGMENTER.
1190	REF	2	LAST	431	40,2665	3 2674 0		DCA	DEGTAB		
1191	REF	100	LAST	432	40,2666	52 155 1		DXCH	MPAC		ADJUSTED ANGLE IN A
1192	REF	2	LAST	413	40,2667	0 7306 0		TC	SHORTMP		
1193	REF	9	LAST	431	40,2670	52 124 1		DXCH	SFTEMP1		
1194	REF	101	LAST	432	40,2671	20 155 1		DAS	MPAC		
1195	REF	1			40,2672	0 2702 0		TC	SCOUTEND		
1196					40,2673	05605 1	DEGTA8	OCT	05605		HI PART OF .18
1197					40,2674	03656 1		OCT	03656		LOW PART OF .18
1198					40,2675	16314 0		OCT	16314		HI PART OF .45
1199					40,2676	31463 1		OCT	31463		LO PART OF .45
1201	REF	10	LAST	432	40,2677	52 124 1	ARTOUTSF	DXCH	SFTEMP1		ASSUMES POINT AT LEFT OF DP SFCON
1202	REF	102	LAST	432	40,2700	52 155 1		MPAC			
1203	REF	1			40,2701	0 4415 0		TC	PRSHRTMP		IF C(A) = -0, SHORTMP FAILS TO GIVE -0.
1204	REF	21	LAST	425	40,2702	0 4635 0	SCOUTEND	TC	POSTJUMP		
1205	REF	2	LAST	430	40,2703	62566 0		CADR	DSPDCEND		
12051	REF	11	LAST	432	40,2704	52 124 1	AROUT1SF	DXCH	SFTEMP1		ASSUMES POINT BETWEEN HI AND LO PARTS OF
12052	REF	103	LAST	432	40,2705	52 155 1		MPAC			DP SFCON. SHIFTS RESULTS LEFT 14, BY
12053	REF	2	LAST	432	40,2706	0 4415 0		TC	PRSHPTMP		TAKING RESULTS FROM MPAC+1, MPAC+2.
12054	REF	1			40,2707	0 2711 1		TC	L14/OUT		
1206	REF	1			40,2710	0 2723 0	DP1OUTSF	TC	DPOUT		SCALES MPAC, MPAC +1 BY DP SCALE FACTOR
1207	REF	104	LAST	432	40,2711	56 156 0	L14/OUT	XCH	MPAC	+2	IN SFTEMP1, SFTEMP2. THEN SCALE RESULT
1208	REF	105	LAST	432	40,2712	56 155 0		XCH	MPAC	+1	BY B14.
1209	REF	106	LAST	432	40,2713	54 154 0		TS	MPAC		
1210	REF	2	LAST	432	40,2714	0 2702 0		TC	SCOUTEND		
1211	REF	2	LAST	432	40,2715	0 2723 0	DP2OUTSF	TC	DPOUT		SCALES MPAC, MPAC +1 BY DP SCALE FACTOR
1212	REF	3	LAST	432	40,2716	0 2702 0		TC	SCOUTEND		
1213	REF	3	LAST	432	40,2717	0 2723 0	DP3OUTSF	TC	DPOUT		ASSUMES POINT BETWEEN BITS 7-8 OF HIGH
1214	REF	11	LAST	423	40,2720	3 6241 0		CAF	SIX		LEFT BY 7, ROUNDS MPAC+2 INTO MPAC+1.
1215	REF	1			40,2721	0 3153 0		TC	TPLEFTN		SHIFT LEFT 7.
1216	REF	4	LAST	432	40,2722	0 2702 0		TC	SCOUTEND		

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12165	REF 107	LAST 432	0162	MPAC+6	=	MPAC +6	USE MPAC +6 INSTEAD OF OV FIND
1217	REF 78	LAST 432	40,2723	56 002 0	DPOUT	XCH Q	
1218	REF 1		40,2724	54 162 0		TS MPAC+6	
1219	REF 1		40,2725	0 2747 1		TC READLO	GET FRESH DATA FOR BOTH HI AND LO.
1220	REF 2	LAST 290	40,2726	0 7256 1		TC TPAGREE	MAKE DP DATA AGREE
1221	REF 2	LAST 413	40,2727	0 7102 0		TC DMP	
1222	REF 12	LAST 432	40,2730	00123 1		ADRES SFTEMP1	
1223	REF 2	LAST 433	40,2731	0 0162 1		TC MPAC+6	
R12231	THE FOLLOWING ROUTINE DISPLAYS TWO CONTIGUOUS SP POSITIVE INTEGERS						
R12232	AS TWO POSITIVE DECIMAL INTEGERS IN RXD1-RXD2 AND RXD4-RXD5 (RXD3 IS						
R12233	BLANKED). THE INTEGER IN THE LOWER NUMBERED ADDRESS IS DISPLAYED IN						
R12234	RXD1-RXD2.						
12235	REF 3	LAST 424	40,2732	0 2536 0	2INTOUT	TC 5BLANK	TO BLANK RXD3
122355	REF 2	LAST 415	40,2733	0 2413 0		TC +ON	TURN ON + SIGN
12236	REF 108	LAST 433	40,2734	3 0154 1		CA MPAC	
12237	REF 1		40,2735	0 3306 1		TC DSPDECVN	DISPLAY 1ST INTEGER (LIKE VERB AND NOUN)
122371	REF 13	LAST 431	40,2736	4 6244 1		CS THREE	
122372	REF 9	LAST 430	40,2737	50 117 0		INDEX DECOUNT	
122373	REF 6	LAST 429	40,2740	6 4317 0		AD RID1	RXD4
122374	REF 30	LAST 430	40,2741	54 777 1		TS DSPCOUNT	
122375	REF 2	LAST 433	40,2742	0 2747 1		TC READLO	GET 2ND INTEGER
122376	REF 109	LAST 433	40,2743	3 0155 0		CA MPAC +1	
122377	REF 2	LAST 433	40,2744	0 3306 1		TC DSPDECVN	DISPLAY 2ND INTEGER (LIKE VERB AND NOUN)
122378	REF 22	LAST 432	40,2745	0 4635 0		TC POSTJUMP	
122379	REF 3	LAST 432	40,2746	62570 1		CADR DSPDCEND +2	
R1224	READLO PICKS UP FRESH DATA FOR BOTH HI AND LO AND LEAVES IT IN						
R1225	MPAC, MPAC+1. THIS IS NEEDED FOR TIME DISPLAY. IT ZEROES MPAC+2, BUT						
R1226	DOES NOT FORCE TPAGREE.						
1227	REF 79	LAST 433	40,2747	56 002 0	READLO	XCH Q	
1228	REF 8	LAST 114	40,2750	54 144 1		TS TEM4	
1229	REF 7	LAST 430	40,2751	50 140 1		INDEX MIXBR	
1230			40,2752	0 2752 0		TC +0	
1231	REF 1		40,2753	0 2767 0		TC RDONOR	
1232	REF 10	LAST 433	40,2754	50 117 0		INDEX DECOUNT	
1233	REF 3	LAST 423	40,2755	3 0150 0		CA IDADITAM	GET IDADITAM ENTRY FOR COMP K OF NOUN.
1234	REF 4	LAST 423	40,2756	7 4356 1		MASK LOW11	F SUBK
1235	REF 2	LAST 423	40,2757	0 4313 1		TC SETEBANK	SET EB, LEAVE EADRES IN A.
1236			40,2760	0 0006 1	READLO1	EXTEND	MIXED NORMAL
1237	REF 126	LAST 430	40,2761	5 0000 1		INDEX A	C(ESUBK) C(E)
1238			40,2762	3 0001 0		DCA 0	C((E SUBK)+1) C(E+1)
1239	REF 110	LAST 433	40,2763	52 155 1		DXCH MPAC	
1240	REF 67	LAST 431	40,2764	3 4755 1		CAF ZFRO	
1241	REF 111	LAST 433	40,2765	54 156 1		TS MPAC	+2
1242	REF 9	LAST 433	40,2766	0 0144 0		TC TEM4	

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1243	REF	10	LAST	429	40,2767	3 0145 1	ROLO NOR	CA	NOUN ADD	E
1244	RFF	1			40,2770	0 2760 1	ENDROLO	TC	READLO1	
1245					42,3224			BANK	42	
124501	REF	3	LAST	319	42,2000			SETLOC	PINBALL3	
124502					42,3224			BANK		
12455	REF	1						COUNT*	\$\$/PIN	
1246	REF	78	LAST	430	42,3224	0 4616 1	HMSOUT	TC	BANKCALL	REAO ERESH DATA EOR HI AND LO INTO MPAC,
1247	REF	3	LAST	433	42,3225	60747 0		CADR	READLO	MPAC+1.
1248	REF	3	LAST	433	42,3226	0 7256 1		TC	TPAGREE	MAKE DP DATA AGREE
1249	REE	1			42,3227	0 3413 1		TC	SEPSECNR	LEAVE ERACT SEC/60 IN MPAC, MPAC+1.LEAVE
A1250										WHOLE MIN IN 8IT13 OF LOTEMOUT AND ABOVE
1251	REF	3	LAST	433	42,3230	0 7102 0		TC	DMP	USE ONLY ERACT SEC/60 MOD 60
1252	REF	1			42,3231	03265 0		ADRES	SECON2	MULT BY .06
1253	REF	4	LAST	424	42,3232	3 4321 0		CAF	R301	GIVES CENTI-SEC/10EXP5 MOD 60
1254	REF	31	LAST	433	42,3233	54 777 1		TS	DSPCOUNT	
1255	REF	79	LAST	434	42,3234	0 4616 1		TC	BANKCALL	DISPLAY SEC MOD 60
1256	REF	2	LAST	430	42,3235	61226 0		CADR	DSPDECHD	
1257	REF	1			42,3236	0 3431 1		TC	SEPMIN	REMOVE REST OF SECONDS
1258	REF	1			42,3237	3 3267 1		CAF	MINCON2	LEAVE FRACT MIN/60 IN MPAC+1. LEAVE
1259	REF	112	LAST	433	42,3240	56 154 1		XCH	MPAC	WHOLE HOURS IN MPAC.
1260	REE	1			42,3241	55'007 0		TS	HITEMOUT	SAVE WHOLE HOURS.
1261	REE	2	LAST	434	42,3242	3 3270 1		CAF	MINCON2 +1	
1262	REF	113	LAST	434	42,3243	56 155 0		XCH	MPAC +1	USE ONLY FRACT MIN/60 MOD 60
1263	REF	3	LAST	432	42,3244	0 4415 0		TC	PRSHRTMP	IF C(A) = -0, SHORTMP FAILS TO GIVE -0.
A1264										MULT BY .0006
1265	REE	3	LAST	424	42,3245	3 4320 1		CAF	R201	GIVES MIN/10EXP5 MOD 60
1266	REF	32	LAST	434	42,3246	54 777 1		TS	DSPCOUNT	
1267	REF	80	LAST	434	42,3247	0 4616 1		TC	BANKCALL	DISPLAY MIN MOD 60
1268	REE	3	LAST	434	42,3250	61226 0		CADR	DSPDECHD	
1269					42,3251	0 0006 1		EXTEND		MINUTES, SECONDS HAVE BEEN REMOVED
1270	REF	1			42,3252	3 3274 0		DCA	HRCO1	
1271	REF	114	LAST	434	42,3253	52 155 1		DXCH	MPAC	
1272	REF	2	LAST	434	42,3254	3 1007 1		CA	HITEMOUT	USE WHOLE HOURS
1273	REE	4	LAST	434	42,3255	0 4415 0		TC	PRSHRTMP	IF C(A) = -0, SHORTMP FAILS TO GIVE -0.
A1274										MULT BY .16384
1275	REE	7	LAST	433	42,3256	3 4317 0		CAF	R101	GIVES HOURS/10EXP5
1276	REE	33	LAST	434	42,3257	54 777 1		TS	OSPCOUNT	
1277	REF	81	LAST	434	42,3260	0 4616 1		TC	BANKCALL	USE REGULAR DSPDECHD, WITH ROUND OFF.
1278	REF	4	LAST	434	42,3261	61226 0		CADR	DSPDECHD	
1279	REE	5	LAST	430	42,3262	0 0136 0		TC	ENTEXIT	
1280					42,3263	25660 0	SECON1	20EC*	1.666666666	E-4 812* 2EXP12/6000
1280					42,3264	31742 1				
1281					42,3265	01727 1	SECON2	OCT	01727	.06 FOR SECONDS DISPLAY
1282					42,3266	01217 1		OCT	01217	
1283					42,3267	00011 1	MINCON2	OCT	00011	.0006 FOR MINUTES DISPLAY
1284					42,3270	32445 0		OCT	32445	

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1285				42,3271	02104	0	MINCON1	OCT	02104	.066..66	UPPED BY 2EXP-28
1286				42,3272	10422	1		OCT	10422		
1287				42,3273	05174	0	HRCON1	2DEC	.16384		
1287				42,3274	13261	0					
1288				42,3275	00000	1		OCT	00000		
1289				42,3276	00062	0	RNDCON	OCT	00062	.5	SEC
1290	REF	82	LAST	434	42,3277	0 4616	1	M/SOUT	TC	BANKCALL	READ FRESH DATA FOR HI AND LO INTO MPAC,
1291	REF	4	LAST	434	42,3300	60747	0		CADR	READLO	MPAC+1.
1292	REF	4	LAST	434	42,3301	0 7256	1		TC	TPAGREE	MAKE DP DATA AGREE
1293	REF	115	LAST	434	42,3302	10 154	0		CCS	MPAC	IF MAG OF (MPAC, MPAC+1) G/ 59 M 59 S,
1294					42,3303	0 3305	1		TC	+2	DISPLAY 59B59, WITH PROPER SIGN.
1295	REF	1			42,3304	0 3336	1		TC	M/SNORM	MPAC = +0. L/ 59M58.5S
1296	REF	1			42,3305	6 3373	0		AD	M/SCON1	- HI PART OF (59M58.5S) +1 FOR CCS
1297	REF	127	LAST	433	42,3306	10 000	0		CCS	A	MAG OF MPAC - HI PART OF (59M58.5S)
1298	REF	1			42,3307	0 3322	1		TC	M/SLIMIT	G/ 59M58.5S
1299	REF	2	LAST	435	42,3310	0 3336	1		TC	M/SNCRM	ORIGINAL MPAC = -0. L/ 59M58.5S
1300	REF	3	LAST	435	42,3311	0 3336	1		TC	M/SNCRM	L/ 59M58.5S
1301	REF	116	LAST	435	42,3312	10 155	1		CCS	MPAC +1	MAG OF MPAC = HI PART OF 59M58.5S
1302					42,3313	0 3315	0		TC	+2	
1303	REF	4	LAST	435	42,3314	0 3336	1		TC	M/SNCRM	MPAC+1 = +0. L/ 59M58.5S
1304	REF	1			42,3315	6 3374	1		AD	M/SCON2	- LO PART OF (59M58.5S) +1 FOR CCS
1305	REF	128	LAST	435	42,3316	10 000	0		CCS	A	MAG OF MPAC+1 - LO PART OF (59M58.5S)
1306	REF	2	LAST	435	42,3317	0 3322	1		TC	M/SLIMIT	G/ 59M58.5S
1307	REF	5	LAST	435	42,3320	0 3336	1		TC	M/SNCRM	ORIGINAL MPAC+1 = -0. L/ 59M58.5S
1308	REF	6	LAST	435	42,3321	0 3336	1		TC	M/SNORM	L/ 59M58.5S
1309	REF	117	LAST	435	42,3322	10 154	0	M/SLIMIT	CCS	MPAC	= 59M58.5S LIMIT
1310	REF	1			42,3323	3 3376	0		CAF	M/SCON3	MPAC CANNOT BE +/- 0 AT THIS POINT.
1311	REF	1			42,3324	0 3333	1		TC	+LIMIT	FORCE MPAC, MPAC+1 TO +/- 59M59.5S
1312	REF	2	LAST	435	42,3325	4 3376	1		CS	M/SCON3	
1313	REF	118	LAST	435	42,3326	54 154	0		TS	MPAC	WILL DISPLAY 59M59S IN DSPDECNR
1314	REF	3	LAST	435	42,3327	4 3377	0		CS	M/SCON3 +1	
1315	REF	119	LAST	435	42,3330	54 155	1	LIMITCOM	TS	MPAC +1	
1316	REF	1			42,3331	3 3375	0		CAF	NORMADR	SET RETURN TO M/SNORM+1.
1317	REF	2	LAST	434	42,3332	0 3414	0		TC	SEPSECNR +1	
1318	REF	120	LAST	435	42,3333	54 154	0	+LIMIT	TS	MPAC	
1319	REF	4	LAST	435	42,3334	3 3377	1		CAF	M/SCON3 +1	
1320	REF	1			42,3335	0 3330	1		TC	LIMITCOM	
1321	REF	1			42,3336	0 3400	0	M/SNORM	TC	SEPSEC	LEAVE FRACT SEC/60 IN MPAC, MPAC+1. LEAVE
A1322											WHOLE MIN IN BIT13 OF LOTEMOUT AND ABOVE
1323	REF	1			42,3337	3 3371	1		CAF	HISECON	USE ONLY FRACT SEC/60 MOD 60
1324	REF	3	LAST	432	42,3340	0 7306	0		TC	SHORTMP	MULT BY .6 + 2EXP-14
1325	REF	14	LAST	433	42,3341	4 6244	1		CS	THREF	GIVES SEC/100 MOD 60
1326	REF	34	LAST	434	42,3342	26 777	1		ADS	DSPCOUNT	DSPCOUNT ALREADY SET TO RXD1
1327	REF	83	LAST	435	42,3343	0 4616	1		TC	BANKCALL	DISPLAY SEC MOD 60 IN D4D5.
1328	REF	1			42,3344	61266	1		CADR	DSPDC2NR	
1329	REF	68	LAST	433	42,3345	3 4755	1		CAF	ZERO	
1330	REF	5	LAST	418	42,3346	54 124	1		TS	CODE	
1331	REF	23	LAST	427	42,3347	4 4752	1		CS	TWO	

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1332	REF	11	LAST	433	42,3350	50 117 0	INDEX	DECOUNT		
1333	REF	8	LAST	434	42,3351	6 4317 0	AD	R1D1	RXD3	
1334	REF	3	LAST	41B	42,3352	54 143 0	TS	COUNT		
1335	REF	84	LAST	435	42,3353	0 4616 1	TC	BANKCALL	BLANK MIDDLE CHAR	
1336	REF	3	LAST	41B	42,3354	61322 0	CADR	DSP1N		
1337	REF	2	LAST	434	42,3355	0 3431 1	TC	SEPMIN	REMOVE REST OF SECONDS	
1338	REF	121	LAST	435	42,3356	56 155 0	XCH	MPAC +1	LEAVE FRACT MIN/60 IN MPAC+1	
1339					42,3357	0 0006 1	EXTEND		USE ONLY FRACT MIN/60 MOD 60	
1340	REF	1			42,3360	7 3372 0	MP	HIMINCON	MULT BY .6 + 2EXP-7	
1341	REF	122	LAST	436	42,3361	52 155 1	DXCH	MPAC	GIVES MIN/100 MOD 60	
1342	REF	12	LAST	436	42,3362	50 117 0	INDEX	DECOUNT		
1343	REF	9	LAST	436	42,3363	3 4317 0	CAF	R1D1	RXD1	
1344	REF	35	LAST	435	42,3364	54 777 1	TS	DSPCCOUNT		
1345	REF	85	LAST	436	42,3365	0 4616 1	TC	BANKCALL	DISPLAY MIN MOD 60 IN 01D2.	
1346	REF	2	LAST	435	42,3366	61266 1	CADR	DSPDC2NR		
1347	REF	23	LAST	433	42,3367	0 4635 0	TC	POSTJUMP		
1348	REF	4	LAST	433	42,3370	62570 1	CADR	DSPDCEND +2		
1349					42,3371	23147 1	HISECON	OCT	23147	.6 + 2EXP-14
1350					42,3372	23346 1	HIMINCON	OCT	23346	.6 + 2EXP-7
1351					42,3373	77753 0	M/SCON1	OCT	77753	- HI PART OF (59M58.5S) +1
1352					42,3374	41126 1	M/SCON2	OCT	41126	- LO PART OF (59M58.5S) +1
1353	REF	7	LAST	435	42,3375	03337 0	NORMADR	ADRES	M/SNCRM +1	
1354					42,3376	00025 0	M/SCON3	OCT	00025	59M 59.5S
1355					42,3377	37016 1		OCT	37016	
1356	REF	123	LAST	436	42,3400	10 155 1	SEPSEC	CCS	MPAC +1	IF +, ROUND BY ADDING .5 SEC
1357	REF	1			42,3401	1 3410 0	TCF	POSEC		IF -, ROUND BY SUBTRACTING .5 SEC
1358	REF	2	LAST	436	42,3402	1 3410 0	TCF	POSEC		FINDS TIME IN MPAC, MPAC+1
1359					42,3403	1 3404 0	TCF	+1		ROUNDS OFF BY +/- .5 SEC
1360					42,3404	0 0006 1	EXTEND			LEAVES WHOLE MIN IN BIT13 OF
1361	REF	1			42,3405	4 3276 0	DOS	RNDCON -1		LOTEMOUT AND ABOVE.
1362	REF	124	LAST	436	42,3406	20 155 1	SEPSEC1	DAS	MPAC	LEAVES FRACT SEC/60 IN MPAC, MPAC+1.
1363	REF	3	LAST	435	42,3407	1 3413 0	TCF	SEPSECNR		
1364					42,3410	0 0006 1	POSEC	EXTEND		
1365	REF	2	LAST	436	42,3411	3 3276 1	DCA	RNDCON -1		
1366	RFF	1			42,3412	1 3406 1	TCF	SEPSEC1		
1367	REF	80	LAST	433	42,3413	56 002 0	SEPSECNR	XCH	Q	THIS ENTRY AVOIDS ROUNDING BY .5 SEC
1368	REF	1			42,3414	54 144 1	TS	SEPSCRET		
1369	REF	4	LAST	434	42,3415	0 7102 0	TC	DMP		MULT BY 2EXP12/6000
1370	REF	1			42,3416	03263 0	ADRES	SECON1		GIVES FRACT SEC/60 IN BIT12 OF MPAC+1
1371					42,3417	0 0006 1	EXTEND			AND BELOW.
1372	REF	125	LAST	436	42,3420	3 0155 0	DCA	MPAC		SAVE MINUTES AND HOURS
1373	REF	3	LAST	434	42,3421	53 010 0	DXCH	HITEMOUT		
1374	REF	1			42,3422	0 4404 0	TC	TPSL1		
1375	REF	2	LAST	436	42,3423	0 4404 0	TC	TPSL1		GIVES FRACT SEC/60 IN MPAC+1, MPAC+2.
1376	REF	69	LAST	435	42,3424	3 4755 1	CAF	ZERO		
1377	REF	126	LAST	436	42,3425	56 156 0	XCH	MPAC +2		LEAVE FRACT SEC/60 IN MPAC, MPAC+1.

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1378	REF 127	LAST	436	42,3426	56 155 0		XCH	MPAC	+1	
1379	REF 128	LAST	437	42,3427	56 154 1		XCH	MPAC		
1380	REF 2	LAST	436	42,3430	0 0144 0		TC	SEPSCRET		
1381	REF 81	LAST	436	42,3431	56 002 0	SEPMIN	XCH	Q		FINDS WHOLE MINUTES IN BIT13
1382	REF 1			42,3432	54 144 1		TS	SEPMNRET		OF LOTEMOUT AND ABOVE.
1383	REF 1			42,3433	3 1010 1		CA	LOTEMOUT		REMOVES REST OF SECONDS.
1384				42,3434	0 0006 1		EXTEND			LEAVES FRACT MIN/60 IN MPAC+1.
1385	REF 21	LAST	314	42,3435	7 4751 1		MP	BIT3		LEAVES WHOLE HOURS IN MPAC.
1386				42,3436	0 0006 1		EXTEND			SR 12, THROW AWAY LP.
1387	REF 22	LAST	307	42,3437	7 4737 1		MP	BIT13		SR 2, TAKE FROM LP. = SL 12.
1388	REF 129	LAST	437	42,3440	22 155 0		LXCH	MPAC	+1	THIS FORCES BITS 12-1 TO 0 IF +,
A1389										FORCES BITS 12-1 TO 1 IF -.
1390	REF 4	LAST	436	42,3441	3 1007 1		CA	HITEMOUT		
1391	REF 130	LAST	437	42,3442	54 154 0		TS	MPAC		
1392	REF 5	LAST	436	42,3443	0 7102 0		TC	DMP		MULT BY 1/15
1393	REF 1			42,3444	03271 0		ADRES	MINCON1		GIVES FRACT MIN/60 IN MPAC+1.
1394	REF 2	LAST	437	42,3445	0 0144 0	ENDSPMIN	TC	SEPMNRET		GIVES WHOLE HOURS IN MPAC.

R1395 THIS IS A SPECIAL PURPOSE VERB FOR DISPLAYING A DOUBLE PRECISION AGC
 R1396 WORD AS 10 DECIMAL DIGITS ON THE AGC DISPLAY PANEL. IT CAN BE USED WITH
 R1397 ANY NCUN, EXCEPT MIXED NOUNS. IT DISPLAYS THE CONTENTS
 R1398 OF THE REGISTER NOUNADD IS POINTING TO . IF USED WITH NOUNS WHICH ARE
 R1399 INHERENTLY NOT DP SUCH AS THE CDU COUNTERS THE DISPLAY WILL BE GARBAGE.
 R1400 DISPLAY IS IN R1 AND R2 ONLY WITH THE SIGN IN R1.

1401	REF 1			40,2771			SETLOC	ENDRDLO	+1	
14015	REF 3	LAST	431 TO	434:	108 442*		COUNT*	\$/PIN		
1402	REF 8	LAST	433	40,2771	50 140 1	DSPDPDEC	INDEX	MIXBR		
1403				40,2772	0 2772 1		TC	+0		
1404				40,2773	0 2775 0		TC	+2		NORMAL NOUN
1405	REF 3	LAST	425	40,2774	0 3420 1		TC	DSPALARM		
1406				40,2775	0 0006 1		EXTEND			
1407	REF 11	LAST	434	40,2776	5 0145 1		INDEX	NOUNADD		
1408				40,2777	3 0001 0		DCA	0		
1409	REF 131	LAST	437	40,3000	52 155 1		DXCH	MPAC		
1410	REF 10	LAST	436	40,3001	3 4317 0		CAF	R1D1		
1411	REF 36	LAST	436	40,3002	54 777 1		TS	DSPCOUNT		
1412	REF 70	LAST	436	40,3003	3 4755 1		CAF	ZERO		
1413	REF 132	LAST	437	40,3004	54 156 1		TS	MPAC	+2	
1414	REF 5	LAST	435	40,3005	0 7256 1		TC	TPAGREE		
1415	REF 1			40,3006	0 3273 1		TC	DSP2DEC		
1416	REF 6	LAST	434	40,3007	0 0136 0	ENDDPDEC	TC	ENTEXIT		

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R1417 LOAD VERBS IF ALARM CONDITION IS DETECTED DURING EXECUTE,
 R1418 CHECK FAIL LIGHT IS TURNED ON AND ENDOFJOB. IF ALARM CONDITION IS
 R1419 DETECTED DURING ENTER OF DATA, CHECK FAIL IS TURNED ON AND IT RECYCLES
 R1420 TO EXECUTE OF ORIGINAL LOAD VERB. RECYCLE CAUSED BY 1) DECIMAL MACHINE
 R1421 CADR 2) MIXTURE OF OCTAL/DECIMAL DATA 3) OCTAL DATA INTO DECIMAL
 R1422 ONLY NOUN 4) DEC DATA INTO OCT ONLY NOUN 5) DATA TOO LARGE FOR SCALE
 R1423 6) FEWER THAN 3 DATA WORDS LOADED FOR HRS, MIN, SEC NOUN.8(2)-(6) ALARM
 R1424 AND RECYCLE OCCUR AT FINAL ENTER OF SET. (1) ALARM AND RECYCLE OCCUR AT
 R1425 ENTER OF CADR.

1426 REF 1 41,2616 SETLOC ENDRTOU

14265	REF	2	LAST	419	TO	431:	398	398*	COUNT*	\$/PIN	
1427	REF	24	LAST	435		41,2616	4	4752	1	ABCLD	CS TWO
1428	REF	3	LAST	427		41,2617	0	2424	1		TC COMPTST
1429	REF	1				41,2620	0	2460	1		TC NOUNTEST TEST IF NOUN CAN BE LOADED.
1430	REF	1				41,2621	3	3006	1		CAF VBSP1LD
1431	REF	2	LAST	417		41,2622	0	2337	1		TC UPDATVB -1
1432	REF	1				41,2623	0	2303	0		TC REQDATX
1433	REF	1				41,2624	3	3007	0		CAF VBSP2LD
1434	REF	3	LAST	438		41,2625	0	2337	1		TC UPDATVB -1
1435	REF	1				41,2626	0	2305	0		TC REQDATY
1436	REF	1				41,2627	3	3010	0		CAF VBSP3LD
1437	REF	4	LAST	438		41,2630	0	2337	1		TC UPDATVB -1
1438	REF	2	LAST	420		41,2631	0	2307	1		TC REQDATZ

1439	REF	12	LAST	432		41,2632	4	6241	1	PUTXYZ	CS SIX	TEST THAT THE 3 DATA WORDS LOADED ARE
1440	REF	1				41,2633	0	3011	1		TC ALLDC/OO	ALL DEC OR ALL OCT.
1441						41,2634	0	0006	1		EXTEND	
1442	REF	4	LAST	424		41,2635	3	2114	1		DCA LODNNLOC	SWITCH BANKS TO NOUN TABLE READING
1443	REF	7	LAST	430		41,2636	52	006	0		DXCH Z	ROUTINE.
1444	REF	71	LAST	437		41,2637	3	4755	1		CAF ZERO	X COMP
1445	REF	1				41,2640	0	3075	0		TC PUTCOM	
1446	REF	12	LAST	437		41,2641	50	145	1		INDEX NOUNADD	
1447						41,2642	54	000	0		TS 0	
1448	REF	38	LAST	431		41,2643	3	4753	1		CAF ONE	Y COMP
1449	REF	2	LAST	438		41,2644	0	3075	0		TC PUTCOM	
1450	REF	13	LAST	438		41,2645	50	145	1		INDEX NOUNADD	
1451						41,2646	54	001	1		TS 1	
1452	REF	25	LAST	438		41,2647	3	4752	0		CAF TWO	Z COMP
1453	REF	3	LAST	438		41,2650	0	3075	0		TC PUTCOM	
1454	REF	14	LAST	438		41,2651	50	145	1		INDEX NOUNADD	
1455						41,2652	54	002	1		TS 2	
145501	REF	2	LAST	170		41,2653	4	4757	1		CS SEVEN	IF NOUN 7 HAS JUST BEEN LOADED, SET
145502	REF	10	LAST	424		41,2654	6	1002	1		AD NOUNREG	FLAG BITS AS SPECIFIED.
145503						41,2655	0	0006	1		EXTEND	
145504						41,2656	1	2660	1		BZF +2	
145505	REF	2	LAST	419		41,2657	0	2775	0		TC LOADLV	

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145506	REF	4	LAST	429	41,2660	3 1003 0	CA	XREG	ECADR DF FLAG WORD.
145507	REF	5	LAST	424	41,2661	0 4304 1	TC	SETNCADR +1	SET FBANK, NDUNADD.
145508	REF	2	LAST	420	41,2662	3 1005 0	CA	ZREG	ZERD TO RESET BITS, NON-ZERD TO SET BITS
145509					41,2663	0 0004 0		INHINT	
14551					41,2664	0 0006 1		EXTEND	
145511	REF	1			41,2665	1 2674 1	BZF	BITSCFF	
145512	REF	15	LAST	438	41,2666	50 145 1	INDEX	NDUNADD	
145513					41,2667	4 0000 0	CS	0	
145514	REF	1			41,2670	7 1004 0	MASK	YREG	BITS TO BE PROCESSED.
145515	REF	16	LAST	439	41,2671	50 145 1	INDEX	NDUNADD	
145516					41,2672	26 000 0	ADS	0	SET BITS.
145517	REF	1			41,2673	0 2701 0	TC	BITSDFF1	
145518	REF	2	LAST	439	41,2674	4 1004 0	CS	YREG	BITS TO BE PROCESSED.
145519	REF	17	LAST	439	41,2675	50 145 1	INDEX	NDUNADD	
14552					41,2676	7 0000 0	MASK	0	
145521	REF	18	LAST	439	41,2677	50 145 1	INDEX	NDUNADD	
145522					41,2700	54 000 0	TS	0	RESET BITS.
145523					41,2701	0 0003 1	BITSOFF1	RELINT	
1456	REF	3	LAST	438	41,2702	0 2775 0	TC	LDADLV	
1457	REF	39	LAST	438	41,2703	4 4753 0	ABLOAD	CS	DNE
1458	REF	4	LAST	438	41,2704	0 2424 1	TC	CDMP TEST	
1459	REF	2	LAST	438	41,2705	0 2460 1	TC	NOUNTEST	TEST IF NDUN CAN BE LOADED.
1460	REF	2	LAST	438	41,2706	3 3006 1	CAF	VBSP1LD	
1461	REF	5	LAST	438	41,2707	0 2337 1	TC	UPDATVB -1	
1462	REF	2	LAST	438	41,2710	0 2303 0	TC	REQDATX	
1463	REF	2	LAST	438	41,2711	3 3007 0	CAF	VBSP2LD	
1464	REF	6	LAST	439	41,2712	0 2337 1	TC	UPDATVB -1	
1465	REF	2	LAST	438	41,2713	0 2305 0	TC	REQDATY	
1466	REF	9	LAST	421	41,2714	4 4756 0	PUTXY	CS	FIVE
1467	REF	2	LAST	438	41,2715	0 3011 1	TC	ALLDC/DC	TEST THAT THE 2 DATA WDRDS LOADED ARE ALL DEC DR ALL DCT.
1468					41,2716	0 0006 1		EXTEND	
1469	REF	5	LAST	438	41,2717	3 2114 1	DCA	LODNNLOC	SWITCH BANKS TO NDUN TABLE READING
1470	REF	8	LAST	438	41,2720	52 006 0	DXCH	Z	RDUTINE.
1471	REF	72	LAST	438	41,2721	3 4755 1	CAF	ZERO	X CDMP
1472	REF	4	LAST	438	41,2722	0 3075 0	TC	PUTCOM	
1473	REF	19	LAST	439	41,2723	50 145 1	INDEX	NDUNADD	
1474					41,2724	54 000 0	TS	0	
1475	REF	40	LAST	439	41,2725	3 4753 1	CAF	DNE	Y CDMP
1476	REF	5	LAST	439	41,2726	0 3075 0	TC	PUTCOM	
1477	REF	20	LAST	439	41,2727	50 145 1	INDEX	NDUNADD	
1478					41,2730	54 001 1	TS	1	
1479	REF	4	LAST	439	41,2731	0 2775 0	TC	LDADLV	
1481	REF	3	LAST	439	41,2732	0 2303 0	ALDAD	TC	REQDATX
1482					41,2733	0 0006 1		EXTEND	
1483	REF	6	LAST	439	41,2734	3 2114 1	DCA	LODNNLOC	SWITCH BANKS TO NDUN TABLE READING
1484	REF	9	LAST	439	41,2735	52 006 0	DXCH	Z	RDUTINE.
1485	REF	73	LAST	439	41,2736	3 4755 1	CAF	ZERO	X CDMP
1486	REF	6	LAST	439	41,2737	0 3075 0	TC	PUTCOM	

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1487	REF	21	LAST	439	41,2740	50 145 1		INDEX	NOUNADD	
1488					41,2741	54 000 0		TS	0	
1489	REF	5	LAST	439	41,2742	0 2775 0		TC	LOADLV	
1490	REF	41	LAST	439	41,2743	4 4753 0	BLOAD	CS	ONE	
1491	REF	5	LAST	439	41,2744	0 2424 1		TC	COMPTST	
1493	REF	23	LAST	432	41,2745	3 4735 1		CAF	BIT15	SET CLPASS FOR PASSO ONLY
1494	REF	10	LAST	420	41,2746	55'015 0		TS	CLPASS	
1495	REF	3	LAST	439	41,2747	0 2305 0		TC	REQDATY	
1496					41,2750	0 0006 1		EXTEND		
1497	REF	7	LAST	439	41,2751	3 2114 1		DCA	LODNALOC	SWITCH BANKS TO NOUN TABLE READING
1498	REF	10	LAST	439	41,2752	52 006 0		DXCH	Z	ROUTINE.
1499	REF	42	LAST	440	41,2753	3 4753 1		CAF	ONE	
1500	REF	7	LAST	439	41,2754	0 3075 0		TC	PUTCOM	
1501	REF	22	LAST	440	41,2755	50 145 1		INDEX	NOUNADD	
1502					41,2756	54 001 1		TS	1	
1503	REF	6	LAST	440	41,2757	0 2775 0		TC	LOADLV	
1504	REF	26	LAST	438	41,2760	4 4752 1	CLOAD	CS	TWO	
1505	REF	6	LAST	440	41,2761	0 2424 1		TC	COMPTST	
1507	REF	24	LAST	440	41,2762	3 4735 1		CAF	BIT15	SET CLPASS FOR PASSO ONLY
1508	REF	11	LAST	440	41,2763	55'015 0		TS	CLPASS	
1509	REF	3	LAST	438	41,2764	0 2307 1		TC	REQDATZ	
1510					41,2765	0 0006 1		EXTEND		
1511	REF	8	LAST	440	41,2766	3 2114 1		DCA	LODNALOC	SWITCH BANKS TO NOUN TABLE READING
1512	REF	11	LAST	440	41,2767	52 006 0		DXCH	Z	ROUTINE.
1513	REF	27	LAST	440	41,2770	3 4752 0		CAF	TWO	
1514	REF	8	LAST	440	41,2771	0 3075 0		TC	PUTCOM	
1515	REF	23	LAST	440	41,2772	50 145 1		INDEX	NOUNADD	
1516					41,2773	54 002 1		TS	2	
1517	REF	7	LAST	440	41,2774	0 2775 0		TC	LOADLV	
1518	REF	74	LAST	439	41,2775	3 4755 1	LOADLV	CAF	ZERO	
1519	REF	13	LAST	420	41,2776	55'000 1		TS	DECBRNCH	
1520	REF	75	LAST	440	41,2777	4 4755 0		CS	ZERO	
1521	REF	1			41,3000	55'014 1		TS	LOADSTAT	
15215	REF	5	LAST	421	41,3001	0 4457 0		TC	RELDSP	RELEASE FOR PRIORITY DISPLAY PROBLEM.
1522	REF	6	LAST	424	41,3002	4 4360 1		CS	VD1	TO BLOCK NUMERICAL CHARACTERS AND
1523	REF	37	LAST	437	41,3003	54 777 1		TS	OSPCOUNT	CLEARs AFTER A COMPLETED LOAD
1524	REF	24	LAST	436	41,3004	0 4635 0		TC	POSTJUMP	AFTER COMPLETED LOAD, GO TO RECALTST
1525	REF	1			41,3005	61545 1		CADR	RECALTST	TO SEE IF THERE IS RECALL FROM ENDIDLE.
1526					41,3006	00025 0	VBSP1LD	DEC	21	VB21 = ALOAD
1527					41,3007	00026 0	VBSP2LD	DEC	22	VB22 = BLOAD
1528					41,3010	00027 1	VBSP3LD	DEC	23	VB23 = CLOAD
1529	REF	13	LAST	436	41,3011	54 117 1	ALLDC/OC	TS	DECOUNT	TESTS THAT DATA WORDS LOADED ARE EITHER
1530	REF	14	LAST	440	41,3012	4 1000 1		CS	DECBRNCH	ALL DEC OR ALL OCT. ALARMS IF NOT.
1531	REF	3	LAST	418	41,3013	54 021 0		TS	SR	

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1532	RFF	4	LAST	440	41,3014	4 0021 0	CS	SR		
1533	REF	5	LAST	441	41,3015	4 0021 0	CS	SR		
1534	REF	129	LAST	435	41,3016	10 000 0	CCS	A	SHIFTED RIGHT 2	
1535					41,3017	1 3021 0	TCF	+2	DEC COMP BITS IN LOW 3	
1536	RFF	82	LAST	437	41,3020	0 0002 0	TC	Q	SOME ONES IN LOW 3	
1537	REF	14	LAST	440	41,3021	6 0117 0	AD	DECOUNT	ALL ZEROS. ALL OCTAL. OK	
1538					41,3022	0 0006 1	EXTEND		DEC COMP = 7 FOR 3COMP, =6 FOR 2COMP	
1539					41,3023	1 3025 1	BZF	+2	(BUT IT HAS BEEN DECREMENTED BY CCS)	
1540	REF	4	LAST	428	41,3024	0 4145 0	TC	ALMCYCLE	MUST MATCH 6 FOR 3COMP, 5 FOR 2COMP.	
1541	REF	83	LAST	441	41,3025	0 0002 0	TC	Q	ALARM AND RECYCLE.	
							GOQ		ALL REQUIRED ARE DEC. OK	
1542	REF	84	LAST	441	41,3026	56 002 0	SFRUTNOR	XCH	Q	GETS SF ROUTINE NUMBER FOR NORMAL CASE
1543	RFF	1			41,3027	54 114 1	TS	EXITEM		CANT USE L FOR RETURN. TSTFORMD USES L.
1544	REF	1			41,3030	3 4347 0	CAF	MID5		
1545	REF	3	LAST	429	41,3031	7 0147 1	MASK	NNPTYTFM		
1546	REF	1			41,3032	0 4322 0	TC	RIGHT5		
1547	REF	2	LAST	441	41,3033	0 0114 0	TC	EXITEM		SF ROUTINE NUMBER IN A
1548	REF	85	LAST	441	41,3034	56 002 0	SFRUTMIX	XCH	Q	GETS SF ROUTINE NUMBER FOR MIXED CASE
1549	REF	3	LAST	441	41,3035	54 114 1	TS	EXITEM		
1550	REF	15	LAST	441	41,3036	50 117 0	INDEX	DECOUNT		
1551	REF	1			41,3037	3 3066 1	CAF	DISPLACE		PUT TC GOQ, TC RIGHT5, OR TC LEFT5 IN L
1552	REF	54	LAST	429	41,3040	54 001 1	TS	L		
1553	REF	16	LAST	441	41,3041	50 117 0	INDEX	DECOUNT		
1554	REF	2	LAST	412	41,3042	3 4346 1	CAF	LOW5		LOW5, MID5, OR HI5 IN A
1555	REF	2	LAST	319	41,3043	7 0153 1	MASK	RUTMXTM		GET HI5, MID5, OR LOW5 OF RUTMXTAB ENTRY
1556	REF	55	LAST	441	41,3044	50 001 0	INDEX	L		
1557					41,3045	0 0000 1	TC	0		
R1558	DO TC	GOQ(DECOUNT=0), DO TC	RIGHT5(DECOUNT=1), DO TC	LEFT5(DECOUNT=2).						
1559	REF	4	LAST	441	41,3046	0 0114 0	SFRET1	TC	EXITEM	SF ROUTINE NUMBER IN A
1560	REF	86	LAST	441	41,3047	56 002 0	SFCONUM	XCH	Q	GETS 2X(SF CONSTANT NUMBER)
1561	REF	5	LAST	441	41,3050	54 114 1	TS	EXITFM		
1562	REF	9	LAST	437	41,3051	50 140 1	INDEX	MIXBR		
1563					41,3052	0 3052 0	TC	+0		
1564	REF	1			41,3053	0 3071 1	TC	CONUMNOR		NORMAL NOUN
1565	REF	17	LAST	441	41,3054	50 117 0	INDEX	DECOUNT		MIXED NOUN
1566	REF	2	LAST	441	41,3055	3 3066 1	CAF	DISPLACE		
1567	REF	56	LAST	441	41,3056	54 001 1	TS	L		PUT TC GOQ, TC RIGHT5, OR TC LEFT5 IN L
1568	RFF	18	LAST	441	41,3057	50 117 0	INDEX	DECOUNT		
1569	REF	3	LAST	441	41,3060	3 4346 1	CAF	LOW5		
1570	REF	4	LAST	441	41,3061	7 0147 1	MASK	NNPTYTFM		
1571	REF	57	LAST	441	41,3062	50 001 0	INDEX	L		
1572					41,3063	0 0000 1	TC	0		
R1573	DO TC	GOQ(DECOUNT=0), DO TC	RIGHT5(DECOUNT=1), DO TC	LEFT5(DECOUNT=2).						
1574					41,3064	6 0000 1	SFRET	DOUBLE		2X(SF CONSTANT NUMBER) IN A
1575	REF	6	LAST	441	41,3065	0 0114 0	TC	EXITEM		
1576	REF	1			41,3066	0 3025 0	DISPLACE	TC	GOQ	

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1577	REF	2	LAST	441	41,3067	0 4322 0	TC	RIGHT5	
1578	REF	3	LAST	429	41,3070	0 4331 1	TC	LEFT5	
1579	REF	4	LAST	441	41,3071	3 4346 1	CONUMNOR	CAF	LOW5
1580	REF	5	LAST	441	41,3072	7 0147 1		MASK	NNPTYTEM
1581					41,3073	6 0000 1		DOUBLE	
1582	REF	7	LAST	441	41,3074	0 0114 0	TC	EXITEM	2X(SF CONSTANT NUMBER) IN A
1583	REF	19	LAST	441	41,3075	54 117 1	PUTCOM	TS	DECOUNT
1584	REF	87	LAST	441	41,3076	56 002 0		XCH	Q
1585	REF	1			41,3077	54 115 0		TS	DECRET
1586	REF	76	LAST	440	41,3100	3 4755 1		CAF	ZERO
1587	REF	3	LAST	433	41,3101	54 162 0		TS	MPAC+6
1588	REF	20	LAST	442	41,3102	50 117 0		INDEX	DECOUNT
1589	REF	3	LAST	418	41,3103	57'006 0		XCH	XREGLP
1590	REF	133	LAST	437	41,3104	54 155 1		TS	MPAC +1
1591	REF	21	LAST	442	41,3105	50 117 0		INDEX	DECOUNT
1592	REF	5	LAST	439	41,3106	57'003 0		XCH	XREG
1593	REF	134	LAST	442	41,3107	54 154 0		TS	MPAC
1594	REF	10	LAST	441	41,3110	50 140 1		INDEX	MIXER
1595					41,3111	0 3111 0		TC	+0
1596	REF	1			41,3112	0 3137 1		TC	PUTNORM
1597	IF MIXNOUN, PLACE ADDRESS FOR COMPONENT K INTO NOUNADD, SET EBANK BITS.								NORMAL NOUN
1598	REF	22	LAST	442	41,3113	50 117 0		INDEX	DECOUNT
1599	REF	4	LAST	433	41,3114	3 0150 0		CA	IDADITEM
1600	REF	5	LAST	433	41,3115	7 4356 1		MASK	LOW11
1601	REF	6	LAST	439	41,3116	0 4303 0		TC	SETNCADR
1602					41,3117	0 0006 1		EXTEND	
1603	REF	23	LAST	442	41,3120	60 117 0		SU	DECOUNT
1604	REF	24	LAST	440	41,3121	54 145 0		TS	NOUNADD
1605	REF	15	LAST	440	41,3122	11'000 1		CCS	DECBRNCH
1606	REF	1			41,3123	0 3174 0		TC	PUTDECSE
1607	REF	1			41,3124	0 2452 0		TC	DCSTCYC
1608	REF	3	LAST	430	41,3125	0 3034 0		TC	SFRUTMIX
1609	REF	3	LAST	429	41,3126	0 2261 0		TC	DPTEST
1610	REF	1			41,3127	0 3155 0		TC	PUTCOM2
1611									TEST FOR DP SCALE FOR OCT LOAD. IF SO,
1612									+0 INTO MAJOR PART. SET NOUNADD FOR
1613									LOADING OCTAL WORD INTO MINOR PART.
1614	REF	25	LAST	442	41,3130	24 145 1	PUTDPCOM	INCR	NOUNADD
1615	REF	26	LAST	442	41,3131	3 0145 1		CA	NOUNADD
1616	REF	24	LAST	442	41,3132	26 117 1		ADS	DECOUNT
1617	REF	77	LAST	442	41,3133	3 4755 1		CAF	ZERO
1618	REF	25	LAST	442	41,3134	50 117 0		INDEX	DECOUNT
1619					41,3135	53'777 0		TS	0
1620	REF	2	LAST	442	41,3136	0 3155 0		TC	PUTCCM2
1621	REF	2	LAST	420	41,3137	0 4311 0	PUTNORM	TC	SETNADD
1622	REF	16	LAST	442	41,3140	11'000 1		CCS	DECBRNCH

GET IDADDTAB ENTRY FOR COMPONENT K OF NOUN.
(ECADR)SUBK FOR CURRENT COMP OF NOUN
ECADR INTO NOUNCADR. SETS EB, NOUNADD.
C(NOUNADD) IN A UPON RETURN
PLACE (ESUBK)-K INTO NOUNADD

+ DEC
+0 OCTAL
TEST IF DEC ONLY BIT = 1. IF SO,
ALARM AND RECYCLE. IF NOT, CONTINUE.
NO DP
TEST FOR DP SCALE FOR OCT LOAD. IF SO,
+0 INTO MAJOR PART. SET NOUNADD FOR
LOADING OCTAL WORD INTO MINOR PART.
DP (ESUBK)-K+1 OR E+1
NOUNADD NOW SET FOR MINOR PART
(ESUBK)+1 OR E+1 INTO DECOUNT
NOUNADD SET FOR MINOR PART

ZERO MAJOR PART(ESUBK OR E)

ECADR FROM NOUNCADR. SETS EB, NOUNADD.

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1623 REF 2 LAST 442 41,3141 0 3174 0
 1624 REF 2 LAST 442 41,3142 0 2452 0
 1625 REF 3 LAST 430 41,3143 0 3026 0
 1626 REF 4 LAST 442 41,3144 0 2261 0
 1627 REF 3 LAST 442 41,3145 0 3151 1
 1628 REF 78 LAST 442 41,3146 3 4755 1
 1629 REF 26 LAST 442 41,3147 54 117 1
 1630 REF 1 41,3150 0 3130 0

TC PUTDECSF
 TC DCTSTCYC
 TC SFRUTNOR
 TC DPTEST
 TC PUTCOM2 -4
 CAF ZERO
 TS DECOUNT
 TC PUTDPCOM

+ DEC
 +0 OCTAL
 TEST IF DEC ONLY BIT = 1. IF SO,
 ALARM AND RECYCLE. IF NOT, CONTINUE.
 NO DP
 DP

1631 REF 8 LAST 429 41,3151 3 0146 1
 1632 REF 43 LAST 440 41,3152 6 4753 1
 1633 41,3153 0 0006 1
 1634 REF 1 41,3154 1 3161 0
 1635 REF 135 LAST 442 41,3155 56 154 1
 1636 REF 2 LAST 442 41,3156 0 0115 1

CA NNADTEM
 AD ONE
 EXTEND
 BZF CHANLOAD
 XCH MPAC
 TC DECRET

IF NNADTEM = -1, CHANNEL TO BE SPECIFIED

1637 REF 38 LAST 440 0777
 1638 REF 1 41,3157 02147 1
 1638 REF 1 41,3160 64101 0

PUTCOM2
 GTSFINLC
 EBANK= DSPCOUNT
 2CADR GTSFIN

1639 REF 3 LAST 438 41,3161 4 4757 1
 16391 REF 4 LAST 429 41,3162 6 1017 0
 16392 41,3163 0 0006 1
 16393 REF 8 LAST 440 41,3164 1 2775 1
 16394 REF 5 LAST 443 41,3165 3 1017 0
 1640 REF 7 LAST 429 41,3166 7 5004 1
 1641 REF 136 LAST 443 41,3167 56 154 1
 16411 41,3170 0 0006 1
 16412 REF 137 LAST 443 41,3171 5 0154 1
 1642 41,3172 01 000 0
 1643 REF 9 LAST 443 41,3173 0 2775 0

CHANLOAD CS SEVEN
 AD NOUNCADR
 EXTEND
 BZF LOADLV
 CA NOUNCADR
 MASK LOW9
 XCH MPAC
 EXTEND
 INDEX MPAC
 WRITE 0
 TC LOADLV

DONT LOAD CHAN 7. (IT = SUPERBANK).

R1644 PUTDECSF FINDS MIXBR AND DECOUNT STILL SET FROM PUTCOM

1645 REF 2 LAST 429 41,3174 0 3047 1
 1646 REF 13 LAST 433 41,3175 54 123 0
 1647 41,3176 0 0006 1
 1648 REF 1 41,3177 3 3160 0
 1649 REF 12 LAST 440 41,3200 52 006 0
 1650 REF 11 LAST 442 41,3201 50 140 1
 1651 41,3202 0 3202 1
 1652 REF 1 41,3203 0 3206 0
 1653 REF 4 LAST 442 41,3204 0 3034 0
 1654 REF 1 41,3205 0 3207 1
 1655 REF 4 LAST 443 41,3206 0 3026 0

PUTDECSF TC SFCONUM
 TS SFTEMP1
 EXTEND
 DCA GTSFINLC
 DXCH Z
 INDEX MIXBR
 TC +0
 TC PUTSFNOR
 TC SFRUTMIX
 TC PUTDCSF2
 PUTSFNOR TC SFRUTNOR

2X(SF CON NUMB) IN A
 SWITCH BANKS TO SF CONSTANT TABLE
 READING ROUTINE.
 LOADS SFTEMP1, SFTEMP2.

1656 REF 130 LAST 441 41,3207 50 000 1
 1657 REF 1 41,3210 3 3212 0

PUTDCSF2 INDEX A
 CAF SFINTABR

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1658	REF	4	LAST	430	41,3211	0 4640 1	TC	8ANKJUMP	SWITCH BANKS FOR EXPANSION ROOM
1659	REF	1			41,3212	62350 0	SFINTABR	CADR	ALARM AND RECYCLE IF DEC LOAD
A1660									WITH OCTAL ONLY NOUN.
1661	REF	1			41,3213	61106 1		CADR	8INRCUND
1662	REF	1			41,3214	61010 1		CADR	DEGINSF
1663	REF	1			41,3215	61076 1		CADR	ARTHINSF
1664	REF	1			41,3216	61114 1		CADR	DPINSF
1665	REF	1			41,3217	61141 1		CADR	DPINSF2
1666	REF	4	LAST	437	41,3220	61420 0		CADR	DSPALARM
1667	REF	2	LAST	444	41,3221	61114 1		CADR	DPINSF
1668	REF	1			41,3222	65446 1		CADR	HMSIN
1669	REF	5	LAST	444	41,3223	61420 0		CADR	DSPALARM
1671	REF	1			41,3224	61146 0		CADR	DPINSF4
16711	REF	1			41,3225	61111 1		CADR	ARTINSF
16712	REF	6	LAST	444	41,3226	61420 0		CADR	DSPALARM
16714	REF	2	LAST	444	41,3227	61010 1		CADR	DEGINSF
1672					41,3230		ENDROUTIN	EQUALS	TESTS AT END FOR 360-CDU

R1673 SCALE FACTORS FOR THOSE ROUTINES NEEDING THEM ARE AVAILABLE IN SFTEMP1.
 R1674 ALL SFIN ROUTINES USE MPAC MPAC+1. LEAVE RESULT IN A. END WITH TC DECRET

1675 REF 1 40,3010 SETLOC ENDDPDEC +1

16755 REF 4 LAST 437 TO 438: 15 457* COUNT* \$\$/PIN
 R1676 DEGINSF APPLIES 1000/180 =5.5555(10) = 5.43434(8)

1677	REF	6	LAST	437	40,3010	0 7102 0	DEGINSF	TC	DMP	SF ROUTINE FOR DEC DEGREES
1678	REF	1			40,3011	03074 1		ADRES	DEGCON1	MULT BY 5.5 5(10)X2EXP-3
1679	REF	138	LAST	443	40,3012	10 155 1		CCS	MPAC +1	THIS ROUNDS OFF MPAC+1 BEFORE SHIFT
1680	REF	20	LAST	416	40,3013	3 4741 1		CAF	8IT11	LEFT 3, AND CAUSES 360.00 TO OF/UF
1681					40,3014	0 3016 0		TC	+2	WHEN SHIFTED LEFT AND ALARM.
1682	REF	21	LAST	444	40,3015	4 4741 0		CS	8IT11	
1683	REF	139	LAST	444	40,3016	6 0155 0		AD	MPAC +1	
1684	REF	1			40,3017	0 3165 0		TC	2ROUND +2	
1685	REF	3	LAST	436	40,3020	0 4404 0		TC	TPSL1	LEFT 1
1686	REF	4	LAST	444	40,3021	0 4404 0	DEGINSF2	TC	TPSL1	LEFT 2
1687	REF	1			40,3022	0 3174 0		TC	TESTOFUF	
1688	REF	5	LAST	444	40,3023	0 4404 0		TC	TPSL1	RETURNS IF NO OF/UF (LEFT3)
1689	REF	140	LAST	444	40,3024	10 154 0		CCS	MPAC	
1690	REF	1			40,3025	0 3031 0		TC	SIGNFIX	IF+, GO TO SIGNFIX
1691	REF	2	LAST	444	40,3026	0 3031 0		TC	SIGNFIX	IF +0, GO TO SIGNFIX
1692					40,3027	4 0000 0		COM		IF -, USE -MAGNITUDE +1
1693	REF	141	LAST	444	40,3030	54 154 0		TS	MPAC	IF -0, USE +0
1694	REF	4	LAST	442	40,3031	10 162 0	SIGNFIX	CCS	MPAC+6	
1695	REF	1			40,3032	0 3070 0		TC	SCNT01	IF OVERFLOW
1696	REF	1			40,3033	0 3043 0		TC	ENDSCALE	NO OVERFLOW/UNDERFLOW
1697	REF	142	LAST	444	40,3034	10 154 0		CCS	MPAC	IF UF FORCE SIGN TO 0 EXCEPT -180
1698	REF	5	LAST	428	40,3035	0 5677 1		TC	CCSHOLE	

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1699	REF	1		40,3036	0 3066	1	TC	NEG180	
1700				40,3037	0 3040	0	TC	+1	
1701	REF	143	LAST	444	40,3040	56 154	1	XCH	MPAC
1702	REF	8	LAST	431	40,3041	7 4733	0	MASK	POS MAX
1703	REF	144	LAST	445	40,3042	54 154	0	TS	MPAC
1704	REF	12	LAST	443	40,3043	50 140	1	ENDSCALE	INDEX MIXBR
170405					40,3044	0 3044	1	TC	+0
17041					40,3045	0 3050	1	TC	+3
17042	REF	1			40,3046	0 3060	1	TC	SFMIXCAL
17043					40,3047	0 3051	0	MIXBACK	TC +2
17044	REF	1			40,3050	0 3063	1	TC	SFNORCAL
1705	REF	131	LAST	443	40,3051	4 0000	0	NORBACK	CS A
17051	REF	26	LAST	298	40,3052	6 4752	0	AD	BIT2
17052					40,3053	0 0006	1	EXTEND	
17053					40,3054	1 3056	0	BZF	+2
17054	REF	2	LAST	431	40,3055	0 2625	1	TC	360-CDU
17055	REF	25	LAST	440	40,3056	0 4635	0	ENDSCALE1	TC POST JUMP
17056	REF	4	LAST	443	40,3057	63155	0	CADR	PUTCOM2
17057	REF	86	LAST	436	40,3060	0 4616	1	SFMIXCAL	TC BANKCALL
17058	REF	5	LAST	443	40,3061	63034	0	CADR	SFRUTMIX
17059	REF	1			40,3062	0 3047	1	TC	MIXBACK
170591	REF	87	LAST	445	40,3063	0 4616	1	SFNORCAL	TC BANKCALL
170592	REF	5	LAST	443	40,3064	63026	0	CADR	SFRUTNOR
170593	REF	1			40,3065	0 3051	0	TC	NORBACK
1706	REF	9	LAST	445	40,3066	4 4733	0	NEG180	CS POS MAX
1707	REF	2	LAST	444	40,3067	0 3042	1	TC	ENDSCALE -1
1708	REF	145	LAST	445	40,3070	4 0154	0	SGNT01	CS MPAC
1709	REF	10	LAST	445	40,3071	7 4733	0	MASK	POS MAX
1710	REF	132	LAST	445	40,3072	4 0000	0	CS	A
1711	REF	3	LAST	445	40,3073	0 3042	1	TC	FNDSSCALE -1
1712					40,3074	26161	0	DEGCON1	2DEC 5.555555555 B-3
1712					40,3075	30707	1		
1715	REF	7	LAST	444	40,3076	0 7102	0	ARTHINSF	TC DMP
1716	REF	14	LAST	443	40,3077	00123	1	ADRES	SFTFMP1
1717	REF	146	LAST	445	40,3100	56 156	0	XCH	MPAC +2
1718	REF	147	LAST	445	40,3101	56 155	0	XCH	MPAC +1
1719	REF	148	LAST	445	40,3102	56 154	1	XCH	MPAC
1720					40,3103	0 0006	1	EXTEND	
1721	REF	2	LAST	444	40,3104	1 3106	1	BZF	BINROUND
1722	REF	5	LAST	441	40,3105	0 4145	0	TC	ALMCYCLE
1723	REF	2	LAST	444	40,3106	0 3163	0	BINROUND	TC 2ROUND
1724	REF	2	LAST	444	40,3107	0 3174	0	TC	TESTOFUF
1725	REF	1			40,3110	0 3056	1	TC	ENDSCALE1

IF ROUTINE NO. IS NOT CDU DEGREES,
THEN THIS IS 360 - CDU DEGREES
AND ANGLE IN MPAC MUST BE REPLACED
BY 360 DEGREES MINUS ITSELF.

IF OF FORCE SIGN TO 1

TOO LARGE A LOAD. ALARM AND RECYCLE.

RETURNS IF NO OF/UF

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17251	REF	8	LAST	445	40,3111	0 7102 0	ARTINISF	TC	DMP	SCALES MPAC, +1 BY SFTEMP1, SFTEMP2.
17252	RFF	15	LAST	445	40,3112	0 0123 1		ADRES	SFTEMP1	ROUNDS MPAC+1 INTO MPAC.
17253	RFF	3	LAST	445	40,3113	0 3106 0		TC	BINROUND	
1739	REF	9	LAST	446	40,3114	0 7102 0	DPINSF	TC	DMP	SCALES MPAC, MPAC +1 BY SFTEMP1,
1740	REF	16	LAST	446	40,3115	0 0123 1		ADRES	SFTEMP1	SFTEMP2. STORES LOW PART OF RESULT
1741	REF	149	LAST	445	40,3116	56 156 0		XCH	MPAC +2	IN (E SUBK) +1 OR E+1
1742					40,3117	6 0000 1		DOUBLE		
1743	REF	150	LAST	446	40,3120	54 156 1		TS	MPAC +2	
1744	REF	79	LAST	443	40,3121	3 4755 1		CAF	ZFRO	
1745	RFF	151	LAST	446	40,3122	6 0155 0		AD	MPAC +1	
1746	REF	3	LAST	445	40,3123	0 3165 0		TC	2ROUND +2	
1747	REF	3	LAST	445	40,3124	0 3174 0		TC	TFSTOFUF	
1748	REF	13	LAST	445	40,3125	50 140 1		INDEX	MIXBR	RETURNS IF NO OF/UF
1749					40,3126	0 3126 1		TC	+0	
1750	REF	1			40,3127	0 3137 1		TC	DPINORM	
1751	REF	27	LAST	443	40,3130	3 0117 0		CA	DECOUNT	MIXEDNOUN
1752	REF	27	LAST	442	40,3131	6 0145 1	DPINCOM	AD	NOUNADD	MIXED
1753	REF	88	LAST	442	40,3132	54 002 1		TS	Q	E SUBK
1754	REF	152	LAST	446	40,3133	56 155 0		XCH	MPAC +1	E
1755	REF	89	LAST	446	40,3134	50 002 0		INDEX	Q	
1756					40,3135	54 001 1		TS	1	PLACE LOW PART IN
1757	REF	2	LAST	445	40,3136	0 3056 1		TC	ENDSCAL1	(E SUBK) +1 MIXFD
1758	REF	80	LAST	446	40,3137	3 4755 1	DPINORM	CAF	ZERO	E +1
1759	REF	1			40,3140	0 3131 1		TC	DPINCOM	NORMAL
1760	REF	10	LAST	446	40,3141	0 7102 0	DPINSF2	TC	DMP	ASSUMES POINT BETWEEN BITS 7-8 OF HIGH
1761	REF	17	LAST	446	40,3142	0 0123 1		ADRES	SFTEMP1	PART OF SF CONST. DPINSF2 SHIFTS RESULTS
1762	REF	13	LAST	438	40,3143	3 6241 0		CAF	SIX	LEFT BY 7, ROUNDS MPAC+2 INTO MPAC+1
1763	REF	2	LAST	432	40,3144	0 3153 0		TC	TPLEFTN	SHIFT LEFT 7.
1764	REF	3	LAST	444	40,3145	0 3116 1		TC	DPINSF +2	
1765	REF	11	LAST	446	40,3146	0 7102 0	DPINSF4	TC	DMP	ASSUMES POINT BETWEEN BITS 11-12 OF HIGH
1766	REF	18	LAST	446	40,3147	0 0123 1		ADRES	SFTEMP1	PART OF SF CONST. DPINSF2 SHIFTS RESULTS
1767	REF	28	LAST	440	40,3150	3 4752 0		CAF	TWO	LEFT BY 3, ROUNDS MPAC+2 INTO MPAC+1.
1768	REF	3	LAST	446	40,3151	0 3153 0		TC	TPLEFTN	SHIFT LEFT 3.
1769	REF	4	LAST	446	40,3152	0 3116 1		TC	DPINSF +2	
1770	REF	90	LAST	446	40,3153	56 002 0	TPLEFTN	XCH	Q	SHIFTS MPAC, +1, +2 LEFT N. SETS OVFLND
1771	REF	1			40,3154	54 124 1		TS	SFTEMP2	TO +1 FOR OF, -1 FOR UF.
1772	REF	91	LAST	446	40,3155	56 002 0		XCH	Q	CALL WITH N-1 IN A.
1773	REF	19	LAST	446	40,3156	54 123 0	LEFTNCOM	TS	SFTEMP1	LOOP TIME .37 MSEC.
1774	REF	6	LAST	444	40,3157	0 4404 0		TC	TPSL1	
1775	REF	20	LAST	446	40,3160	10 123 0		CCS	SFTEMP1	
1776	REF	1			40,3161	0 3156 0		TC	LEFTNCOM	

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1777	REF	2	LAST	446	40,3162	0 0124 0		TC	SFTEMP2	
1778	REF	153	LAST	446	40,3163	56 155 0	2ROUND	XCH	MPAC	+1
1779					40,3164	6 0000 1		DOUBLE		
1780	REF	154	LAST	447	40,3165	54 155 1		TS	MPAC	+1
1781	REF	92	LAST	446	40,3166	0 0002 0		TC	Q	IF MPAC+1 DOES NOT OF/UF
1782	REF	155	LAST	447	40,3167	6 0154 1		AD	MPAC	
1783	REF	156	LAST	447	40,3170	54 154 0		TS	MPAC	
1784	REF	93	LAST	447	40,3171	0 0002 0		TC	Q	IF MPAC DOES NOT OF/UF
1785	REF	5	LAST	444	40,3172	54 162 0		TS	MPAC+6	
1786	REF	94	LAST	447	40,3173	0 0002 0	2RNDEND	TC	Q	
1787	REF	6	LAST	447	40,3174	10 162 0	TESTOFUF	CCS	MPAC+6	RETURNS IF NO OF/UF
1788	REF	6	LAST	445	40,3175	0 4145 0		TC	ALMCYCLE	OF ALARM AND RECYCLE.
1789	REF	95	LAST	447	40,3176	0 0002 0		TC	Q	
1790	REF	7	LAST	447	40,3177	0 4145 0		TC	ALMCYCLE	UF ALARM AND RECYCLE.
1791	REF	1			42,3446			SETLOC	ENDSPMIN	+1
17915	REF	2	LAST	434	TO 437:	146 146*		COUNT*	\$\$/PIN	
1792	REF	1			42,3446	0 3567 0	HMSIN	TC	ALL3DEC	IF ALL 3 WORDS WERE NOT LOADED, ALARM.
1793	REF	12	LAST	446	42,3447	0 7102 0		TC	DMP	XREG, XREGLP (=HOURS) WERE ALREADY PUT
1794	REF	1			42,3450	03530 1		ADRES	WHOLECON	INTO MPAC, MPAC+1.
1795	REF	1			42,3451	0 3537 0		TC	RND/TST	ROUND OFF TO WHOLE HRS IN MPAC+1.
1796	REF	81	LAST	446	42,3452	3 4755 1		CAF	ZERO	ALARM IF MPAC NON ZERO (G/ 16383).
1797	REF	157	LAST	447	42,3453	54 156 1		TS	MPAC	+2
1798	REF	1			42,3454	3 3532 0		CAF	HRCON	
1799	REF	158	LAST	447	42,3455	54 154 0		TS	MPAC	
1800	REF	2	LAST	447	42,3456	3 3533 1		CAF	HRCON	+1
1801	REF	159	LAST	447	42,3457	56 155 0		XCH	MPAC	+1
1802	REF	4	LAST	435	42,3460	0 7306 0		TC	SHORTMP	
1803	REF	1			42,3461	0 3550 1		TC	MPACTST	ALARM IF MPAC NON ZERO (G/ 745)
1804	REF	160	LAST	447	42,3462	52 156 1		DXCH	MPAC	+1
1805	REF	1			42,3463	52 124 1		DXCH	HITEMIN	STORE HOURS CONTRIBUTION
1806	REF	3	LAST	439	42,3464	3 1004 1		CA	YREG	PUT YREG, YREGLP INTO MPAC, +1.
1807	REF	2	LAST	117	42,3465	23'007 1		LXCH	YREGLP	
1808	REF	161	LAST	447	42,3466	52 155 1		DXCH	MPAC	
1809	REF	13	LAST	447	42,3467	0 7102 0		TC	DMP	
1810	REF	2	LAST	447	42,3470	03530 1		ADRES	WHOLECON	
1811	REF	2	LAST	447	42,3471	0 3537 0		TC	RND/TST	ROUND OFF TO WHOLE MIN IN MPAC+1
1812	REF	1			42,3472	4 3535 0		CS	59MIN	ALARM IF MPAC NON ZERO (G/16383)
1813	REF	1			42,3473	0 3555 1		TC	SIZETST	ALARM IF MPAC+1 G/ 59MIN
1814	REF	162	LAST	447	42,3474	56 155 0		XCH	MPAC	+1
1815					42,3475	0 0006 1		EXTEND		
1816	REF	1			42,3476	7 3534 1		MP	MINCON	LEAVES MINUTES CONTRIBUTION IN A,L
1817	REF	2	LAST	447	42,3477	20 124 1		DAS	HITEMIN	ADD IN MINUTES CONTRIBUTION
1818					42,3500	0 0006 1		EXTEND		IF THIS DAS OVERFLOWS, G/ 745HR,39MIN

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1819				42,3501	1 3503 0	8ZF	+2		
1820	REF	8	LAST	447	42,3502	0 4145 0	TC	ALMCYCLE	
1821	RFF	3	LAST	439	42,3503	3 1005 0	CA	ZREG	PUT ZREG, ZREGLP INTO MPAC, +1.
1822	RFF	2	LAST	117	42,3504	23 010 1	LXCH	ZREGLP	
1823	REF	163	LAST	447	42,3505	52 155 1	DXCH	MPAC	
1824	RFF	14	LAST	447	42,3506	0 7102 0	TC	DMP	
1825	RFF	3	LAST	447	42,3507	03530 1	AORES	WHOLECON	
1826	RFF	3	LAST	447	42,3510	0 3537 0	TC	RND/TST	ROUND OFF TO WHOLE CENTI-SEC IN MPAC+1
1827	REF	1			42,3511	4 3536 0	CS	59.99SEC	ALARM IF MPAC NON ZERO (G/163.83 SEC)
1828	RFF	2	LAST	447	42,3512	0 3555 1	TC	SIZETST	ALARM IF MPAC+1 G/59.99 SEC
1829	RFF	3	LAST	447	42,3513	52 124 1	DXCH	HITFMIN	ADD IN SECONDS CONTRIBUTION
1830	RFF	164	LAST	448	42,3514	20 155 1	DAS	MPAC	IF THIS DAS OVERFLOWS,
1831					42,3515	0 0006 1	EXTEND		G/ 745 HR, 39 MIN, 14.55 SEC.
1832					42,3516	1 3520 1	BZF	+2	
1833	REF	9	LAST	448	42,3517	0 4145 0	TC	ALMCYCLE	ALARM AND RECYCLE
1834	REF	82	LAST	447	42,3520	3 4755 1	CAF	ZERO	
1835	RFF	165	LAST	448	42,3521	54 156 1	TS	MPAC	+2
1836	RFF	6	LAST	437	42,3522	0 7256 1	TC	TPAGREE	
1837	RFF	166	LAST	448	42,3523	52 155 1	DXCH	MPAC	
1838	REF	28	LAST	446	42,3524	50 145 1	INDEX	NOUNADD	
1839					42,3525	52 001 1	DXCH	0	
1840	REF	26	LAST	445	42,3526	0 4635 0	TC	POSTJUMP	
1841	REF	10	LAST	443	42,3527	62775 0	CADR	LOADLV	
1842					42,3530	00006 1	WHOLECON	OCT	00006 (10EXP5/2EXP14)2EXP14
1843					42,3531	03240 1		OCT	03240
1844					42,3532	00025 0	HRCON	OCT	00025 1 HOUR IN CENTI-SEC
1845					42,3533	37100 1		OCT	37100
1846					42,3534	13560 0	MINCON	OCT	13560 1 MINUTE IN CENTI-SEC
1847					42,3535	00073 0	59MIN	OCT	00073 59 AS WHOLE
1848					42,3536	13557 1	59.99SEC	OCT	13557 5999 CENTI-SEC
1849	RFF	167	LAST	448	42,3537	56 156 0	RND/TST	XCH	MPAC +2 ROUNDS MPAC+2 INTO MPAC+1.
1850					42,3540	6 0000 1		DOUBLF	ALARMS IF MPAC NOT 0
1851	REF	168	LAST	448	42,3541	54 156 1	TS	MPAC	+2
1852	RFF	83	LAST	448	42,3542	3 4755 1	CAF	ZFRO	
1853	REF	169	LAST	448	42,3543	6 0155 0	AD	MPAC	+1
1854	REF	170	LAST	448	42,3544	54 155 1	TS	MPAC	+1
1855	RFF	84	LAST	448	42,3545	3 4755 1	CAF	ZFRO	
1856	RFF	171	LAST	448	42,3546	6 0154 1	AD	MPAC	CANT OVFLOW
1857	REF	172	LAST	448	42,3547	56 154 1		XCH	MPAC
1858	RFF	173	LAST	448	42,3550	10 154 0	MPACTST	CCS	MPAC
1859	RFF	10	LAST	448	42,3551	0 4145 0	TC	ALMCYCLF	ALARM IF MPAC NON ZERO
1860	RFF	96	LAST	447	42,3552	0 0002 0	TC	0	ALARM AND RECYCLE.
1861	RFF	11	LAST	448	42,3553	0 4145 0	TC	ALMCYCLF	ALARM AND RECYCLF.
1862	RFF	97	LAST	448	42,3554	0 0002 0	TC	0	
1863	REF	174	LAST	448	42,3555	54 156 1	SIZFTST	TS	MPAC +2 CALLED WITH - CON IN A
1864	RFF	175	LAST	448	42,3556	10 155 1		CCS	MPAC +1 GFT MAG OF MPAC+1

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1865	REF	44	LAST	443	42,3557	6 4753 1	AD	ONE		
1866					42,3560	1 3562 1	TCF	+2		
1867	REF	45	LAST	449	42,3561	6 4753 1	AD	ONE		
1868	REF	176	LAST	448	42,3562	6 0156 0	AD	MPAC	+2	
1869					42,3563	0 0006 1	EXTEND			MAG OF MPAC+1 - CON
1870					42,3564	6 3566 1	BZMF	+2		
1871	REF	12	LAST	448	42,3565	0 4145 0	TC	ALMCYCLE		MAG OF MPAC+1 G/ CON. ALARM AND RECYCLE.
1872	REF	98	LAST	448	42,3566	0 0002 0	TC	Q		MAG OF MPAC+1 L/= CON
<hr/>										
R1873	ALL3DEC TESTS THAT ALL 3 WORDS ARE LOADED IN DEC (FOR HMSIN).									
R1874	ALARM IF NOT.(TEST THAT BITS 3,4,5 OF DECBRNCH ARE ALL = 1)									
1875	REF	1			42,3567	4 3574 0	ALL3DEC	CS	OCT34BAR	GET BITS 3,4,5 IN A
1876	REF	17	LAST	442	42,3570	7 1000 1		MASK	DECBRNCH	GET BITS 3,4,5 OF DECBRNCH IN A
1877	REF	2	LAST	449	42,3571	6 3574 1		AD	OCT34BAR	BITS 3,4,5 OF DECBRNCH MUST ALL = 1
1878	REF	133	LAST	445	42,3572	10 000 0		CCS	A	
1879	REF	1			42,3573	0 3577 1		TC	FORCEV25	
1880					42,3574	77743 1	OCT34BAR	OCT	77743	
1881	REF	2	LAST	449	42,3575	0 3577 1		TC	FORCEV25	
1882	REF	99	LAST	449	42,3576	0 0002 0		TC	Q	
<hr/>										
18825	REF	2	LAST	224	42,3577	4 6010 1	FORCEV25	CS	OCT31	FORCE VERB 25 TO BE EXECUTED BY RECYCLE
18826	REF	2	LAST	420	42,3600	55'041 1		TS	VERBSAVE	IN CASE OPERATOR EXECUTED A LOWER LOAD
18827	REF	13	LAST	449	42,3601	0 4145 0		TC	ALMCYCLE	VERB. ALARM AND RECYCLE.
1883					42,3602		ENDHMSS	EQUALS		

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R1884 MCNITCR ALLOWS OTHER KEYBOARD ACTIVITY. IT IS ENDED BY VERB TERMINATE,
 R1885 VERB PROCEED WITHOUT DATA, VERB RESEQUENCE,
 R1886 ANCTHER MONITOR, OR ANY NVSUB CALL THAT PASSES THE DSPLOCK (PROVIDED
 R18861 THAT THE OPERATOR HAS SOMEHOW ALLOWED THE ENDING OF A MONITOR WHICH
 R18862 HE HAS INITIATED THROUGH THE KEYBOARD).

R1887 MCNITCR ACTION IS SUSPENDED, BUT NOT ENDED, BY ANY KEYBOARD ACTION,
 R1888 EXCEPT ERROR LIGHT RESET. IT BEGINS AGAIN WHEN KEY RELEASE IS PERFORMED.
 R1889 MCNITCR SAVES THE NOUN AND APPROPRIATE DISPLAY VERB IN MONSAVE. IT SAVES
 R1890 NCUNCADR IN MONSAVE1, IF NOUN = MACHINE CADR TO BE SPECIFIED. BIT 15 OF
 R1891 MONSAVE1 IS THE KILL MONITOR SIGNAL (KILLER BIT). BIT 14 OF MONSAVE1
 R18911 INDICATES THE CURRENT MONITOR WAS EXTERNALLY INITIATED (EXTERNAL
 R18912 MCNITCR BIT). IT IS TURNED OFF BY RELDSP AND KILMONON.

R1892 MONSAVE INDICATES IF MONITOR IS ON(+=ON, +0=OFF)
 R1893 IF MONSAVE IS +, MONITOR ENTERS NO REQUEST, BUT TURNS KILLER BIT OFF.
 R1894 IF MONSAVE IS +0, MONITOR ENTERS REQUEST AND TURNS KILLER BIT OFF.

R1895 NVSUB (IF EXTERNAL MONITOR BIT IS OFF), VB=PROCEED WITHOUT DATA,
 R1896 VB=RESEQUENCE, AND VB=TERMINATE TURN KILL MONITOR BIT ON.

R1897 IF KILLER BIT IS ON, MONREQ ENTERS NO FURTHER REQUESTS, ZEROS MONSAVE
 R1898 AND MONSAVE1 (TURNING OFF KILLER BIT AND EXTERNAL MONITOR BIT).

R1899 MCNITCR DOSENT TEST FOR MATBS SINCE NVSUB CAN HANDLE INTERNAL MATBS NOW
 1900 REF 1 41,3230 SETLOC ENDRUTIN

19005	REF	3	LAST	438	TO	444:	266	664*	COUNT*	\$\$/PIN	
1901	REF	1				41,3230	4	3237 0	CS	BIT15/14	
1902	REF	6	LAST	443		41,3231	7	1017 1	MONITOR	MASK	NCUNCADR
1903	REF	177	LAST	449		41,3232	54	155 1	MONIT1	TS	MPAC +1
19031	REF	7	LAST	437		41,3233	4	0136 1		CS	ENTEXIT
19032	REF	4	LAST	420		41,3234	6	4217 1		AD	ENDINST
19033	REF	134	LAST	449		41,3235	10	000 0		CCS	A
19034	REF	1				41,3236	0	3245 1		TC	MONIT2
19035						41,3237	60000	1	BIT15/14	OCT	60000
19036	REF	2	LAST	450		41,3240	0	3245 1		TC	MONIT2
19037	REF	38	LAST	428		41,3241	3	4736 1		CAF	BIT14
19038	REF	178	LAST	450		41,3242	26	155 1		ADS	MPAC +1
190381	REF	85	LAST	448		41,3243	3	4755 1		CAF	ZERO
190382	REF	1				41,3244	55	022 1		TS	MONSAVE2
1904	REF	3	LAST	247		41,3245	3	6073 0	MONIT2	CAF	LOW7
1905	REF	17	LAST	427		41,3246	7	1001 0		MASK	VERBREG
1906	REF	4	LAST	442		41,3247	0	4331 1		TC	LEFT5
1907	REF	5	LAST	413		41,3250	54	022 0		TS	CYL
1908	REF	6	LAST	450		41,3251	4	0022 0		CS	CYL
1909	REF	7	LAST	450		41,3252	56	022 1		XCH	CYL
1910	REF	11	LAST	438		41,3253	6	1002 1		AD	NOUNREG
1911	REF	179	LAST	450		41,3254	54	154 0		TS	MPAC
1912	REF	86	LAST	450		41,3255	3	4755 1		CAF	ZERO

TEMP STORAGE

EXTERNALLY INITIATED MONITOR,
 SET BIT 14 FOR MONSAVE1.

ZERO NVMONOPT OPTIONS

TEMP STORAGE

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1913	REF	3	LAST	411	41,3256	55'012	1	TS	DSPLCK	+0 INTO DSPLCK SO MONITOR CAN RUN.	
1914	REF	4	LAST	420	41,3257	11'042	1	CCS	CADRSTOR	TURN OFF KR LITE IF CADRSTOR AND DSPLIST	
1915					41,3260	0 3262	1	TC	+2	ARE BOTH EMPTY. (LITE COMES ON IF NEW	
1916	REF	1			41,3261	0 4502	1	TC	RELDSP1	MONITOR IS KEYED IN OVER OLD MONITOR.)	
1917					41,3262	0 0004	0	INHINT			
1918	REF	2	LAST	237	41,3263	11'020	0	CCS	MONSAVE		
1919					41,3264	0 3271	0	TC	+5	IF MONSAVE WAS +, NO REQUEST	
1920	REF	46	LAST	449	41,3265	3 4753	1	CAF	ONE	IF MONSAVE WAS 0, REQUEST MONREQ	
1921	REF	15	LAST	380	41,3266	0 5203	0	TC	WAITLIST		
1922	REF	39	LAST	443	0777			EBANK=	DSPCOUNT		
1923	REF	1			41,3267	03275	1	2CADR	MONREQ		
1923	REF	1			41,3270	62101	0				
1924	REF	180	LAST	450	41,3271	52 155	1	DXCH	MPAC	PLACE MONITOR VERB AND NOUN INTO MONSAVE	
1925	REF	3	LAST	451	41,3272	53'021	1	DXCH	MONSAVE	ZERO THE KILL MONITOR BIT	
1926					41,3273	0 0003	1	RELINT		SET UP EXTERNAL MONITOR BIT	
1927	REF	4	LAST	419	41,3274	0 0136	0	TC	ENTRET		
1928	REF	1			41,3275	0 4400	1	MONREQ	TC	LODSAMPT	CALLED BY WAITLIST
1929	REF	2	LAST	237	41,3276	11'021	1	CCS	MONSAVE1	TIME IS SNATCHED IN RUPT FOR NOUN 65	
1930					41,3277	0 3303	1	TC	+4	IF KILLER BIT = 0, ENTER REQUESTS	
1931					41,3300	0 3303	1	TC	+3	IF KILLER BIT = 0, ENTER REQUESTS	
1932	REF	1			41,3301	0 3314	1	TC	KILLMON	IF KILLER BIT = 1, NO REQUESTS	
1933	REF	2	LAST	451	41,3302	0 3314	1	TC	KILLMON	IF KILLER BIT = 1, NO REQUESTS	
1934	REF	1			41,3303	3 3320	0	CAF	MONDEL		
1935	REF	16	LAST	451	41,3304	0 5203	0	TC	WAITLIST	ENTER WAITLIST REQUEST FOR MONREQ	
1936	REF	40	LAST	451	0777			EBANK=	DSPCOUNT		
1937	REF	2	LAST	451	41,3305	03275	1	2CADR	MONREQ		
1937					41,3306	62101	0				
1938	REF	2	LAST	173	41,3307	3 4355	0	CAF	CHRPRI0		
1939	REF	5	LAST	341	41,3310	0 5072	1	TC	NOVAC	ENTER EXEC REQUEST FOR MONDO	
1940	REF	41	LAST	451	0777			EBANK=	DSPCOUNT		
1941	REF	1			41,3311	03321	1	2CADR	MONDC		
1941	REF	1			41,3312	62101	0				
1942	REF	11	LAST	397	41,3313	0 5261	1	TC	TASKOVER		
1943	REF	87	LAST	450	41,3314	3 4755	1	KILLMON	CAF	ZERO	ZERO MONSAVE AND TURN KILLER BIT OFF
1944	REF	4	LAST	451	41,3315	55'020	0	TS	MONSAVE		
1945	REF	3	LAST	451	41,3316	55'021	1	TS	MONSAVE1	TURN OFF KILL MONITOR BIT.	
1946	REF	12	LAST	451	41,3317	0 5261	1	TC	TASKOVER	TURN OFF EXTERNAL MONITOR BIT.	
1947					41,3320	00144	0	MONDEL	OCT	144	FOR 1 SEC MONITOR INTERVALS
1948	REF	4	LAST	451	41,3321	11'021	1	MONDO	CCS	MONSAVE1	CALLED BY EXEC
1949					41,3322	0 3326	0	TC	+4	IF KILLER BIT = 0, CONTINUE	
1950					41,3323	0 3326	0	TC	+3	IF KILLER BIT = 0, CONTINUE	
1951	REF	47	LAST	417	41,3324	0 5155	0	TC	ENDOFJOB	IN CASE TERMINATE CAME SINCE LAST MONREQ	
1952	REF	48	LAST	451	41,3325	0 5155	0	TC	ENDOFJOB	IN CASE TERMINATE CAME SINCE LAST MONREQ	
1953	REF	4	LAST	451	41,3326	11'012	1	CCS	DSPLCK		
1954	REF	1			41,3327	0 3351	0	TC	MONBUSY	NVSUB IS BUSY	

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1955	REE	4	LAST	450	41,3330	3 6073 0	CAF	LOW7		
1956	REE	5	LAST	451	41,3331	7 1020 0	MASK	MONSAVE		
1958	REF	1			41,3332	0 2317 0	TC	UPDATNN -1	PLACE NOUN INTO NOUNREG AND DISPLAY IT	
1960	REF	1			41,3333	3 4144 1	CAE	MID7		
1961	REE	6	LAST	452	41,3334	7 1020 0	MASK	MONSAVE	CHANGE MONITOR VERB TO DISPLAY VERB	
1962	REE	1			41,3335	6 3347 1	AD	MONREF	-DEC10, STARTING IN BIT8	
1963	REE	1			41,3336	54 023 1	TS	EDOP	RIGHT 7	
1964	REE	2	LAST	452	41,3337	3 0023 0	CA	EOOP		
1965	REE	18	LAST	450	41,3340	55'001 0	TS	VERBREG		
1966	REF	1			41,3341	3 3350 1	CAF	MONBACK	SET RETURN TO PASTEVB AFTER DATA DISPLAY	
1967	REE	5	LAST	451	41,3342	54 136 1	TS	ENTRET		
1968	REF	2	LAST	450	41,3343	4 3237 0	CS	BIT15/14		
1969	REE	5	LAST	451	41,3344	7 1021 1	MASK	MONSAVE1	PUT ECAOR INTO MPAC +2. INTACTBS WILL	
1970	REE	181	LAST	451	41,3345	54 156 1	TS	MPAC +2	DISPLAY IT AND SET NOUNCAOR, NOUNAOO,	
1971	REE	1			41,3346	0 2046 1	ENDMONDO TC	TESTNN	EBANK.	

1972 4124 BLOCK 2

197201	REE	1			4000		SETLOC	FETAG8		
197202					4124		BANK			

19725	REE	1					COUNT*	\$/PIN		
1973	REE	2	LAST	452	4124	3 4144 1	CAE	MID7		
1974	REF	2	LAST	450	4125	7 1022 1	MASK	MONSAVE2	NVMONOPT PASTE OPTION	
1975					4126	0 0006 1	EXTENO			
1976					4127	1 4131 1	8ZF	+2		
1977	REF	1			4130	0 4132 0	TC	PASTEOPT	PASTE PLEASE VERB FOR NVMONOPT	
1978	REE	7	LAST	452	4131	3 1020 1	CA	MONSAVE	PASTE MONITOR VERB - PASTE OPTION IS 0	
19782	REE	3	LAST	452	4132	54 023 1	TS	EDOP	RIGHT 7	
19783	REF	4	LAST	452	4133	3 0023 0	CA	EOOP	PLACE MONITOR VERB OR PLEASE VERB INTO	
197832	REE	88	LAST	445	4134	0 4616 1	TC	BANKCALL	VERBREG AND DISPLAY IT.	
197833	REE	7	LAST	439	4135	62337 1	CAOR	UPDATVB -1		
197835	REF	88	LAST	451	4136	3 4755 1	CAF	ZERO	ZERO REQRET SO THAT PASTED VERBS CAN	
197838	REE	10	LAST	424	4137	55'013 0	TS	REQRET	BE EXECUTED BY OPERATOR.	
19784	REE	3	LAST	452	4140	3 1022 0	CA	MONSAVE2		
19785	REF	1			4141	0 4255 1	TC	BLANKSUB	PROCESS NVMONOPT BLANK OPTION IF ANY	
19786					4142	0 4143 0	TC	+1		
19787	REE	49	LAST	451	4143	0 5155 0	ENOPASTE TC	ENDOFJOB		

1979 4144 37600 0 MID7 OCT 37600

1980	REE	1			41,3347		SETLOC	ENDMONDO +1		
19805	REE	4	LAST	450 TO	452:	79 743*	COUNT*	\$/PIN		
1981					41,3347	75377 0	MONREF	OCT	75377	-DEC10, STARTING IN BIT8
1982	REF	1			41,3350	04124 1	MONBACK	ADRES	PASTEVB	
1983	REF	2	LAST	411	41,3351	0 4374 0	MONBUSY	TC	RELDSPON	TURN KEY RELEASE LIGHT
1984	REF	50	LAST	452	41,3352	0 5155 0	TC	TC	ENDOEJOB	

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R1985 DSPFMEM IS USED TO DISPLAY (IN OCTAL) ANY FIXED REGISTER.
 R1986 IT IS USED WITH NOUN = MACHINE CADR TO BE SPECIFIED. THE FCADR OF THE
 R1987 DESIRED LOCATION IS THEN PUNCHED IN. IT HANDLES F/F (FCADR 4000-7777)

R19871 FOR BANKS L/E 27, THIS IS ENOUGH.

R19872 FOR BANKS G/E 30, THE THIRD COMPONENT OF NOUN 26 (PRIO, ADRES, BBCON)
 R19873 MUST BE PRELOADED WITH THE DESIRED SUPERBANK BITS (BITS 5,6,7).
 R19874 V23N26 SHOULD BE USED.

R19875 SUMMARY

R19876 FOR BANKS L/E 27, V27N01E(FCADR)E

R19877 FOR BANKS G/E 30, V23N26E(SUPERBITS)E V27N01E(FCADR)E

1988	REF	11	LAST	437	41,3353	3	4317	0	DSPFMEM	CAF	R1D1
1989	REF	42	LAST	451	41,3354	54	777	1		TS	DSPCOUNT
19891	REF	17	LAST	387	41,3355	3	1047	0		CA	DSPTEM1 +2
19892	REF	58	LAST	441	41,3356	54	001	1		TS	L
1990	REF	7	LAST	450	41,3357	3	1017	0		CA	NOUNCADR
1991	REF	1			41,3360	0	4651	1		TC	SUPDACAL
1992	REF	3	LAST	427	41,3361	0	3363	1		TC	DSPDCTWD
1993	REF	51	LAST	452	41,3362	0	5155	0	ENOSPF	TC	ENDOFJOB

IF F/F, DATACALL USES BANK 02 OR 03.

SUPERBANK BITS WERE PRELOADED INTO
 3RD COMPONENT OF NOUN 26.
 ORIGINAL FCADR LOADED STILL IN NOUNCADR.
 CALL WITH FCADR IN A, SUPERBITS IN L.

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P1994 WORD DISPLAY ROUTINES

1995	REF	4	LAST	446	40,3200		SETLOC	TESTOFUF	+4
19955	REF	5	LAST	444 TO 447:	120 577*		COUNT*	\$/PIN	
1996	REF	100	LAST	449	40,3200	56 002 0	DSPSIGN	XCH	Q
1997	REF	1			40,3201	54 144 1		TS	DSPWDRET
1998	REF	182	LAST	452	40,3202	10 154 0	CCS	MPAC	
1999					40,3203	0 3213 1	TC	+8D	
2000					40,3204	0 3213 1	TC	+7	
2001	REF	47	LAST	451	40,3205	6 4753 1	AD	ONE	
2002	REF	183	LAST	454	40,3206	54 154 0	TS	MPAC	
2003	REF	2	LAST	415	40,3207	0 2433 1	TC	-ON	
2004	REF	184	LAST	454	40,3210	4 0155 1	CS	MPAC	+1
2005	REF	185	LAST	454	40,3211	54 155 1	TS	MPAC	+1
2006	REF	2	LAST	454	40,3212	0 0144 0	TC	DSPWDRET	
2007	REF	3	LAST	433	40,3213	0 2413 0	TC	+ON	
2008	REF	3	LAST	454	40,3214	0 0144 0	TC	DSPWDRET	

2009					40,3215	0 0006 1	DSPRND	EXTEND		ROUND BY 5 EXP-6
2010	REF	1			40,3216	3 3261 1		DCA	DECROUND	-1
2011	REF	186	LAST	454	40,3217	20 155 1		DAS	MPAC	
2012					40,3220	0 0006 1		EXTEND		
2013					40,3221	1 3225 0		BZF	+4	
2014					40,3222	0 0006 1		EXTEND		
2015	REF	1			40,3223	3 4733 1		DCA	DPOSMAX	
2016	REF	187	LAST	454	40,3224	52 155 1		DXCH	MPAC	
2017	REF	101	LAST	454	40,3225	0 0002 0		TC	Q	

R2018 DSPDECWD CONVERTS C(MPAC, MPAC+1) INTO A SIGN AND 5 CHAR DECIMAL
 R2019 STARTING IN LOC SPECIFIED IN DSPCOUNT. IT ROUNDS BY 5 EXP-6.

2020	REF	102	LAST	454	40,3226	56 002 0	DSPDECWD	XCH	Q	
2021	REF	1			40,3227	54 115 0		TS	WDRET	
2022	REF	1			40,3230	0 3200 0		TC	DSPSIGN	
2023	REF	1			40,3231	0 3215 1		TC	DSPRND	
2024	REF	7	LAST	346	40,3232	3 4751 0		CAF	FOUR	
2025	REF	1			40,3233	54 137 0	DSPDCWD1	TS	WDCNT	
2026	REF	1			40,3234	3 4363 0		CAF	BINCON	
2027	REF	5	LAST	447	40,3235	0 7306 0		TC	SHORTMP	
2028	REF	188	LAST	454	40,3236	50 154 1	TRACE1	INDEX	MPAC	
2029	REF	3	LAST	412	40,3237	3 4066 0		CAF	RFLTAB	
2030	REF	5	LAST	442	40,3240	7 4346 0		MASK	LDW5	
2031	REF	6	LAST	435	40,3241	54 124 1		TS	CODE	
2032	REF	89	LAST	452	40,3242	3 4755 1		CAF	ZERO	
2033	REF	189	LAST	454	40,3243	56 156 0		XCH	MPAC	+2
2034	REF	190	LAST	454	40,3244	56 155 0		XCH	MPAC	+1
2035	REF	191	LAST	454	40,3245	54 154 0		TS	MPAC	
2036	REF	43	LAST	453	40,3246	56 777 0		XCH	DSPCOUNT	
2037	REF	4	LAST	436	40,3247	54 143 0	TRACEL5	TS	COUNT	
2038	REF	135	LAST	450	40,3250	10 000 0		CCS	A	DECREMENT DSPCOUNT EXCEPT AT +0

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2039	REF	44	LAST	454	40,3251	54 777 1	TS	DSPCOUNT
2040	REF	4	LAST	436	40,3252	0 3322 1	TC	DSPIN
2041	REF	2	LAST	454	40,3253	10 137 0	CCS	WDCNT
2042	REF	1			40,3254	0 3233 0	TC	DSPDCWD1
2043	REF	7	LAST	440	40,3255	4 4360 1	CS	VD1
2044	REF	45	LAST	455	40,3256	54 777 1	TS	DSPCOUNT
2045	REF	2	LAST	454	40,3257	0 0115 1	TC	WDRET

2046					40,3260	00000 1	OCT	00000
2047					40,3261	02476 0	DECROUND OCT	02476

R2048 DSPDECNR CONVERTS C(MPAC,MPAC+1) INTO A SIGN AND 5 CHAR DECIMAL
 R2049 STARTING IN LOC SPECIFIED IN DSPCOUNT. IT DOES NOT ROUND

2050	REF	103	LAST	454	40,3262	56 002 0	DSPDECNR XCH	Q
2051	REF	3	LAST	455	40,3263	54 115 0	TS	WDRET
2052	REF	2	LAST	454	40,3264	0 3200 0	TC	DSPSIGN
2053	REF	2	LAST	455	40,3265	0 3232 1	TC	DSPDCWD1 -1

R2054 DSPDC2NR CONVERTS C(MPAC,MPAC+1) INTO A SIGN AND 2 CHAR DECIMAL
 R2055 STARTING IN LOC SPECIFIED IN DSPCOUNT. IT DOES NOT ROUND

2056	REF	104	LAST	455	40,3266	56 002 0	DSPDC2NR XCH	Q
2057	REF	4	LAST	455	40,3267	54 115 0	TS	WDRET
2058	REF	3	LAST	455	40,3270	0 3200 0	TC	DSPSIGN
2059	REF	48	LAST	454	40,3271	3 4753 1	CAF	ONE
2060	REF	3	LAST	455	40,3272	0 3233 0	TC	DSPDCWD1

R2061 DSP2DEC CONVERTS C(MPAC) AND C(MPAC+1) INTO A SIGN AND 10 CHAR DECIMAL
 R2062 STARTING IN THE LCC SPECIFIED IN DSPCOUNT.

2063	REF	105	LAST	455	40,3273	56 002 0	DSP2DEC XCH	Q
2064	REF	5	LAST	455	40,3274	54 115 0	TS	WDRET
2065	REF	90	LAST	454	40,3275	3 4755 1	CAF	ZERO
2066	REF	7	LAST	454	40,3276	54 124 1	TS	CODE
2067	REF	15	LAST	435	40,3277	3 6244 0	CAF	THREE
2068	REF	3	LAST	416	40,3300	0 3404 1	TC	11DSPIN -R2 OFF
2069	REF	8	LAST	454	40,3301	3 4751 0	CAF	FOUR
2070	REF	4	LAST	455	40,3302	0 3404 1	TC	11DSPIN +R2 OFF
2071	REF	4	LAST	455	40,3303	0 3200 0	TC	DSPSIGN
2072	REF	4	LAST	434	40,3304	3 4320 1	CAF	R2D1
2073	REF	4	LAST	455	40,3305	0 3233 0	END2DEC TC	DSPDCWD1

R2074 DSPDECVN DISPLAYS C(A) UPON ENTRY AS A 2 CHAR DECIMAL BEGINNING IN THE
 R2075 DSP LOC SPECIFIED IN DSPCOUNT.
 R2076 C(A) SHOULD BE IN FORM N X 2EXP-14. THIS IS SCALED TO FORM N/100 BEFORE
 R2077 DISPLAY CONVERSION.

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2078				40,3306	0 0006 1	DSPDECVN	EXTEND		
2079	REF	1		40,3307	7 3316 1	MP	VNDSPCON	MULT BY .01	
2080	REF	192	LAST	454	40,3310	22 154 1	LXCH	MPAC	TAKE RESULTS FROM L.(MULT BY 2EXP14).
2081	REF	91	LAST	455	40,3311	3 4755 1	CAF	ZFRO	
2082	REF	193	LAST	456	40,3312	54 155 1	TS	MPAC	+1
2083	REF	106	LAST	455	40,3313	56 002 0	XCH	Q	
2084	REF	6	LAST	455	40,3314	54 115 0	TS	WDRET	
2085	REF	3	LAST	436	40,3315	0 3271 0	TC	DSPDC2NR	+3 NO SIGN, NO ROUND, 2 CHAR
2086				40,3316	00244 0	VNDSPCON	OCT	00244	.01 ROUNDED UP
2087	REF	3	LAST	433	40,3317	0 3306 1	GOVNUPDT	TC	DSPDECVN
2088	REF	27	LAST	448	40,3320	0 4635 0	TC	POSTJUMP	THIS IS NOT FOR GENERAL USE. REALLY PART
2089	REF	2	LAST	424	40,3321	62347 0	CADR	UPDAT1	+2 OF UPDATVB.
2090				40,3322		ENDECVN	EQUALS		
2091	REF	1		41,3363			SETLOC	ENDSPF	+1
20915	REF	5	LAST	452 TO 454:	12 755*		COUNT*	\$\$/PIN	
R2092	DSPOCTWD DISPLAYS C(A) UPON ENTRY AS A 5 CHAR OCT STARTING IN THE DSP								
R2093	CHAR SPECIFIED IN DSPCOUNT. IT STOPS AFTER 5 CHAR HAVE BEEN DISPLAYED.								
2094	REF	8	LAST	450	41,3363	54 022 0	DSPDOCTWD	TS	CYL
2095	REF	107	LAST	456	41,3364	56 002 0	XCH	Q	
2096	REF	7	LAST	456	41,3365	54 115 0	TS	WDRET	MUST USE SAME RETURN AS DSP2BIT.
2097	REF	39	LAST	450	41,3366	3 4736 1	CAF	BIT14	TO BLANK SIGNS
2098	REF	46	LAST	455	41,3367	26 777 1	ADS	DSPCCOUNT	
2099	REF	9	LAST	455	41,3370	3 4751 0	CAF	FOUR	
2100	REF	3	LAST	455	41,3371	54 137 0	WDAGAIN	TS	WDCNT
2101	REF	9	LAST	456	41,3372	4 0022 0	CS	CYL	
2102	REF	10	LAST	456	41,3373	4 0022 0	CS	CYL	
2103	REF	11	LAST	456	41,3374	4 0022 0	CS	CYL	
2104	REF	136	LAST	454	41,3375	4 0000 0	CS	A	
2105	REF	1		41,3376	7 4757 1		MASK	DSPMSK	
2106	REF	137	LAST	456	41,3377	50 000 1	INDEX	A	
2107	REF	4	LAST	454	41,3400	3 4066 0	CAF	RELTAB	
2108	REF	6	LAST	454	41,3401	7 4346 0	MASK	LOW5	
2109	REF	8	LAST	455	41,3402	54 124 1	TS	CODE	
2110	REF	47	LAST	456	41,3403	56 777 0	XCH	DSPCCOUNT	
2111	REF	5	LAST	454	41,3404	54 143 0	TS	COUNT	
2112	REF	138	LAST	456	41,3405	10 000 0	CCS	A	DECREMENT DSPCOUNT EXCEPT AT +0
2113	REF	48	LAST	456	41,3406	54 777 1	TS	DSPCCOUNT	
2114	REF	28	LAST	456	41,3407	0 4635 0	TC	POSTJUMP	
2115	REF	1		41,3410	61412 1		CADR	DSPOCTIN	
2116	REF	4	LAST	456	41,3411	10 137 0	OCTBACK	CCS	WDCNT
2117	REF	1		41,3412	0 3371 1		TC	WDAGAIN	
2118	REF	8	LAST	455	41,3413	4 4360 1	DSPLV	CS	VD1
2119	REF	49	LAST	456	41,3414	54 777 1	TS	DSPCCOUNT	+ TO BLOCK NUMERICAL CHARACTERS, CLEARS, AND SIGNS AFTER A COMPLETED DISPLAY.

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2120 REF 8 LAST 456 41,3415 0 0115 1 TC WDRET
 2121 REF 4 LAST 443 4757 DSPMSK = SEVEN

R2122 DSP2BIT DISPLAYS C(A) UPON ENTRY AS A 2 CHAR OCT BEGINNING IN THE DSP
 R2123 LOC SPECIFIED IN DSPCOUNT BY PRE CYCLING RIGHT C(A) AND USING THE LOGIC
 R2124 OF THE 5 CHAR OCTAL DISPLAY

2125 REF 3 LAST 247 41,3416 54 020 1 DSP2BIT TS CYR
 2126 REF 108 LAST 456 41,3417 56 002 0 XCH Q
 2127 REF 9 LAST 457 41,3420 54 115 0 TS WDRET
 2128 REF 49 LAST 455 41,3421 3 4753 1 CAF DNE
 2129 REF 5 LAST 456 41,3422 54 137 0 TS WDCNT
 2130 REF 4 LAST 457 41,3423 4 0020 1 CS CYR
 2131 REF 5 LAST 457 41,3424 4 0020 1 CS CYR
 2132 REF 6 LAST 457 41,3425 56 020 0 XCH CYR
 2133 REF 12 LAST 456 41,3426 54 022 0 TS CYL
 2134 REF 2 LAST 456 41,3427 0 3376 0 TC WDAGAIN +5

R2135 FOR DSPIN PLACE 0/25 OCT INTO COUNT, 5 BIT RELAY CODE INTO CODE. BOTH
 R2136 ARE DESTROYED. IF BIT14 OF COUNT IS 1, SIGN IS BLANKED WITH LEFT CHAR.
 R2137 FOR DSPIN1 PLACE 0,1 INTO BIT11 OF CODE, 2 INTO COUNT, REL ADDRESS OF
 R2138 DSPTAB ENTRY INTO DSREL.

2139 REF 1 40,3322 SETLOC ENDECVN

21395 REF 6 LAST 454 TO 456: 82 659* COUNT* \$\$/PIN
 2140 REF 109 LAST 457 40,3322 56 002 0 DSPIN XCH Q CANT USE L FOR RETURN, SINCE MANY OF THE
 2141 REF 1 40,3323 54 114 1 TS DSEXIT ROUTINES CALLING DSPIN USE L AS RETURN.
 2142 REF 7 LAST 456 40,3324 3 4346 1 CAF LOW5
 2143 REF 6 LAST 456 40,3325 7 0143 0 MASK COUNT
 2144 REF 6 LAST 441 40,3326 54 021 0 TS SR
 2145 REF 7 LAST 457 40,3327 56 021 1 XCH SR
 2146 REF 1 40,3330 54 141 1 TS DSREL
 2147 REF 20 LAST 310 40,3331 3 4753 1 CAF BIT1
 2148 REF 7 LAST 457 40,3332 7 0143 0 MASK COUNT
 2149 REF 139 LAST 456 40,3333 10 000 0 CCS A
 2150 40,3334 0 3336 1 TC +2 LEFT IF COUNT IS ODD
 2151 REF 1 40,3335 0 3346 0 TC DSPIN1 -1 RIGHT IF COUNT IS EVEN
 2152 REF 9 LAST 456 40,3336 56 124 0 XCH CODE
 2153 REF 1 40,3337 0 4340 1 TC SLEFT5 DOES NOT USE CYL
 2154 REF 10 LAST 457 40,3340 54 124 1 TS CDDE
 2155 REF 40 LAST 456 40,3341 3 4736 1 CAF BIT14
 2156 REF 8 LAST 457 40,3342 7 0143 0 MASK COUNT
 2157 REF 140 LAST 457 40,3343 10 000 0 CCS A
 2158 REF 29 LAST 446 40,3344 3 4752 0 CAF TWD BIT14 = 1, BLANK SIGN
 2159 REF 50 LAST 457 40,3345 6 4753 1 AD ONE BIT14 = 0, LEAVE SIGN ALONE
 2160 REF 9 LAST 457 40,3346 54 143 0 TS COUNT +0 INTO COUNT FOR RIGHT

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A2161
 A2162
 2163
 2164 REF 2 LAST 457 40,3347 0 0004 0 DSPIN1 INHINT
 2165 REF 24 LAST 418 40,3350 50 141 0 INDEX DSREL
 2166 40,3351 11'023 0 CCS DSPTAB
 2167 REF 6 LAST 444 40,3352 0 3354 0 TC +2 IF +
 2168 REF 51 LAST 457 40,3353 0 5677 1 TC CASHOLE
 2169 REF 1 40,3354 6 4753 1 AD ONE IF-
 2170 REF 10 LAST 457 40,3355 54 142 1 TS DSMAG
 2171 REF 1 40,3356 50 143 1 INDEX COUNT
 2172 40,3357 7 3400 1 MASK DSMASK
 2173 REF 11 LAST 457 40,3360 0 0006 1 EXTEND
 2174 40,3361 60 124 0 SU CODE
 2175 REF 1 40,3362 0 0006 1 EXTEND
 2176 REF 11 LAST 458 40,3363 1 3376 1 BZF DSLV SAME
 2177 REF 2 LAST 458 40,3364 50 143 1 DERNT INDEX COUNT
 2178 REF 2 LAST 458 40,3365 4 3400 1 CS DSMASK MASK WITH 77740,76037,75777, OR 74037
 2179 REF 12 LAST 458 40,3366 7 0142 1 MASK DSMAG
 2180 REF 141 LAST 457 40,3367 6 0124 0 AD CODE
 2181 REF 3 LAST 458 40,3370 4 0000 0 CS A
 2182 REF 25 LAST 458 40,3371 50 141 0 INDEX DSREL
 2183 40,3372 57'023 1 XCH DSPTAB
 2184 REF 2 LAST 458 40,3373 0 0006 1 EXTEND
 2185 REF 7 LAST 418 40,3374 6 3376 0 BZMF DSLV DSPTAB ENTRY WAS -
 2186 40,3375 25'016 1 INCR NOUT DSPTAB ENTRY WAS +
 2187 REF 2 LAST 457 40,3376 0 0003 1 DSLV RELINT
 2188 40,3377 0 0114 0 TC DSEXIT
 2189 40,3400 00037 0 DSMSK OCT 37
 2190 40,3401 01740 0 OCT 1740
 2191 40,3402 02000 0 OCT 2000
 2192 40,3403 03740 1 OCT 3740

R2192 FOR 11DSPIN, PUT REL ADDRESS OF DSPTAB ENTRY INTO A, 1 IN BIT11 OR 0 IN
 R2193 BIT11 OF CCDE.

2194 REF 4 LAST 458 40,3404 54 141 1 11DSPIN TS DSREL
 2195 REF 30 LAST 457 40,3405 3 4752 0 CAF TWO
 2196 REF 12 LAST 458 40,3406 54 143 0 TS COUNT
 2197 REF 110 LAST 457 40,3407 56 002 0 XCH Q MUST USE SAME RETURN AS DSPIN
 2198 REF 3 LAST 458 40,3410 54 114 1 TS DSEXIT
 2199 REF 2 LAST 457 40,3411 0 3347 1 TC DSPIN1

2200 REF 5 LAST 455 40,3412 0 3322 1 DSPOCTIN TC DSPIN SO DSPOCTWD DOESNT USE SWCALL
 2201 40,3413 3 3415 1 CAF +2
 2202 REF 5 LAST 444 40,3414 0 4640 1 TC BANK JUMP
 2203 REF 1 40,3415 63411 0 ENDSPCT CADR OCTBACK

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R2204 DSPALARM FINDS TC NVSUBEND IN ENTRET FOR NVSUB INITIATED ROUTINES.
 R2205 ABCRT WITH 01501.
 R2206 DSPALARM FINDS TC ENDOFJOB IN ENTRET FOR KEYBOARD INITIATED ROUTINES.
 R2207 DO TC ENTRET.

22075	REF	9	LAST	456	40,3416	4 4360	1	PREDSPAL	CS	VD1	
22076	REF	50	LAST	456	40,3417	54 777	1		TS	DSPCOUNT	
2208	REF	1			40,3420	4 3437	0	DSPALARM	CS	NVSBENDL	
2209	REF	8	LAST	450	40,3421	6 0136	0		AD	ENTEXIT	
2210					40,3422	0 0006	1			EXTEND	
2211	REF	16	LAST	412	40,3423	1 3434	0		BZF	CHARALRM +2	
22111	REF	1			40,3424	4 3436	1		CS	MONADR	IF THIS IS A MONITOR, KILL IT
22112	REF	9	LAST	459	40,3425	6 0136	0		AD	ENTEXIT	
22113					40,3426	0 0006	1			EXTEND	
22114					40,3427	1 3431	0		BZF	+2	
22115					40,3430	0 3432	1		TC	+2	
22116	REF	1			40,3431	0 4204	0		TC	KILMONON	
2212	REF	4	LAST	279	40,3432	0 4364	1	CHARALRM	TC	FALTON	NOT NVSUB INITIATED. TURN ON OPR ERROR
2213	REF	52	LAST	453	40,3433	0 5155	0		TC	ENDOFJOB	
2214	REF	2	LAST	259	40,3434	0 5652	0		TC	POODOO	
2217					40,3435	01501	1		OCT	01501	
22171	REF	2	LAST	452	40,3436	04124	1	MONADR	GENADR	PASTEVB	
2218	REF	1			40,3437	0 4202	0	NVSBENDL	TC	NVSBEND	

R2219 ALMCYCLE TURNS ON CHECK FAIL LIGHT, REDISPLAYS THE ORIGINAL VERB THAT
 R2220 WAS EXECUTED, AND RECYCLES TO EXECUTE THE ORIGINAL VERB/NOUN COMBINATION
 R2221 THAT WAS LAST EXECUTED. USED FOR BAD DATA DURING LOAD VERBS AND BY
 R2222 MCTRS. ALSO BY MMCHANG IF 2 NUMERICAL CHARACTERS WERE NOT PUNCHED IN
 R2223 FOR MM CODE.

2224	REF	3	LAST	452	4145				SETLOC	MID7	+1
22245	REF	2	LAST	452 TO 452:	17	17*			COUNT*	\$/PIN	
2225	REF	5	LAST	459	4145	0 4364	1	ALMCYCLE	TC	FALTON	TURN ON CHECK FAIL LIGHT.
2228	REF	3	LAST	449	4146	4 1041	1		CS	VERBSAVE	GET ORIGINAL VERB THAT WAS EXECUTED
2229	REF	11	LAST	452	4147	55'013	0		TS	REQRET	SET FOR ENTPASO
2230	REF	89	LAST	452	4150	0 4616	1		TC	BANKCALL	PUTS ORIGINAL VERB INTO VERBREG AND
2231	REF	8	LAST	452	4151	62337	1		CADR	UPDATVB -1	DISPLAYS IT IN VERB LIGHTS.
2232	REF	29	LAST	456	4152	0 4635	0		TC	POSTJUMP	
2233	REF	2	LAST	412	4153	62002	1	ENDALM	CADR	ENTER	

R2234 MMCHANG USES NOUN DISPLAY UNTIL ENTER. THEN IT USES MODE DISP.
 R2235 IT GOES TO MODROUT WITH THE NEW M M CODE IN A, BUT NOT DISPLAYED IN
 R2236 MM LIGHTS.
 R2237 IT DEMANDS 2 NUMERICAL CHARACTERS BE PUNCHED IN FOR NEW MM CODE.
 R2238 IF NOT, IT RECYCLES.

2239	REF	1			41,3430				SETLOC	DSP2BIT	+10D
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22395	REF	6	LAST	456	TO	457:	37	792*	COUNT*	\$\$/PIN	
2240	REF	1				41,3430	0	3452 1	TC	REQMM	
A2241											ENTPASHI ASSUMES THE TC REQMM AT MMCHANG
A2242											IF THIS MOVES AT ALL, MUST CHANGE
2243	REF	21	LAST	389		41,3431	3	4747 1	CAF	BIT5	MMADREF AT ENTPASHI.
2244	REF	51	LAST	459		41,3432	6	0777 0	AD	DSPCOUNT	OCT20 = ND2.
2245						41,3433	0	0006 1	EXTEND		DSPCOUNT MUST = -ND2.
2246						41,3434	1	3436 1	BZF	+2	DEMAND THAT 2 NUM CHAR WERE PUNCHED IN.
2247	REF	14	LAST	449		41,3435	0	4145 0	TC	ALMCYCLE	DSPCOUNT NOT= -ND2. ALARM AND RECYCLE.
2248	REF	92	LAST	456		41,3436	3	4755 1	CAF	ZERO	DSPCOUNT = -ND2.
2249	REF	12	LAST	450		41,3437	57	002 1	XCH	NOUNREG	
2250	REF	194	LAST	456		41,3440	54	154 0	TS	MPAC	
2251	REF	4	LAST	424		41,3441	3	4361 1	CAF	ND1	
2252	REF	52	LAST	460		41,3442	54	777 1	TS	DSPCOUNT	
2253	REF	90	LAST	459		41,3443	0	4616 1	TC	BANKCALL	
2254	REF	4	LAST	418		41,3444		60601 0	CADR	2BLANK	
2255	REF	10	LAST	459		41,3445	4	4360 1	CS	VD1	BLOCK NUM CHAR IN
2256	REF	53	LAST	460		41,3446	54	777 1	TS	DSPCOUNT	
2257	REF	195	LAST	460		41,3447	3	0154 1	CA	MPAC	
2258	REF	30	LAST	459		41,3450	0	4635 0	TC	POSTJUMP	
2259	REF	1				41,3451		10037 1	CADR	MODROUTB	GO THRU STANDARD LOC.

2260	REF	2	LAST	313		04,2037			MODROUTB =	V37	
2261	REF	111	LAST	458		41,3452	4	0002 1	REQMM	CS	Q
2262	REF	12	LAST	459		41,3453	55	013 0		TS	REQRET
2263	REF	5	LAST	460		41,3454	3	4361 1	CAF	ND1	
2264	REF	54	LAST	460		41,3455	54	777 1	TS	DSPCOUNT	
2265	REF	93	LAST	460		41,3456	3	4755 1	CAF	ZERO	
2266	REF	13	LAST	460		41,3457	55	002 0	TS	NOUNREG	
2267	REF	91	LAST	460		41,3460	0	4616 1	TC	BANKCALL	
2268	REF	5	LAST	460		41,3461		60601 0	CADR	2BLANK	
2269	REF	3	LAST	424		41,3462	0	4427 1	TC	FLASHON	
2270	REF	52	LAST	458		41,3463	3	4753 1	CAF	ONF	
2271	REF	18	LAST	449		41,3464	55	000 1	TS	DECBRNCH	SET FOR DEC
2272	REF	10	LAST	459		41,3465	0	0136 0	TC	ENTEXIT	

R2273 VBRQEXEC ENTERS REQUEST TO EXEC FOR ANY ADDRESS WITH ANY PRIORITY.
 R2274 IT DOES ENDOFJOB AFTER ENTERING REQUEST. DISPLAY SYST IS RELEASED.
 R2275 IT ASSUMES NOUN 26 HAS BEEN PRELOADED WITH
 R2276 COMPONENT 1 PRIORITY(BITS 10-14) BIT1=0 FOR NOVAC, BIT1=1 FOR FINDVAC.
 R2277 COMPONENT 2 JOB ADRES (12 BIT)
 R2278 COMPONENT 3 BBCON

2279	REF	21	LAST	457		41,3466	3	4753 1	VBRQEXEC	CAF	BIT1	
2280	REF	18	LAST	453		41,3467	7	1045 0		MASK	DSPTEM1	
2281	REF	142	LAST	458		41,3470	10	000 0		CCS	4	
2282	REF	1				41,3471	0	3510 0		TC	SFTVAC	IF BIT1 = 1, FINDVAC
2283	REF	1				41,3472	3	4351 1		CAF	TCNOVAC	IF BIT1 = 0, NOVAC

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2284	REF 196	LAST 460	41,3473	54 154 0	REQFX1	TS	MPAC	TC NOVAC OR TC FINDVAC INTO MPAC
2285	REF 22	LAST 460	41,3474	4 4753 0		CS	BIT1	
2286	REF 19	LAST 460	41,3475	7 1045 0		MASK	DSPTM1	
2287	REF 197	LAST 461	41,3476	54 160 1		TS	MPAC +4	PRI0 INTO MPAC+4 AS A TEMP
2288	REF 6	LAST 440	41,3477	0 4457 0	REQUESTC	TC	RELDSP	
2289	REF 5	LAST 450	41,3500	3 4217 1		CA	ENDINST	
2290	REF 198	LAST 461	41,3501	54 157 0		TS	MPAC +3	TC ENDOFJOB INTO MPAC+3
2291			41,3502	0 0006 1		EXTEND		
2292	REF 20	LAST 461	41,3503	3 1047 0		DCA	DSPTM1 +1	JOB ADRES INTO MPAC+1
2293	REF 199	LAST 461	41,3504	52 156 1		DXCH	MPAC +1	BBCON INTO MPAC+2
2294	REF 200	LAST 461	41,3505	3 0160 0		CA	MPAC +4	PRI0 IN A
2295			41,3506	0 0004 0		INHINT		
2296	REF 201	LAST 461	41,3507	0 0154 1		TC	MPAC	
2297	REF 1		41,3510	3 4354 1	SETVAC	CAF	TCFINDVC	
2298	REF 1		41,3511	0 3473 1		TC	REQFX1	

R2299 VBRQWAIT ENTERS REQUEST TO WAITLIST FOR ANY ADDRESS WITH ANY DELAY.
 R2300 IT DOES ENDOFJOB AFTER ENTERING REQUEST.DISPLAY SYST IS RELEASED.
 R2301 IT ASSUMES NOUN 26 HAS BEEN PRELOADED WITH
 R2302 COMPONENT 1 DELAY (LOW BITS)
 R2303 COMPONENT 2 TASK ADRES (12 BIT)
 R2304 COMPONENT 3 BBCON

2305	REF 1		41,3512	3 4352 1	VBRQWAIT	CAF	TCWAIT	TC WAITLIST INTO MPAC
2306	REF 202	LAST 461	41,3513	54 154 0		TS	MPAC	TIME DELAY
2307	REF 21	LAST 461	41,3514	3 1045 1		CA	DSPTM1	
2308	REF 1		41,3515	0 3476 1	ENDRQWT	TC	REQUFSTC -1	

R2309 REQUESTC WILL PUT TASK ADRES INTO MPAC+1, BBCON INTO MPAC+2,
 R2310 TC ENDOFJOB INTO MPAC+3. IT WILL TAKE TIME DELAY OUT OF MPAC+4 AND
 R2311 LEAVE IT IN A, INHINT AND TC MPAC.

2312	REF 2	LAST 459	40,3440			SETLOC	NVSBENDL +1	
23125	REF 7	LAST 457 TO 459:	78 737*			COUNT*	\$/PIN	
2313	REF 53	LAST 460	40,3440	3 4753 1	VBPROC	CAF	ONE	PROCEED WITHOUT DATA
2314	REF 2	LAST 440	40,3441	55'014 1		TS	LOADSTAT	
2315	REF 2	LAST 459	40,3442	0 4204 0		TC	KILLMONON	TURN ON KILL MONITOR BIT
2316	REF 7	LAST 461	40,3443	0 4457 0		TC	RELDSP	
2317	REF 3	LAST 419	40,3444	0 4433 1		TC	FLASHOFF	
2318	REF 2	LAST 440	40,3445	0 3545 0		TC	RECALTST	SEE IF THERE IS ANY RECALL FROM FNDIDLE

2319	REF 54	LAST 461	40,3446	4 4753 0	VBTERM	CS	ONE	
2320	REF 2	LAST 422	40,3447	0 3441 0		TC	VBPROC +1	TERM VERB SETS LOADSTAT NEG

R23201 PROCKEY PERFORMS THE SAME FUNCTION AS VBPROC. IT MUST BE CALLED UNDER
 R23202 EXECUTIVE CONTROL, WITH CHRPRIO.

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23205	REF	94	LAST	460	40,3450	3 4755 1	PROCKEY	CAF	ZERO	SET REQRET FOR ENTER PASS 0.
23206	REF	13	LAST	460	40,3451	55'013 0		TS	REQRET	
23207	REF	11	LAST	460	40,3452	4 4360 1		CS	VD1	BLOCK NUMERICAL CHARACTERS, SIGNS, CLEAR
23208	REF	55	LAST	460	40,3453	54 777 1		TS	DSPCCUNT	
23209	REF	3	LAST	461	40,3454	0 3440 1		TC	VBPROC	

R2321 VBRESEQ WAKES ENDIDLE AT SAME LINE AS FINAL ENTER OF LOAD (L+3).
 R2322 (MAIN USE IS INTENDED AS RESPONSE TO INTERNALLY INITIATED FLASHING
 R2323 DISPLAYS IN ENDIDLE. SHOULD NOT BE USED WITH LOAD VERBS, PLEASE PERFORM,
 R2324 OR PLEASE MARK VERBS BECAUSE THEY ALREADY USE L+3 IN ANOTHER CONTEXT.)

2325	REF	95	LAST	462	40,3455	4 4755 0	VBRESEQ	CS	ZERO	MAKE IT LOOK LIKE DATA IN.
2326	REF	4	LAST	462	40,3456	0 3441 0		TC	VBPROC +1	

R2327 FLASH IS TURNED OFF BY PROCEED WITHOUT DATA, TERMINATE, RESQUENCE,
 R2328 END OF LOAD.

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P2329 KEY RELEASE ROUTINE

R2330 THIS ROUTINE ALWAYS TURNS OFF THE UPACT LIGHT AND ALWAYS CLEARS DSPLOCK.

R2331 THE HIGHEST PRIDRITY FUNCTION OF THE KEY RELEASE BUTTON IS THE
 R2332 UNSUSPENDING OF A SUSPENDED MONITOR WHICH WAS EXTERNALLY INITIATED.
 R2333 THIS FUNCTION IS ACCOMPLISHED BY CLEARING DSPLOCK AND TURNING OFF
 R2334 THE KEY RELEASE LIGHT IF BOTH DSPLIST AND CADRSTOR ARE EMPTY.

R2335 IF NO SUCH MONITOR EXISTS, THEN RFLDSP IS EXECUTED TO CLEAR DSPLOCK
 R2336 AND THE EXTERNAL MONITOR BIT (FREEING THE DISPLAY SYSTEM FOR INTERNAL
 R2337 USE), TURN OFF THE KEY RELEASE LIGHT, AND WAKE UP ANY JOB IN DSPLIST.

R2338 IN ADDITION IF THERE IS A JOB IN FNDIDLE, THEN CONTROL IS TRANSFERRED
 R2339 TO PINBRNCH (IN DISPLAY INTERFACE ROUTINE) TO RE-EXECUTE THE SERIES OF
 R23391 NVSUB CALLS ETC. THAT PRECEDED THE ENDIDLF CALL STILL AWAITING RESPONSE.
 R2340 THIS FEATURE IS INTENDED FOR USE WHEN THE OPERATOR HAS BEEN REQUESTED TO
 R2341 RESPOND TO SOME INTERNAL ACTION THAT USED ENDIDLE, BUT HE HAS WRITTEN
 R2342 OVER THE INFORMATION ON THE DISPLAY PANEL BY SOME DISPLAYS OF HIS OWN
 R2343 INITIATION WHICH DO NOT SERVE AS RESPONSES. HITTING KEY RLSE WILL
 R2344 RE-ESTABLISH THE DISPLAYS TO THE STATE THEY WERE IN BEFORE HE OBSCURED
 R2345 THEM, SO THAT HE CAN SEE THE WAITING REQUEST. THIS WORKS ONLY FOR
 R2346 INTERNAL PROGRAMS THAT USED ENDIDLE THROUGH MARGARETS DISPLAY
 R2347 SUBROUTINES.

2348	REF	22	LAST	437	40,3457	4 4751	1	VBRELDSP	CS	BIT3	
2349					40,3460	0 0006	1		EXTEND		
2350	REF	11	LAST	234	40,3461	03 011	1		WAND	DSALMOUT	TURN OFF UPACT LITE
2351	REF	2	LAST	411	40,3462	10 115	0		CCS	21/22REG	OLD DSPLOCK
2352	REF	41	LAST	457	40,3463	3 4736	1		CAF	BIT14	
2353	RFF	6	LAST	452	40,3464	7 1021	1		MASK	MONSAVF1	EXTERNAL MONITOR BIT (EMB)
2354	REF	143	LAST	460	40,3465	10 000	0		CCS	A	
2355	RFF	1			40,3466	0 3475	1		TC	UNSUSPEN	OLD DSPLOCK AND EMB BOTH 1, UNSUSPEND.
2356	RFF	8	LAST	461	40,3467	0 4457	0	TSTLTS4	TC	RELDSP	NOT UNSUSPENDING EXTERNAL MONITOR,
2357	REF	5	LAST	451	40,3470	11'042	1		CCS	CADRSTOR	RELEASE DISPLAY SYSTEM AND
2358					40,3471	0 3473	1		TC	+2	DO RE-ESTABLISH IF CADRSTOR IS FULL.
2359	REF	53	LAST	459	40,3472	0 5155	0		TC	ENDOFJOB	
2360	RFF	31	LAST	460	40,3473	0 4635	0		TC	POSTJUMP	
2361	REF	4	LAST	313	40,3474	20723	0		CADR	PINBRNCH	
2362	REF	96	LAST	462	40,3475	3 4755	1	UNSUSPEN	CAF	ZERO	EXTERNAL MONITOR IS SUSPENDED,
2363	REF	5	LAST	451	40,3476	55'012	1		TS	DSPLOCK	JUST UNSUSPEND IT BY CLEARING DSPLOCK.
2364	REF	6	LAST	463	40,3477	11'042	1		CCS	CADRSTOR	TURN KEY RELEASE LIGHT OFF IF BOTH
2365	REF	54	LAST	463	40,3500	0 5155	0		TC	ENDOFJOB	CADRSTOR AND DSPLIST ARE EMPTY.
2366	REF	2	LAST	451	40,3501	0 4502	1		TC	RELDSP1	
23661	REF	55	LAST	463	40,3502	0 5155	0		TC	ENDOFJOB	

2367

40,3503

ENDRELDSP EQUALS

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R2368 NVSUB IS USED FOR SUB ROUTINE CALLS FROM WITHIN COMPUTER. IT CAN BE
R2369 USED TO CALL THE COMBINATION OF ANY DISPLAY, LOAD, OR MONITOR VERB
R2370 TOGETHER WITH ANY NOUN AVAILABLE TO THE KEYBOARD.
R23701 PLACE OVVVVVVVNNNNNN INTO A.
R23702 V-S ARE THE 7 BIT VERB CODE. N-S ARE THE 7 BIT NOUN CODE.

R23703 IF NVSUB IS CALLED WITH THE FOLLOWING NEGATIVE NUMBERS (RATHER THAN THE
R23704 VERB-NOUN CODE) IN A, THEN THE DISPLAY IS BLANKED AS FOLLOWS-
R23705 -4 FULL BLANK, -3 LEAVE MODE, -2 LEAVE MODE AND VERB, -1 BLANK R-S ONLY

R2371 NVSUB CAN BE USED WITH MACH CADR TO BE SPEC BY PLACING THE CADR INTO
R2372 MPAC+2 BEFORE THE STANDARD NVSUB CALL.

R2373 NVSUB RETURNS TO 2+ CALLING LOC AFTER PERFORMING TASK, IF DISPLAY
R2374 SYSTEM IS AVAILABLE. THE NEW NOUN AND VERB CODES ARE DISPLAYED.
R2375 IF V:S =0, THE NEW NOUN CODE IS DISPLAYED ONLY(RETURN WITH NO FURTHER
R2376 ACTION). IF N-S =0, THE NEW VERB CODE IS DISPLAYED ONLY(RETURN WITH NO
R2377 FURTHER ACTION).

R2378 IT RETURNS TO 1+ CALLING LOC WITHOUT PERFORMING TASK, IF DISPLAY
R2379 SYSTEM IS BLOCKED (NOTHING IS DISPLAYED IN THIS CASE).
R2380 IT DOES TC ABORT (WITH OCT 01501) IF IT ENCOUNTERS A DISPLAY PROGRAM
R2381 ALARM CONDITION BEFORE RETURN TO CALLER.

R2382 THE DISPLAY SYSTEM IS BLOCKED BY THE DEPRESSION OF ANY
R2383 KEY, EXCEPT ERROR LIGHT RESET
R2384 IT IS RELEASED BY THE KEY RELEASE BUTTON, ALL EXTENDED VERBS,
R2385 PROCEED WITHOUT DATA, TERMINATE, RESEQUENCE, INITIALIZE EXECUTIVE,
R2386 RECALL PART OF RECALST IF ENDIDLE WAS USED,
R2387 VB = REQUEST EXECUTIVE, VB = REQUEST WAITLIST,
R2388 MCNITCR SET UP.

R23881 THE DISPLAY SYSTEM IS ALSO BLOCKED BY THE EXTERNAL MONITOR BIT, WHICH
R23882 INDICATES AN EXTERNALLY INITIATED MONITOR IS RUNNING (SEE MONITOR)

R2389 A NVSUB CALL THAT PASSES DSPLOCK AND THE EXTERNAL MONITOR BIT ENDS OLD
R23891 MCNITCR.

R2390 DSPLOCK IS THE INTERLOCK FOR USE OF KEYBOARD AND DISPLAY SYSTEM WHICH
R2391 LOCKS OUT INTERNAL USE WHENEVER THERE IS EXTERNAL KEYBOARD ACTION.

R23911 NVSUB SHOULD BE USED TWICE IN SUCCESSION FOR :PLEASE PERFORM: SITUATIONS
R23912 (SIMILARLY FOR PLEASE MARK). FIRST PLACE THE CODED NUMBER FOR WHAT
R23913 ACTION IS DESIRED OF OPERATOR INTO THE REGISTERS REFERRED TO BY THE
R23914 :CHECKLIST: NOUN. GO TO NVSUB WITH A DISPLAY VERB AND THE :CHECKLIST:
R23915 NOUN. GO TO NVSUB AGAIN WITH THE :PLEASE PERFORM: VERB AND ZEROS IN THE
R23916 LOW 7 BITS. THIS :PASTES UP: THE :PLEASE PERFORM: VERB INTO THE VERB
R23917 LIGHTS.

R23918 NVMCNCPPT IS AN ENTRY SIMILAR TO NVSUB, BUT REQUIRING AN ADDITIONAL

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R2391B1 PARAMETER IN L. IT SHOULD BE USED ONLY WITH A MONITOR VERB-NOUN CODE IN
 R2391B2 A. AFTER EACH MONITOR DISPLAY A *PLEASE* VERB WILL BE PASTED IN THE VERB
 R2391B3 LIGHTS OR DATA WILL BE BLANKED (OR BOTH) ACCORDING TO THE OPTIONS
 R2391B4 SPECIFIED IN L. IF BITS B-14 OF L ARE OTHER THAN ZERO, THEN THEY WILL
 R2391B5 BE INTERPRETED AS A VERB CODE AND PASTED IN THE VERB LIGHTS. (THIS VERB
 R2391B6 CODE SHOULD DESIGNATE ONE OF THE *PLEASE* VERBS.) IF BITS 1-3 OF L ARE
 R2391B7 OTHER THAN ZERO, THEN THEY WILL BE USED TO BLANK DATA BY BEING FED TO
 R2391B8 BLANKSUB. IF NVMONOPT IS USED WITH A VERB OTHER THAN A MONITOR VERB,
 R2391B9 THE PARAMETER IN L HAS NO EFFECT.

R2392 NVSUB IN FIXED-FIXED PLACES 2+CALLING LOC INTO NVQTEM, TC NVSUBEND INTO
 R2393 ENTRET. (THIS WILL RESTORE OLD CALLING BANK BITS)

2394	REF	1		4154		SETLOC ENDALM +1	
23945	REF	3	LAST	459 TO 460:	7 24*	COUNT* \$\$/PIN	
2395				4154	22 007 0	NVSUB LXCH 7	ZERO NVMONOPT OPTIONS
2396	REF	1		4155	54 123 0	NVMONOPT TS NVTEMP	
2397	REF	42	LAST	463	4156 3 4736 1	CAF BIT14	
23971	REF	7	LAST	463	4157 7 1021 1	MASK MONSAVE1	EXTERNAL MONITOR BIT
23972	REF	6	LAST	463	4160 6 1012 0	AD DSPLOCK	
23973	REF	144	LAST	463	4161 10 000 0	CCS A	
23974	REF	112	LAST	460	4162 0 0002 0	TC Q	DSP SYST BLOCKED. RET TO 1+ CALLING LOC
2398	REF	55	LAST	461	4163 3 4753 1	CAF ONE	DSP SYST AVAILABLE
2399	REF	113	LAST	465	4164 6 0002 0	NVSB COM AD Q	
2400	REF	1		4165	55 037 0	TS NVQTEM	2+ CALLING LOC INTO NVQTEM
24001	REF	4	LAST	452	4166 23 022 0	LXCH MONSAVE2	STORE NVMONOPT OPTIONS
2401	REF	3	LAST	461	4167 0 4204 0	TC KILMONON	TURN ON KILL MONITOR BIT
2402	REF	1		4170	3 4201 0	NVSB COM CAF NVSBBBNK	
2403	REF	11	LAST	383	4171 56 006 1	XCH RBANK	
24031				4172	0 0006 1	EXTEND	SAVE OLD SUPERBITS
24032	REF	4	LAST	289	4173 04 007 1	ROR SUPERBNK	
2404	REF	1		4174	55 040 0	TS NVBNKTFM	
24041	REF	2	LAST	289	4175 3 4201 0	CAF PINSUPBT	
24042				4176	0 0006 1	EXTEND	
24043	REF	5	LAST	465	4177 01 007 1	WRITE SUPERBNK	
2405	REF	1		4200	0 2000 0	TC NVSUBB	GO TO NVSUB1 THRU STANDARD LOC
2406	REF	56	LAST	462	0777	EBANK= DSPCQNT	
2407	REF	2	LAST	419	4201 62101 0	NVSB BBNK BB CON NVSUB1	
24071	REF	2	LAST	465	4201	PINSUPBT = NVSBBBNK	CONTAINS THE PINBALL SUPERBITS.
2412	REF	2	LAST	465	4202 53 040 0	NVSB END DXCH NVQTEM	NVBNKTEM MUST = NVQTEM+1
2413	REF	2	LAST	298	4203 0 5165 0	TC SUPDXCHZ	OTCB WITH SUPERBIT SWITCHING
2414	REF	1		41,3516		SETLOC ENDRQWT +1	

241405 REF 7 LAST 460 TO 461: 54 B46* COUNT* \$\$/PIN
 R241412 BLANKDSP BLANKS DISPLAY ACCORDING TO OPTION NUMBER IN NVTEMP AS FOLLOWS

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R241415 -4 FULL BLANK, -3 LEAVE MODE, -2 LEAVE MODE AND VERB, -1 BLANK R-S ONLY

241419	REF	5	LAST	457	41,3516	6 4757 0	BLANKDSP	AD	SEVEN	7,8,9,OR 10 (A HAD 0,1,2,OR 3)
241422					41,3517	0 0004 0		INHINT		
241425	REF	13	LAST	458	41,3520	54 124 1		TS	CODE	BLANK SPECIFIED DSPTAB5
241429	REF	21	LAST	337	41,3521	4 4740 1		CS	BIT12	
241432	REF	14	LAST	466	41,3522	50 124 0		INDEX	CODE	
241435	REF	26	LAST	458	41,3523	57*023 1		XCH	DSPTAB	
241439	REF	145	LAST	465	41,3524	10 000 0		CCS	A	
241442	REF	8	LAST	458	41,3525	25*016 1		INCR	NOUT	
241445					41,3526	0 3527 1		TC	+1	
241449	REF	15	LAST	466	41,3527	10 124 1		CCS	CODE	
241452	REF	1			41,3530	0 3520 0		TC	BLANKDSP +2	
241455					41,3531	0 0003 1		RELINT		
241459	REF	2	LAST	465	41,3532	50 123 1		INDEX	NVTEMP	
241462					41,3533	0 3540 0		TC	+5	
241465					41,3534	0 3535 1		TC	+1	NVTEMP HAS -4 (NEVER TOUCH MODRFG)
241469	REF	19	LAST	452	41,3535	55*001 0		TS	VERBREG	-3
241472	REF	14	LAST	460	41,3536	55*002 0		TS	NOUNREG	-2
241475	REF	12	LAST	440	41,3537	55*015 0		TS	CLPASS	-1
241479	REF	12	LAST	462	41,3540	4 4360 1		CS	VD1	
241482	REF	57	LAST	465	41,3541	54 777 1		TS	DSPCOUNT	
241485	REF	4	LAST	461	41,3542	0 4433 1		TC	FLASHOFF	PROTECT AGAINST INVISIBLE FLASH
241489	REF	1			41,3543	0 3566 1		TC	ENTSET -2	ZEROS REQRET
2415	REF	2	LAST	466	41,3544	3 3570 0	NVSUB1	CAF	ENTSET	IN BANK
2416	REF	6	LAST	452	41,3545	54 136 1		TS	ENTRET	SET RETURN TO NVSUBEND
24161	REF	3	LAST	466	41,3546	10 123 0		CCS	NVTEMP	WHAT NOW
24162					41,3547	0 3553 1		TC	+4	NORMAL NVSUB CALL (EXFCUTE VN OR PASTE)
24163	REF	19	LAST	428	41,3550	0 2351 1		TC	GODSPALM	
24164	REF	2	LAST	466	41,3551	0 3516 0		TC	BLANKOSP	BLANK DISPLAY AS SPECIFIED
24165	REF	20	LAST	466	41,3552	0 2351 1		TC	GODSPALM	
2417	REF	5	LAST	452	41,3553	3 6073 0		CAF	LOW7	
2418	REF	4	LAST	466	41,3554	7 0123 0		MASK	NVTEMP	
2419	REF	203	LAST	461	41,3555	54 157 0		TS	MPAC +3	TEMP FOR NOUN (CANT USE MPAC. DSPDECVN
2420	REF	5	LAST	466	41,3556	3 0123 1		CA	NVTEMP	USES MPAC, +1, +2
2422	REF	5	LAST	452	41,3557	54 023 1		TS	EDOP	RIGHT 7
2423	REF	6	LAST	466	41,3560	3 0023 0		CA	EDOP	
2424	REF	204	LAST	466	41,3561	54 160 1		TS	MPAC +4	TEMP FOR VERB (CANT USE MPAC+1. DSPDECVN
A2425										USES MPAC, +1, +2).
2426	REF	205	LAST	466	41,3562	10 157 0		CCS	MPAC +3	TEST NOUN
2427	REF	1			41,3563	0 3571 1		TC	NVSUB2	IF NOUN NOT +0, GO ON
2428	REF	206	LAST	466	41,3564	3 0160 0		CA	MPAC +4	
2429	REF	9	LAST	459	41,3565	0 2337 1		TC	UPDATVB -1	IF NOUN = +0, DISPLAY VERB . THEN RETURN
24291	REF	57	LAST	463	41,3566	3 4755 1		CAF	ZERO	ZERO REQRET SO THAT PASTED VERBS CAN
24292	REF	14	LAST	462	41,3567	55*013 0		TS	REQRET	BE EXECUTED BY OPERATOR.
2430	REF	2	LAST	459	41,3570	0 4202 0	ENTSET	TC	NVSUBEND	
2431	REF	207	LAST	466	41,3571	10 160 1	NVSUB2	CCS	MPAC +4	TEST VERB
2432					41,3572	0 3576 0		TC	+4	IF VERB NOT +0, GO ON
2433	REF	208	LAST	466	41,3573	3 0157 1		CA	MPAC +3	

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2434	REF	2	LAST	452	41,3574	0	2317	0	TC	UPDATNN -1	IF VERB = +0, DISPLAY NOUN. THEN RETURN
2435	REF	3	LAST	466	41,3575	0	4202	0	TC	NVSUBEND	
2436	REF	209	LAST	466	41,3576	3	0156	0	CA	MPAC +2	TEMP FOR MACH CADR TO BE SPEC. (DSPDECVN
2437	REF	210	LAST	467	41,3577	54	161	0	TS	MPAC +5	USES MPAC, +1, +2)
2438	RFF	211	LAST	467	41,3600	3	0160	0	CA	MPAC +4	
2439	REF	10	LAST	466	41,3601	0	2337	1	TC	UPDATVB -1	IF BOTH NOUN AND VERB NOT +0, DISPLAY
2440	REF	212	LAST	467	41,3602	3	0157	1	CA	MPAC +3	BOTH AND GO TO ENTPASO.
2441	REF	3	LAST	467	41,3603	0	2317	0	TC	UPDATNN -1	
2442	REF	98	LAST	466	41,3604	3	4755	1	CAF	ZERO	
2443	RFF	3	LAST	461	41,3605	55	014	1	TS	LOADSTAT	SET FOR WAITING FOR DATA CONDITION
2444	REF	13	LAST	466	41,3606	55	015	0	TS	CLPASS	
2445	REF	15	LAST	466	41,3607	55	013	0	TS	REQRET	SET REQRET FOR PASS 0.
2446	REF	213	LAST	467	41,3610	3	0161	1	CA	MPAC +5	RESTORES MACH CADR TO BE SPEC TO MPAC+2
2447	REF	214	LAST	467	41,3611	54	156	1	TS	MPAC +2	FOR USE IN INTMCTBS (IN ENTPASO).
2448	REF	3	LAST	419	41,3612	0	2035	0	ENDNVSBI TC	ENTPASO	

R2449 IF INTERNAL MACH CADR TO BE SPECIFIED, MPAC+2 WILL BE PLACED INTO
 R2450 NOUNCADR IN ENTPASO (INTMCTBS).

2451	REF	4	LAST	467	4204				SETLOC NVSUBEND +2	
A24515	REF	4	LAST	465 TO	465:	24	48*		COUNT* \$\$/PIN	
2453	REF	25	LAST	440	4204	3	4735	1	KILMONON CAF	BIT15
2454	REF	8	LAST	465	4205	55	021	1	TS	MONSAVE1
A2455										FORCE BIT 15 OF MONSAVE1 TO 1.
2458	REF	114	LAST	465	4206	0	0002	0	TC	Q
										THIS IS THE KILL MONITOR BIT.
										TURN OFF BIT 14, THE EXTERNAL
										MONITOR BIT.

R2459 LOADSTAT +0 INACTIVE(WAITING FOR DATA). SET BY NVSUB
 R2460 +1 PROCEED NO DATA. SET BY SPECIAL VFRB
 R2461 -1 TERMINATE SET BY SPECIAL VERB
 R2462 -0 DATA IN SET BY END OF LOAD ROUTINE
 R2463 OR RESEQUENCE SET BY VERB 32

R2464 L TC ENDIDLE (FIXED FIXED)
 R2465 ROUTINES THAT REQUEST LOADS THROUGH NVSUB SHOULD USE ENDIDLE WHILE
 R2466 WAITING FOR THE DATA TO BE LOADED. ENDIDLE PUTS CURRENT JOB TO SLEEP.
 R2467 ENDIDLE CANNOT BE CALLED FROM ERASABLE OR F/F MEMORY,
 R2468 SINCE JOBSLEEP AND JOBWAKE CAN HANDLE ONLY FIXED BANKS.
 R2469 RECALIST TESTS LOADSTAT AND WAKES JOB UP TO,
 R2470 L+1 FOR TERMINATE
 R2471 L+2 FOR PROCEED WITHOUT DATA
 R2472 L+3 FOR DATA IN, OR RESEQUENCE
 R2473 IT DOES NOTHING IF LOADSTAT INDICATES WAITING FOR DATA.

R2474 ENDIDLE ABORTS (WITH CODE 01206) IF A SECOND JOB ATTEMPTS TO GO TO SLEEP

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R2475 IN PINBALL. IN PARTICULAR, IF AN ATTEMPT IS MADE TO GO TO ENDIDLE WHEN
 R2476 1) CADRSTOR NOT= +0. THIS IS THE CASE WHERE THE CAPACITY OF ENDIDLE IS
 R2477 EXCEEDED. (+NZ INDICATE A JOB IS ALREADY ASLEEP DUE TO ENDIDLE.)
 R2478 2) DSPLIST NOT= +0. THIS INDICATES A JOB IS ALREADY ASLEEP DUE TO
 R2479 NVSUBUSY.

2480	REF 115	LAST 467	4207	22 002 0	ENDIDLE	LXCH	Q	RETURN ADDRESS INTO L.
2481	REF 1		4210	0 4220 0		TC	ISCADR+0	ABORT IF CADRSTOR NOT= +0
2482	REF 1		4211	0 4224 1		TC	ISLIST+0	ABORT IF DSPLIST NOT= +0
2483	REF 59	LAST 453	4212	3 0001 0		CA	L	DONT SET DSPLOCK TO 1 SO CAN USE
2484	REF 4	LAST 393	4213	7 5012 0		MASK	LOWIO	ENDIDLE WITH NVSUB INITIATED MONITOR.
2485	REF 1		4214	6 0004 0		AD	FBANK	SAME STRATEGY FOR CADR AS MAKFCADR.
2486	REF 7	LAST 463	4215	55'042 1		TS	CADRSTOR	
2487	REF 2	LAST 387	4216	0 5133 0		TC	JOBSLEEP	

2488	REF 56	LAST 463	4217	0 5155 0	ENDINST	TC	ENDOFJOB	
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2489	REF 8	LAST 468	4220	11'042 1	ISCADR+0	CCS	CADRSTOR	ABORTS (CODE 01206) IF CADRSTOR NOT= +0.
2490	REF 1		4221	0 4227 1		TC	DSPABORT	RETURNS IF CADRSTOR = +0.
2491	REF 116	LAST 468	4222	0 0002 0		TC	Q	
2492	REF 2	LAST 468	4223	0 4227 1		TC	DSPABORT	

2493	REF 2	LAST 237	4224	11'043 0	ISLIST+0	CCS	DSPLIST	ABORTS (CODE 01206) IF DSPLIST NOT= +0.
2494	REF 3	LAST 468	4225	0 4227 1		TC	DSPABORT	RETURNS IF DSPLIST = +0.
2495	REF 117	LAST 468	4226	0 0002 0		TC	Q	
2496	REF 3	LAST 459	4227	0 5652 0	DSPABORT	TC	POODOO	
2497			4230	01206 1		OCT	01206	

R2498 JAMTERM ALLOWS PROGRAMS TO PERFORM THE TERMINATE FUNCTION.
 R2499 IT DOES ENDOFJOB.

2500	REF 3	LAST 465	4231	3 4201 0	JAMTERM	CAF	PINSUPBT	
2501			4232	0 0006 1		EXTEND		
25011	REF 6	LAST 465	4233	01 007 1		WRITE	SUPERBNK	
25012	REF 2	LAST 224	4234	3 4242 1		CAF	340EC	
25013	REF 16	LAST 467	4235	55'013 0		TS	REQRET	LEAVE ENTER SET FOR ENTPASSO.
2502	REF 13	LAST 466	4236	4 4360 1		CS	VD1	
2503	REF 58	LAST 466	4237	54 777 1		TS	OSPCOUNT	
2504	REF 32	LAST 463	4240	0 4635 0		TC	POSTJUMP	
2505	REF 2	LAST 422	4241	61446 0		CADR	V8TERM	
2506			4242	00042 1	340EC	DEC	34	

R2507 JAMPREC ALLOWS PROGRAMS TO PERFORM THE PROCEED/PROCEED WITHOUT DATA
 R2508 FUNCTION. IT DOES ENDOFJOB.

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2509	REF	4	LAST	468	4243	3	4201	0	JAMPROC	CAF	PINSUPBT
2510					4244	0	0006	1		EXTEND	
25101	REF	7	LAST	468	4245	01	007	1		WRITE	SUPERBNK
25102	REF	1			4246	3	4254	0		CAF	33DEC
25103	REF	17	LAST	468	4247	55	013	0		TS	REQRET
2511	REF	14	LAST	468	4250	4	4360	1		CS	VD1
2512	REF	59	LAST	468	4251	54	777	1		TS	DSPCOUNT
2513	REF	33	LAST	468	4252	0	4635	0		TC	POSTJUMP
2514	REF	5	LAST	462	4253	61440	0			CADR	VBPROC

LEAVE ENTER SET FOR ENTPASSO.

2515					4254	00041	1	33DEC	DEC	33
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R2532 BLANKSUB BLANKS ANY COMBINATION OF R1, R2, R3.

R2533 CALL WITH BLANKING CODE IN A.

R2534 BIT1=1 BLANKS R1, BIT2=1 BLANKS R2, BIT3=1 BLANKS R3.

R2535 ANY COMBINATION OF THESE BITS IS ACCEPTED.

R2536 DSPCOUNT IS RESTORED TO STATE IT WAS IN BEFORE BLANKSUB WAS EXECUTED.

2538	REF	6	LAST	466	4255	7	4757	1	BLANKSUB	MASK	SEVEN
25381	REF	6	LAST	466	4256	54	123	0		TS	NVTEMP
2539	REF	43	LAST	465	4257	3	4736	1		CAF	BIT14
2540	REF	9	LAST	467	4260	7	1021	1		MASK	MONSAVE1
25401	REF	7	LAST	465	4261	6	1012	0		AD	DSPLOCK
25402	REF	146	LAST	466	4262	10	000	0		CCS	A
25403	REF	118	LAST	468	4263	0	0002	0		TC	Q
25404	REF	119	LAST	469	4264	24	002	0		INCR	Q

STORE BLANKING CODE IN NVTEMP.

EXTERNAL MONITOR BIT

DSP SYST BLOCKED. RET TO 1+ CALLING LOC

DSP SYST AVAILABLE

SET RETURN FOR 2+ CALLING LOC

A2541											
25411	REF	7	LAST	469	4265	10	123	0		CCS	NVTEMP
25412					4266	1	4270	1		TCF	+2
25413	REF	120	LAST	469	4267	0	0002	0		TC	Q
2542	REF	121	LAST	469	4270	22	002	0		LXCH	Q
2544	REF	1			4271	3	4302	1		CAF	BLNKBBNK
2545	REF	12	LAST	465	4272	56	006	1		XCH	BBANK
25451					4273	0	0006	1		EXTEND	
25452	REF	8	LAST	469	4274	04	007	1		ROR	SUPERBNK
2546	REF	43	LAST	427	4275	52	131	0		DXCH	BUF
25461	REF	5	LAST	469	4276	3	4201	0		CAF	PINSUPBT
25462					4277	0	0006	1		EXTEND	
25463	REF	9	LAST	469	4300	01	007	1		WRITE	SUPERBNK
2547	REF	1			4301	0	3503	1		TC	BLNKSUB1

SAVE OLD SUPERBITS.

2548	REF	60	LAST	469	0777					EBANK=	DSPCOUNT
25481	REF	2	LAST	469	4302	60101	1		BLNKBBNK	BBCON	BLNKSUB1
2549					4303				ENDBLFF	EQUALS	

2550	REF	1			40,3503					SETLOC	ENDRELDS
25505	REF	8	LAST	461 TO	465:	35	772*			COUNT*	\$/PIN
2551	REF	61	LAST	469	40,3503	3	0777	0	BLNKSUB1	CA	DSPCOUNT

SAVE OLD DSPCOUNT FOR LATER RESTORATION

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25511	REF	44	LAST	469	40,3504	54 132 0	TS	BUF	+2	
25512	REF	23	LAST	461	40,3505	3 4753 1	CAF	BIT1		TEST BIT1. SEE IF R1 TO BE BLANKED.
2552	RFF	1			40,3506	0 3525 0	TC	TESTBIT		
2553	REF	12	LAST	453	40,3507	3 4317 0	CAF	R1D1		
2554	REF	4	LAST	433	40,3510	0 2535 0	TC	5BLANK -1		
2555	REF	27	LAST	445	40,3511	3 4752 0	CAF	BIT2		TEST BIT 2. SEE IF R2 TO BE BLANKED.
2556	REF	2	LAST	470	40,3512	0 3525 0	TC	TESTBIT		
2557	REF	5	LAST	455	40,3513	3 4320 1	CAF	R2D1		
2558	REF	5	LAST	470	40,3514	0 2535 0	TC	5BLANK -1		
2559	REF	23	LAST	463	40,3515	3 4751 0	CAF	BIT3		TEST BIT3. SEE IF R3 TO BE BLANKED.
2560	REF	3	LAST	470	40,3516	0 3525 0	TC	TESTBIT		
2561	REF	5	LAST	434	40,3517	3 4321 0	CAF	R3D1		
2562	REF	6	LAST	470	40,3520	0 2535 0	TC	5BLANK -1		
2563	REF	45	LAST	470	40,3521	3 0132 1	CA	BUF	+2	RESTORE DSPCOUNT TO STATE IT HAD
2564	REF	62	LAST	469	40,3522	54 777 1	TS	DSPCOUNT		BEFORE BLANKSUB.
2565	REF	46	LAST	470	40,3523	52 131 0	DXCH	BUF		CALL L+2 DIRECTLY.
2566	REF	3	LAST	465	40,3524	0 5166 0	TC	SUPDXCHZ +1		DTCB WITH SUPERBIT SWITCHING
2567	REF	8	LAST	469	40,3525	7 0123 0	TESTBIT	MASK	NVTEMP	NVTEMP CONTAINS BLANKING CODE.
2568	REF	147	LAST	469	40,3526	10 000 0	CCS	A		
2569	REF	122	LAST	469	40,3527	0 0002 0	TC	Q		IF CURRENT BIT = 1, RETURN TO L+1.
2570	REF	123	LAST	470	40,3530	50 002 0	INDEX	Q		IF CURRENT BIT = 0, RETURN TO L+3.
2571					40,3531	0 0002 0	TC	2		

2572 40,3532 ENDBSUB1 EQUALS

R257205 DSPMM DOES NOT DISPLAY MODREG DIRECTLY. IT PUTS IN EXEC REQUEST WITH
 R257206 PRIO 30000 FOR DSPMMJB AND RETURNS TO CALLER.

R257207 IF MODREG CONTAINS -0, DSPMMJB BLANKS THE MODE LIGHTS.

R257209 DSPMM MUST BE IN BANK 27 OR LOWER, SO IT CAN BE CALLED VIA BANKCALL.

25721				07,2667			BANK	7	
257215	REF	1		04,2000			SETLOC	PINBALL4	
257217				04,2573			BANK		

257218	REF	1					COUNT*	\$/PIN	
25722	REF	124	LAST	470	04,2573	56 002 0	XCH	Q	DSPMM
25723	REF	215	LAST	467	04,2574	54 154 0	TS	MPAC	
25724					04,2575	0 0004 0	INHINT		
25725	REF	3	LAST	451	04,2576	3 4355 0	CAF	CHRPRI0	
25726	REF	6	LAST	451	04,2577	0 5072 1	TC	NOVAC	
25727	REF	63	LAST	470	0777		EBANK=	DSPCOUNT	
25728	REF	1			04,2600	03532 0	2CADR	DSPMMJB	
25728	REF	1			04,2601	60101 1			
257285					04,2602	0 0003 1	RELINT		
25729	REF	216	LAST	470	04,2603	0 0154 1	TC	MPAC	ENDSPMM

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R2573 DSPMM PLACE MAJOR MODE CODE INTO MODREG

25735	RFF	1		40,3532		SETLOC	END8SUB1	
25736	REF	9	LAST	469 TO 470:	23 795*	COUNT*	\$/PIN	
2574	REF	1		40,3532	3 4362 1	DSPMMJ8	CAF MD1	GETS HERE THRU DSPMM
2575	REF	64	LAST	470	40,3533 56 777 0	XCH	DSPCOUNT	
2576	REF	1		40,3534	54 140 0	TS	DSPMMTEM	SAVE DSPCOUNT
2579	RFF	8	LAST	295	40,3535 11'011 1	CCS	MODREG	
2580	REF	56	LAST	465	40,3536 6 4753 1	AD	ONE	
25801	RFF	4	LAST	456	40,3537 0 3306 1	TC	DSPDECVN	IF MODREG IS + OR +0, DISPLAY MODREG
25802				40,3540	0 3542 1	TC	+2	IF MODREG IS -NZ, DO NOTHING
25803	REF	6	LAST	460	40,3541 0 2601 1	TC	?BLANK	IF MODREG IS -0, BLANK MM
2581	RFF	2	LAST	471	40,3542 56 140 1	XCH	DSPMMTEM	RESTORE DSPCOUNT
2582	RFF	65	LAST	471	40,3543 54 777 1	TS	DSPCOUNT	
2583	REF	57	LAST	468	40,3544 0 5155 0	TC	ENDOFJOB	

R2584 RECALST IS ENTERED DIRECTLY AFTER DATA IS LOADED (OR RESEQUENCE VERB IS
 R2585 EXECUTED), TERMINATE VERB IS EXECUTED, OR PROCEED WITHOUT DATA VERB IS
 R2586 EXECUTED. IT WAKES UP JOB THAT DID TC ENDIDLE.

R2587 IF CADRSTOR NOT= +0, IT PUTS +0 INTO DSPLOCK, AND TURNS OFF KEY RLSE
 R2588 LIGHT IF DSPLIST IS EMPTY (LEAVES KEY RLSE LIGHT ALONE IF NOT EMPTY).

2589	REF	9	LAST	468	40,3545 11'042 1	RECALST	CCS	CADRSTOR	
2590	REF	1		40,3546	0 3550 1		TC	RECALL	
2591	REF	58	LAST	471	40,3547 0 5155 0		TC	ENDOFJOB	NORMAL EXIT IF KEYBOARD INITIATED
2592	REF	99	LAST	467	40,3550 3 4755 1	RECAL1	CAF	ZERO	
2593	REF	10	LAST	471	40,3551 57'042 0		XCH	CADRSTOR	
2594				40,3552	0 0004 0		INHINT		
2595	REF	3	LAST	387	40,3553 0 5137 1		TC	JOBWAKE	
2596	REF	4	LAST	467	40,3554 11'014 1		CCS	LOADSTAT	
2597	REF	1		40,3555	0 3577 1		TC	DOPROC	+ PROCEED WITHOUT DATA
2598	RFF	59	LAST	471	40,3556 0 5155 0		TC	ENDOFJOB	PATHOLOGICAL CASE EXIT
2599	REF	1		40,3557	0 3575 0		TC	DOTERM	- TERMINATE
2600	REF	31	LAST	458	40,3560 3 4752 0		CAF	TWD	-0 DATA IN OR RESEQUENCE
2601	RFF	2	LAST	385	40,3561 50 064 0	RECAL2	INDEX	LOCCTR	
2602	REF	3	LAST	385	40,3562 6 0164 1		AD	LOC	LOC IS + FOR BASIC JOBS
2603	REF	3	LAST	471	40,3563 50 064 0		INDEX	LOCCTR	
2604	RFF	4	LAST	471	40,3564 54 164 0		TS	LOC	
26041	REF	15	LAST	466	40,3565 3 1002 1		CA	NOUNREG	SAVE VERB IN MPAC, NOUN IN MPAC+1 AT
26042	REF	60	LAST	468	40,3566 54 001 1		TS	L	TIME OF RESPONSE TO ENDIDLE FOR
26043	REF	20	LAST	466	40,3567 3 1001 1		CA	VFRBRFG	POSSIBLE LATER TESTING BY JOB THAT HAS
26044	REF	4	LAST	471	40,3570 50 064 0		INDEX	LOCCTR	BEEN WAKED UP.
26045	REF	217	LAST	470	40,3571 52 155 1		DXCH	MPAC	
2605				40,3572	0 0003 1		RELINT		
2606	REF	9	LAST	463	40,3573 0 4457 0	RECAL3	TC	RELDSP	
2607	REF	60	LAST	471	40,3574 0 5155 0		TC	ENDOFJOB	

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2608	REF	100	LAST	471	40,3575	3 4755 1	DOTERM	CAF	ZERO
2609	REF	1			40,3576	0 3561 0		TC	RECAL2
2610	REF	57	LAST	471	40,3577	3 4753 1	DOPROC	CAF	ONE
2611	REF	2	LAST	472	40,3600	0 3561 0		TC	RECAL2

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P2612 MISCELLANFCUS SFRVICE ROUTINF5 IN FIXED/FIXFD

2613 REF 1 4303 SFTLOC ENDBLFF

26135 RFF 5 LAST 467 TO 469: 63 111* COUNT# \$\$/PIN
 R2614 SFTNCADR E CADR ARRIVFS IN A. IT IS STORED IN NOUNCADR. EBANK BITS
 R2615 ARE SET. E ADRES IS DERIVED AND PUT INTO NOUNADD.

2616 REF 8 LAST 453 4303 55'017 1 SETNCADR TS NOUNCADR STORE ECADR
 2617 REF 14 LAST 401 4304 54 003 0 TS EBANK SET EBANK BITS
 2618 REF 2 LAST 206 4305 7 4357 0 MASK LOW8
 2619 REF 1 4306 6 5007 0 AD OCT1400
 2620 REF 29 LAST 448 4307 54 145 0 TS NOUNADD PUT E ADRES INTO NOUNADD
 2621 REF 125 LAST 470 4310 0 0002 0 TC Q

R2622 SETNADD GFTS E CADR FROM NOUNCADR, SETS EBANK BITS, DERIVES
 R2623 E ADRES AND PUTS IT INTO NOUNADD.

2624 REF 9 LAST 473 4311 3 1017 0 SETNADD CA NOUNCADR
 2625 RFF 7 LAST 442 4312 1 4304 0 TCF SFTNCADR +1

R2626 SETEBANK E CADR ARRIVES IN A. EBANK BITS ARE SET. E ADRES IS
 R2627 DERIVED AND LEFT IN A.

2628 RFF 15 LAST 473 4313 54 003 0 SETEBANK TS FBANK SET EBANK BITS
 2629 REF 3 LAST 473 4314 7 4357 0 MASK LOW8
 2630 REF 2 LAST 473 4315 6 5007 0 AD OCT1400 E ADRES LEFT IN A
 2631 REF 126 LAST 473 4316 0 0002 0 TC Q

2632 4317 00016 0 R1D1 OCT 16 THESE 3 CONSTANTS FORM A PACKFD TABLF.
 2633 4320 00011 1 R2D1 OCT 11 DONT SEPARATE.
 2634 4321 00004 0 R3D1 OCT 4

2635 RFF 7 LAST 457 4322 54 020 1 RIGHT5 TS CYR
 2636 REF 8 LAST 473 4323 4 0020 1 CS CYR
 2637 REF 9 LAST 473 4324 4 0020 1 CS CYR
 2638 REF 10 LAST 473 4325 4 0020 1 CS CYR
 2639 REF 11 LAST 473 4326 4 0020 1 CS CYR
 2640 REF 12 LAST 473 4327 56 020 0 XCH CYR
 2641 REF 127 LAST 473 4330 0 0002 0 TC Q

2642 REF 13 LAST 457 4331 54 022 0 LEFT5 TS CYL
 2643 REF 14 LAST 473 4332 4 0022 0 CS CYL
 2644 RFF 15 LAST 473 4333 4 0022 0 CS CYL
 2645 REF 16 LAST 473 4334 4 0022 0 CS CYL
 2646 REF 17 LAST 473 4335 4 0022 0 CS CYL

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2647	REF 18	LAST 473	4336	56 022 1	XCH	CYL	
2648	REF 128	LAST 473	4337	0 0002 0	TC	Q	
2649			4340	6 0000 1	SLEFT5	DOUBLE	
2650			4341	6 0000 1		DOUBLE	
2651			4342	6 0000 1		DOUBLE	
2652			4343	6 0000 1		DOUBLE	
2653			4344	6 0000 1		DOUBLE	
2654	REF 129	LAST 474	4345	0 0002 0	TC	Q	
2655			4346	00037 0	LOW5	OCT	37
2656			4347	01740 0	MID5	OCT	1740
2657			4350	76000 0	HIS	OCT	76000
2658	REF 7	LAST 470	4351	0 5072 1	TCNOVAC	TC	NOVAC
2659	REF 17	LAST 451	4352	0 5203 0	TCWAIT	TC	WAITLIST
2660	REF 13	LAST 451	4353	0 5261 1	TCTSKOVR	TC	TASKOVER
2661	REF 16	LAST 397	4354	0 5105 0	TCFINDVC	TC	FINDVAC
2662			4355	30000 1	CHRPRI0	OCT	30000
2663			4356	03777 0	LOW11	OCT	3777
2664	REF 6	LAST 442	4356		B12-1	EQUALS	LOW11
2665			4357	00377 1	LOW8	OCT	377
2667			4360	00023 0	VD1	OCT	23
2668			4361	00021 1	ND1	OCT	21
2669			4362	00025 0	MD1	OCT	25
2670			4363	00012 1	BINCON	DEC	10
2671	REF 23	LAST 418	4364	3 4745 0	FALTON	CA	BIT7
2672			4365	0 0006 1		EXTEND	
2673	REF 12	LAST 463	4366	05 011 1		WOR	DSALMOUT
2674	REF 130	LAST 474	4367	0 0002 0		TC	Q
2675	REF 24	LAST 474	4370	4 4745 1	FALTOF	CS	BIT7
2676			4371	0 0006 1		EXTEND	
2677	REF 13	LAST 474	4372	03 011 1		WAND	DSALMOUT
2678	REF 131	LAST 474	4373	0 0002 0		TC	Q
2679	REF 22	LAST 460	4374	3 4747 1	RELDSPON	CAF	BIT5
2680			4375	0 0006 1		EXTEND	
2681	REF 14	LAST 474	4376	05 011 1		WOR	DSALMOUT
2682	REF 132	LAST 474	4377	0 0002 0		TC	Q

THESE 3 CONSTANTS FORM A PACKED TABLE.
DONT SEPARATE.
MUST STAY HERE

EXEC PRIORITY OF CHARIN

THESE 3 CONSTANTS FORM A PACKED TABLE.
DONT SEPARATE.

TURN ON OPERATOR ERROR LIGHT

BIT 7 OF CHANNEL 11

TURN OFF OPERATOR ERROR LIGHT

BIT 7 OF CHANNEL 11

TURN ON KEY RELEASE LIGHT

BIT 5 OF CHANNEL 11

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2683				4400	0 0006	1	LODSAMPT	EXTEND	
2684	REF	13	LAST	4401	3 0025	0		DCA	TIME2
2685	REF	5	LAST	4402	52 014	0		DXCH	SAMPTIME
2686	REF	133	LAST	4403	0 0002	0		TC	Q

2687				4404	0 0006	1	TPSL1	EXTEND		
2688	REF	218	LAST	4405	3 0156	0		DCA	MPAC	+1
2689	REF	219	LAST	4406	20 156	1		DAS	MPAC	+1
2690	REF	220	LAST	4407	6 0154	1		AD	MPAC	
2691	REF	221	LAST	4410	26 154	0		ADS	MPAC	
2692				4411	54 007	1		TS	7	
2693	REF	134	LAST	4412	0 0002	0		TC	2	
2694	REF	7	LAST	4413	54 162	0		TS	MPAC+6	
2695	REF	135	LAST	4414	0 0002	0		TC	Q	

SHIFTS MPAC, +1, +2 LEFT 1
LEAVES OVFINO SET TO +/- 1 FOR OF/UF

TS A DOES NOT CHANGE A ON OF/UF.
NO NET OF/UF
MPAC +6 SET TO +/-1 FOR OF/UF

R2696 IF MPAC, +1 ARE EACH +NZ OR +0 AND C(A)=-0, SHORTMP WRONGLY GIVES +0.
 R2697 IF MPAC, +1 ARE EACH -NZ OR -0 AND C(A)=+0, SHORTMP WRONGLY GIVES +0.
 R2698 PRSHRTMP FIXES FIRST CASE ONLY, BY MERELY TESTING C(A) AND IF IT = -0,
 R2699 SETTING RESULT TO -0.
 R2700 (DO NOT USE PRSHRTMP UNLESS MPAC, +1 ARE EACH +NZ OR +0, AS THEY ARE
 R2701 WHEN THEY CONTAIN THE SE CONSTANTS.)

2702	REF	2	LAST	4415	54 135	1	PRSHRTMP	TS	MPTMP	
2703	REF	148	LAST	4416	10 000	0		CCS	A	
2704	REF	3	LAST	4417	3 0135	0		CA	MPTMP	
2705	REF	6	LAST	4420	1 7307	0		TCF	SHORTMP +1	
2706				4421	1 4417	0		TCF	-2	
2707	REF	101	LAST	4422	4 4755	0		CS	ZERO	
2708	REF	222	LAST	4423	54 154	0		TS	MPAC	
2709	REF	223	LAST	4424	54 155	1		TS	MPAC	+1
2710	REF	224	LAST	4425	54 156	1		TS	MPAC	+2
2711	REF	136	LAST	4426	0 0002	0		TC	Q	

C(A) +, DO REGULAR SHORTMP
 C(A) +0, DO REGULAR SHORTMP
 C(A) -, DO REGULAR SHORTMP
 C(A) -0, FORCE RESULT TO -0 AND RETURN.

2712	REF	35	LAST	4427	3 4746	0	FLASHON	CAF	BIT6	
2713				4430	0 0006	1		EXTEND		
2714	REF	15	LAST	4431	05 011	1		WOR	DSALMOUT	
2715	REF	137	LAST	4432	0 0002	0		TC	Q	

TURN ON V/N FLASH
 BIT 6 OF CHANNEL 11

2716	REF	36	LAST	4433	4 4746	1	FLASHOFF	CS	BIT6	
2717				4434	0 0006	1		EXTEND		
2718	REF	16	LAST	4435	03 011	1		WAND	DSALMOUT	
2719	REF	138	LAST	4436	0 0002	0		TC	Q	

TURN OFF V/N FLASH
 BIT 6 OF CHANNEL 11

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P2720 INTERNAL USE OF KEYBOARD AND DISPLAY PROGRAM

R2721 USER MUST SCHEDULE CALLS TO NVSUB SO THAT THERE IS NO CONFLICT OF USE OR
R2722 CONFUSION TO OPERATOR. THE OLD GRABLOCK (INTERNAL/INTERNAL INTELOCK)
R2723 HAS BEEN REMOVED AND THE INTERNAL USER NO LONGER HAS THE PROTECTION THIS
R2724 OFFERED.

R2725 THERE ARE TWO WAYS A JOB CAN BE PUT TO SLEEP BY THE KEYBOARD + DISPLAY
R2726 PROGRAM. 1) BY ENDIDLE
R2727 2) BY NVSUBUSY
R2728 THE BASIC CONVENTION IS THAT ONLY ONE JOB WILL BE PERMITTED ASLEEP VIA
R2729 THE KEYBOARD + DISPLAY PROGRAM AT A TIME. IF A JOB ATTEMPTS TO GO TO
R2730 SLEEP BY MEANS OF (1) OR (2) AND THERE IS ALREADY A JOB ASLEEP THAT WAS
R2731 PUT TO SLEEP BY (1) OR (2), THEN AN ABORT IS CAUSED.

R2732 THE CALLING SEQUENCE FOR NVSUB IS
R2733 CAF V/N
R2734 L TC NVSUB
R2735 L+1 RETURN HERE IF OPERATOR HAS INTERVENED
R2736 L+2 RETURN HERE AFTER EXECUTION

R2737 A ROUTINE CALLED NVSUBUSY IS PROVIDED (USE IS OPTIONAL) TO PUT
R2738 YOUR JOB TO SLEEP UNTIL THE OPERATOR RELEASES THE KEYBOARD + DISPLAY
R2739 SYSTEM. NVSUBUSY ALSO TURNS ON THE KEY RELEASE LIGHT.
R2740 NVSUBUSY CANNOT BE CALLED FROM ERASABLE OR F/F MEMORY,
R2741 SINCE JOBSLEEP AND JOBWAKE CAN HANDLE ONLY FIXED BANKS.

R2742 THE CALLING SEQUENCE IS
R2743 CAF WAKEFCADR
R2744 TC NVSUBUSY

R2745 .

R2746 NVSUBUSY IS INTENDED FOR USE WHEN AN INTERNAL PROGRAM FINDS THE OPERATOR
R2747 IS USING THE KEYBOARD + DISPLAY PROGRAM (BY HIS OWN INITIATION). IT IS
R2748 NOT INTENDED FOR USE WHEN ONE INTERNAL PROGRAM FINDS ANOTHER INTERNAL
R2749 PROGRAM USING THE KEYBOARD + DISPLAY PROGRAM.

R2750 NVSUBUSY ABORTS (WITH CODE 01206) IF A SECOND JOB ATTEMPTS TO GO TO
R2751 SLEEP IN PINBALL. IN PARTICULAR, IF AN ATTEMPT IS MADE TO GO TO NVSUBUSY
R2752 WHEN
R2753 1) DSPLIST NOT= +0. THIS IS THE CASE WHERE THE CAPACITY OF THE DSPLIST
R2754 IS EXCEEDED.
R2755 2) CADRSTOR NOT= +0. THIS INDICATES THAT A JOB IS ALREADY USING

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R2756 ENDIDLE. (+NZ INDICATE A JOB IS ALREADY ASLEEP DUE TO ENDIDLE.)

2757	REF	1		4437	4	4444	0	PRENVBSY	CS	2K+3	SPECIAL ENTRANCE FOR ROUTINES IN FIXED BANKS ONLY DESIRING THE FCADR OF(LOC FROM WHICH THE TC PRENVBSY WAS DONE) -2 TO BE ENTERED.	
2758	REF	139	LAST	475	4440	6	0002	0	AD	0		
2759	REF	2	LAST	468	4441	6	0004	0	AD	FBANK		
2760	REF	34	LAST	469	4442	0	4635	0	NVSUBUSY	TC		POSTJUMP
2761	REF	1			4443	10604	I		CADR	NVSUBSY1		
2762					4444	02003	0	2K+3	OCT	2003		

R27625 NVSUBSY1 MUST BE IN BANK 27 OR LOWER, SO IT WILL PUT CALLER TO SLEEP
 R27626 WITH HIS PROPER SUPERBITS.

2763	REF	1		04,2604					SETLOC	ENDSPMM +1	
27635	REF	2	LAST	470 TO 471:	9	9*			COUNT*	\$/PIN	
2764	REF	61	LAST	471	04,2604	54	001	1	NVSUBSY1	TS	L
2769	REF	2	LAST	468	04,2605	0	4220	0	TC	ISCADR+0	ABORT IF CADRSTOR NOT= +0.
2770	REF	2	LAST	468	04,2606	0	4224	1	TC	ISLIST+0	ABORT IF DSPLIST NOT= +0.
2771	REF	3	LAST	452	04,2607	0	4374	0	TC	RELDSPON	
2772	REF	62	LAST	477	04,2610	3	0001	0	CA	L	
2773	REF	3	LAST	468	04,2611	55	043	0	TS	DSPLIST	
2774	REF	3	LAST	468	04,2612	0	5133	0	ENDNVBSY	TC	JOBSLEEP

R2775 NVSBWAIT IS A SPECIAL ENTRANCE FOR ROUTINES IN FIXED BANKS ONLY. IF
 R2776 SYSTEM IS NOT BUSY, IT EXECUTES V/N AND RETURNS TO L+1 (L= LOC FROM
 R2777 WHICH THE TC NVSBWAIT WAS DONE). IF SYSTEM IS BUSY, IT PUTS CALLING JOB
 R2778 TO SLEEP WITH L-1 GOING INTO LIST FOR EVENTUAL WAKING UP WHEN SYSTEM
 R2779 IS NOT BUSY.

2780	REF	1		4445					SETLOC	NVSUBUSY +3	
27805	REF	6	LAST	473 TO 477:	98	209*			COUNT*	\$/PIN	
2781					4445	22	007	0	NVSBWAIT	LXCH	7
2782	REF	9	LAST	470	4446	54	123	0	TS	NVTEMP	ZERO NVMONOPT OPTIONS
2783	REF	44	LAST	469	4447	3	4736	1	CAF	BIT14	
27831	REF	10	LAST	469	4450	7	1021	1	MASK	MONSAVE1	EXTERNAL MONITOR BIT
27832	REF	8	LAST	469	4451	6	1012	0	AD	DSLOCK	
27833	REF	149	LAST	475	4452	10	000	0	CCS	A	
27834	REF	1			4453	1	4455	0	TCF	NVSBWT1	BUSY
2784	REF	1			4454	1	4164	1	TCF	NVSB COM	FREE. NVSUB WILL SAVE L+1 FOR RETURN AFTER EXECUTION.
A2785											L+2. PRENVBSY WILL PUT L-1 INTO LIST AND GO TO SLEEP.
2786	REF	140	LAST	477	4455	24	002	0	NVSBWT1	INCR	Q
2787	REF	1			4456	1	4437	1	TCF	PRENVBSY	

R2788 RELDSP IS USED BY VBPROC, VBTERM, VBRQEXEC, VBRQWAIT, VBRELDSP, EXTENDED

R2789 VERB DISPATCHER, VBRSEQ, RECALIST.

R2790 RELDSP1 IS USED BY MONITOR SET UP, VBRELDSP.

2791	REF	141	LAST	477	4457	56	002	0	RELDSP	XCH	Q	SET DSLOCK TO +0, TURN RELDSP LIGHT
2792	REF	1			4460	54	144	1	TS	RELRET		OFF, SEARCH DSPLIST
27921	REF	45	LAST	477	4461	4	4736	0	CS	BIT14		

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27922				4462	0 0004 0	INHINT		
27923	REF	11	LAST	4463	7 1021 1	MASK	MONSAVE1	
27924	REF	12	LAST	4464	55'021 1	TS	MONSAVE1	TURN OFF EXTERNAL MONITOR BIT
2793	REF	4	LAST	4465	11'043 0	CCS	DSPLIST	
2794				4466	0 4470 0	TC	+2	
2795	REF	1		4467	0 4473 0	TC	RELDSP2	LIST EMPTY
2796	REF	102	LAST	4470	3 4755 1	CAF	ZFRO	
2797	REF	5	LAST	4471	57'043 1	XCH	DSPLIST	
2799	REF	4	LAST	4472	0 5137 1	TC	JOBWAKE	
2800				4473	0 0003 1	RELDSP2	RELINT	
2801	REF	23	LAST	4474	4 4747 0	CS	BIT5	TURN OFF KEY RELEASE LIGHT
2802				4475	0 0006 1	EXTEND		(BIT 5 OF CHANNEL 11)
2803	REF	17	LAST	4476	03 011 1	WAND	DSALMOUT	
2804	REF	103	LAST	4477	3 4755 1	CAF	ZERO	
2805	REF	9	LAST	4500	55'012 1	TS	DSPLCK	
2807	REF	2	LAST	4501	0 0144 0	TC	RELRF	
2808	REF	142	LAST	4502	56 002 0	RELDSP1	XCH	Q
2809	REF	3	LAST	4503	54 144 1	TS	RELRET	SET DSPLOCK TO +0. NO DSPLIST SEARCH.
A2810								TURN KEY RLSE LIGHT OFF IF DSPLIST IS
A2811								EMPTY. LEAVE KEY RLSE LIGHT ALONE IF
2812	REF	6	LAST	4504	11'043 0	CCS	DSPLIST	DSPLIST IS NOT EMPTY.
2813				4505	0 4507 1	TC	+2	+ NOT EMPTY. LEAVE KEY RLSE LIGHT ALONE
2814	REF	2	LAST	4506	0 4473 0	TC	RELDSP2	+0 EMPTY. TURN OFF KEY RLSE LIGHT
2815	REF	104	LAST	4507	3 4755 1	CAF	ZERO	- NOT EMPTY. LEAVE KEY RLSE LIGHT ALONE
2816	REF	10	LAST	4510	55'012 1	TS	DSPLCK	
2817	REF	4	LAST	4511	0 0144 0	TC	RELRET	

2818

4512

ENDPINBF EQUALS

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P28181 PINTEST IS NEEDED FOR AUTO CHECK OF PINBALL.

28182 REF 2 LAST 277 43,2002

PINTEST EQUALS LST2FAN

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P2819 VBTSTLTS TURNS ON ALL DISPLAY PANEL LIGHTS. AFTER 5 SEC, IT TURNS
R2820 OFF THE CAUTION AND STATUS LIGHTS.

2821	REF	1		41,3613		SETLOC	ENDNVSBI +1	
28215	REF	8	LAST	465 TO 467:	61 907*	COUNT*	\$\$/PIN	
2822				41,3613	0 0004 0	INHINT		
2823	REF	24	LAST	470	41,3614 4 4753 0	CS	BIT1	SET BIT 1 OF IMODES33 SO IMUMON WONT
2824	REF	19	LAST	237	41,3615 7 1303 1	MASK	IMODES33	TURN OUT ANY LAMPS.
2825	REF	25	LAST	480	41,3616 6 4753 1	AD	BIT1	
2826	REF	20	LAST	480	41,3617 55'303 1	TS	IMODES33	
2827	REF	1		41,3620	3 3656 1	CAF	TSTCON1	TURN ON UPLINK ACTIVITY, TEMP, KEY RLSE,
2828				41,3621	0 0006 1	EXTEND		V/N FLASH, OPERATOR ERROR.
2829	REF	18	LAST	478	41,3622 05 011 1	WOR	DSALMOUT	
2830	REF	1		41,3623	3 3657 0	CAF	TSTCON2	TURN ON NO ATT, GIMBAL LOCK, TRACKER,
2831	REF	27	LAST	466	41,3624 55'036 1	TS	DSPTAB +11D	PROG ALM.
2832	REF	21	LAST	431	41,3625 3 4742 1	CAF	BIT10	TURN ON TEST ALARM OUTBIT
2833				41,3626	0 0006 1	EXTEND		
2834	REF	5	LAST	235	41,3627 05 013 0	WOR	CHAN13	
2835	REF	5	LAST	413	41,3630 3 4363 0	CAF	TEN	
2836	REF	1		41,3631	54 117 1	TS	ERCNT	
2837	REF	1		41,3632	4 3654 1	CS	FULLDSP	
2838	REF	2	LAST	480	41,3633 50 117 0	INDEX	ERCNT	
2839	REF	28	LAST	480	41,3634 55'023 0	TS	DSPTAB	
2840	REF	3	LAST	480	41,3635 10 117 1	CCS	ERCNT	
2841	REF	1		41,3636	0 3631 0	TC	ISILTS1	
2842	REF	1		41,3637	4 3655 0	CS	FULLDSP1	
2843	REF	29	LAST	480	41,3640 55'024 1	TS	DSPTAB +1	TURN ON 3 PLUS SIGNS
2844	REF	30	LAST	480	41,3641 55'027 1	TS	DSPTAB +4	
2845	REF	31	LAST	480	41,3642 55'031 0	TS	DSPTAB +6	
2846	REF	1		41,3643	3 4760 1	CAF	ELEVEN	
2847	REF	9	LAST	466	41,3644 55'016 0	TS	NOUT	
2848				41,3645	0 0003 1	RELINT		
2849	REF	1		41,3646	3 3661 0	CAF	SHOLTS	
2850				41,3647	0 0004 0	INHINT		
2851	REF	18	LAST	474	41,3650 0 5203 0	TC	WAITLIST	
2852	REF	32	LAST	480	1023	EBANK=	DSPTAB	
2853	REF	1		41,3651	03662 0	2CADR	TSTLTS2	
2853	REF	1		41,3652	62102 0			
2854	REF	61	LAST	471	41,3653 0 5155 0	TC	ENDOFJOR	DISPLOCK IS LEFT BUSY (FROM KEYBOARD ACTION) UNTIL TSTLTS3 TO INSURE THAT LIGHTS TEST WILL BE SEFN.
A2855								
A2856								
2857				41,3654	05675 0	FULLDSP	OCT	05675
2858				41,3655	07675 1	FULLDSP1	OCT	07675
2859				41,3656	00175 1	TSTCON1	OCT	00175
A2860								
A2861								

DISPLAY ALL R:S
DISPLAY ALL B:S AND +

UPLINK ACTIVITY, TEMP, KEY RLSE,
V/N FLASH, OPERATOR ERROR.

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2862					41,3657	40674	0	TSTCON2	OCT	40674	DSPTAB+11D BITS 3,4,5,6,8,9. LR LITES, NO ATT, GIMBAL LOCK, TRACKER, PROG ALM. CHAN 11 BITS 1, 3, 4, 7. UPLINK ACTIVITY, TEMP, OPERATOR ERROR. 5 SEC
A2863					41,3660	00115	1	TSTCON3	OCT	00115	
2864											
A2865					41,3661	00764	1	SHOLTS	OCT	764	
2866											
2867	REF	4	LAST	470	41,3662	3 4355	0	TSTLTS2	CAF	CHRPRI0	CALLED BY WAITLIST
2868	RFF	8	LAST	474	41,3663	0 5072	1		TC	NOVAC	
2869	REF	33	LAST	480	1023				EBANK=	DSPTAB	
2870	REF	1			41,3664	03667	0		2CADR	TSTLTS3	
2870	REF	1			41,3665	62102	0				
2871	REF	14	LAST	474	41,3666	0 5261	1		TC	TASKOVER	
2872	REF	1			41,3667	4 3660	0	TSTLTS3	CS	TSTCON3	CALLED BY EXECUTIVE
2873					41,3670	0 0004	0		INHINT		
2874					41,3671	0 0006	1		EXTEND		TURN OFF UPLINK ACTIVITY, TEMP, OPERATOR ERROR.
2875	REF	19	LAST	480	41,3672	03 011	1		WAND	DSALMOUT	
2876	REF	22	LAST	480	41,3673	4 4742	0		CS	BIT10	TURN OFF TEST ALARM OUTBIT
2877					41,3674	0 0006	1		EXTEND		
2878	REF	6	LAST	480	41,3675	03 013	0		WAND	CHAN13	MAKE NO ATT FOLLOW BIT 4 OF CHANNEL 12 (NO ATT LIGHT ON IF IN COARSE ALIGN)
28781	REF	22	LAST	345	41,3676	3 4750	1		CAF	BIT4	
28782					41,3677	0 0006	1		EXTEND		
28783	REF	22	LAST	303	41,3700	02 012	0		RAND	CHAN12	
2879	REF	26	LAST	467	41,3701	6 4735	1		AD	BIT15	
2880	REF	34	LAST	481	41,3702	55'036	1		TS	DSPTAB +11D	TURN OFF AUTO, HOLD, FREE, SPARE, GIMBAL LOCK, SPARE, TRACKER, PROG ALM SET BITS TO INDICATE ALL LAMPS OUT. TEST LIGHTS COMPLETE.
2881	REF	1			41,3703	4 3726	0		CS	13-11,1	
2882	REF	21	LAST	480	41,3704	7 1303	1		MASK	IMODES33	
2883	REF	3	LAST	238	41,3705	6 5026	0		AD	PRI016	
2884	REF	22	LAST	481	41,3706	55'303	1		TS	IMODES33	
2885	REF	1			41,3707	4 3730	1		CS	OCT55000	15000.
2886	REF	42	LAST	242	41,3710	7 1302	0		MASK	IMODES30	
2887	REF	4	LAST	275	41,3711	6 5025	0		AD	PRI015	
2888	REF	43	LAST	481	41,3712	55'302	0		TS	IMODES30	
2889	REF	1			41,3713	4 3727	1		CS	RFAILS2	
2890	REF	27	LAST	337	41,3714	7 0110	0		MASK	RADMODES	
2891	REF	25	LAST	474	41,3715	6 4745	0		AD	BIT7	
2892	REF	28	LAST	481	41,3716	54 110	0		TS	RADMODES	
2893					41,3717	0 0003	1		RELINT		
2894	REF	92	LAST	460	41,3720	0 4616	1		TC	BANKCALL	REDISPLAY C(MODREG)
2895	REF	1			41,3721	10573	1		CADR	DSPMM	
2896	REF	4	LAST	465	41,3722	0 4204	0		TC	KILMONON	TURN ON KILL MONITOR BIT.
2897	REF	5	LAST	466	41,3723	0 4433	1		TC	FLASHOFF	
2898	REF	35	LAST	477	41,3724	0 4635	0		TC	POSTJUMP	DOES REIDSP AND GOFS TO PINBRNCH IF ENDIDLE IS AWAITING OPERATOR RESPONSE.
2899	REF	1			41,3725	61467	0		CADR	TSTLTS4	

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2901	41,3726	16001 1	13-11,1	OCT	16001
2902	41,3727	00330 1	RFAILS2	OCT	330
2903	41,3730	55000 1	OCT55000	OCT	55000
2904	41,3731		ENDPINS2	EQUALS	

RADAR CDU AND DATA FAIL FLAGS.

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R2905 ERROR LIGHT RESET (RSET) TURNS OFF,
 R2906 UPLINK ACTIVITY, AUTO, HOLD, FREE, OPERATOR ERROR,
 R2907 PROG ALM, TRACKER FAIL.
 R2908 LEAVES GIMBAL LOCK AND NO ATT ALONE.
 R2909 IT ALSO ZEROES THE :TEST ALARM: OUT BIT, WHICH TURNS OFF STBY,RESTART.
 R2910 IT ALSO SETS :CAUTION RESET: TO 1.
 R2911 IT ALSO FORCES BIT 12 OF ALL DSPTAB ENTRIES TO 1.

2912	REF	2	LAST	471	40,3601			SETLOC	DOPROC	+2	
29125	REF	10	LAST	471 TO	473:	39	834*	COUNT*	\$/PIN		
2913	REF	3	LAST	463	40,3601	56	115	1	XCH	21/22REG	RESTORE ORIGINAL C(DSPLOCK). THUS ERROR
2914	REF	11	LAST	478	40,3602	55	012	1	TS	DSPLOCK	LIGHT RESET LEAVES DSPLOCK UNCHANGED.
2915					40,3603	0	0004	0	INHINT		
2916	REF	23	LAST	481	40,3604	3	4742	1	CAF	BIT10	TURN ON :CAUTION RESET: OUTBIT
2917					40,3605	0	0006	1	EXTEND		
2918	REF	20	LAST	481	40,3606	05	011	1	WOR	DSALMOUT	BIT10 CHAN 11
2919	REF	1			40,3607	3	3670	0	CAF	GL+NOATT	LEAVE GIMBAL LOCK AND NO ATT INTACT,
2920	REF	35	LAST	481	40,3610	7	1036	1	MASK	DSPTAB +11D	TURNING OFF AUTO, HOLD, FREE,
2921	REF	27	LAST	481	40,3611	6	4735	1	AD	BIT15	PROG ALARM, AND TRACKER.
2922	REF	36	LAST	483	40,3612	55	036	1	TS	DSPTAB +11D	
2923	REF	4	LAST	481	40,3613	4	5026	1	CS	PRI016	RESET FAIL BITS WHICH GENERATE PROG
2924	REF	23	LAST	481	40,3614	7	1303	1	MASK	IMODES33	ALARM SO THAT IF THE FAILURE STILL
2925	REF	5	LAST	482	40,3615	6	5026	0	AD	PRI016	EXISTS, THE ALARM WILL COME BACK.
2926	REF	24	LAST	483	40,3616	55	303	1	TS	IMODES33	
2927	REF	24	LAST	483	40,3617	4	4742	0	CS	BIT10	
2928	REF	44	LAST	481	40,3620	7	1302	0	MASK	IMODES30	
2929	REF	25	LAST	483	40,3621	6	4742	1	AD	BIT10	
2930	REF	45	LAST	483	40,3622	55	302	0	TS	IMODES30	
2931	REF	1			40,3623	4	3667	1	CS	RFAILS	
2932	REF	29	LAST	481	40,3624	7	0110	0	MASK	RADMODES	
2933	REF	26	LAST	481	40,3625	6	4745	0	AD	BIT7	
2934	REF	30	LAST	483	40,3626	54	110	0	TS	RADMODES	
2935	REF	26	LAST	483	40,3627	4	4742	0	CS	BIT10	TURN OFF :TEST ALARM: OUTBIT.
2936					40,3630	0	0006	1	EXTEND		
2937	REF	7	LAST	481	40,3631	03	013	0	WAND	CHAN13	
2938	REF	1			40,3632	4	3666	0	CS	ERCON	TURN OFF UPLINK ACTIVITY,
2939					40,3633	0	0006	1	EXTEND		OPERATOR ERROR.
2940	REF	21	LAST	483	40,3634	03	011	1	WAND	DSALMOUT	
2941	REF	2	LAST	454	40,3635	3	4363	0	CAF	8INCON	(DEC 10)
2942	REF	4	LAST	480	40,3636	54	117	1	TS	ERCNT	ERCNT = COUNT
2943					40,3637	0	0004	0	INHINT		
2944	REF	5	LAST	483	40,3640	50	117	0	INDEX	ERCNT	
2945	REF	37	LAST	483	40,3641	11	023	0	CCS	DSPTAB	
2946	REF	58	LAST	472	40,3642	6	4753	1	AD	ONE	
2947	RFF	1			40,3643	0	3650	1	TC	ERPLUS	
2948	REF	59	LAST	483	40,3644	6	4753	1	AD	ONF	
2949	REF	150	LAST	477	40,3645	4	0000	0	CS	A	
2950	REF	1			40,3646	7	3671	0	MASK	NOTBIT12	

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2951	REF	1		40,3647	0 3653 1		TC	ERCOM	
2952	REF	151	LAST	483	40,3650	4 0000 0	ERPLUS	CS	A
2953	REF	2	LAST	483	40,3651	7 3671 0		MASK	NOTBIT12
2954	REF	152	LAST	484	40,3652	4 0000 0		CS	A
2955	REF	6	LAST	483	40,3653	50 117 0	ERCOM	INOEX	ERCNT
2956	REF	38	LAST	483	40,3654	55*023 0		TS	DSPTAB
2957					40,3655	0 0003 1		RELINT	
2958	REF	7	LAST	484	40,3656	10 117 1		CCS	ERCNT
2959	REF	1			40,3657	0 3636 1		TC	ISTAB +1
2960	REF	105	LAST	478	40,3660	3 4755 1		CAF	ZERO
2961	REF	5	LAST	320	40,3661	54 375 1		TS	FAILREG
29611	REF	6	LAST	484	40,3662	54 376 1		TS	FAILREG +1
29612	REF	7	LAST	484	40,3663	54 377 0		TS	FAILREG +2
2962	REF	2	LAST	124	40,3664	55*357 0		TS	SFAIL
2963	REF	62	LAST	480	40,3665	0 5155 0		TC	ENDCFJ08
2964					40,3666	00104 1	ERCON	OCT	104
A2965									
2966					40,3667	00330 1	RFAILS	OCT	330
29665					40,3670	00050 1	GL+NOATT	OCT	00050
2967					40,3671	73777 1	NOTBIT12	OCT	73777
2968					40,3672		ENDPINS1	EQUALS	
2969	REF	5	LAST	334	30,2000		SBANK=	LOWSUPER	

CHAN 11 BITS 3,7.
 UPLINK ACTIVITY, AND OPERATOR ERROR.
 RADAR COU AND OATA FAIL FLAGS.
 NO ATT AND GIMBAL LOCK LAMPS

L R60,R62

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R0100 MCD NC: 0 DATE: 1 MAY 1968

R0101 MOD BY: DIGITAL DEVEL GROUP LOG SECTION R60,R62

R0102 FUNCTIONAL DESCRIPTION:

R0103 CALLED AS A GENERAL SUBROUTINE TO MANEUVER THE LM TO A SPECIFIED
R0104 ATTITUDE.R0105 1. IF THE 3-AXIS FLAG IS NOT SET THE FINAL CDU ANGLES ARE
R0106 CALCULATED (VECPPOINT).

R0107 2. THE FDAI BALL ANGLFS (NOUN 18) ARE CALCULATED (BALLANGS).

R0108 3. REQUEST FLASHING DISPLAY V50 N18 PLEASE PERFORM AUTO MANEUVER.

R0109 4. IF PRIORITY DISPLAY FLAG IS SET DO A PHASECHANGE. THEN AWAIT
R0110 ASTRONAUT RESPONSE.

R0111 5. DISPLAY RESPONSE RETURNS:

R0112 A. ENTER - RESET 3-AXIS FLAG AND RETURN TO CLIENT.

R0113 B. TERMINATE - IF IN P00 GO TO STEP 5A. OTHERWISE CHECK IF R61 IS
R0114 THE CALLING PROGRAM. IF IN R61 AN EXIT IS MADE TO GOTCV56. IF
R0115 NOT IN R61 AN EXIT IS DONE VIA GOTOP00H.

R0116 C. PROCEED - CONTINUE WITH PROGRAM AT STEP 6.

R0117 6. IF THE 3-AXISFLAG IS NOT SET, THE FINAL CDU ANGLES ARE CALCULATED
R0118 (VECPPOINT).

R0119 7. THE FDAI BALL ANGLES (NOUN 18) ARE CALCULATED (BALLANGS).

R0120 8. IF THE G+N SWITCH IS NOT SET GO BACK TO STEP 3.

R0121 9. IF THE AUTO SWITCH IS NOT SET GO BACK TO STEP 3.

R0122 10. NONFLASHING DISPLAY V06N18 (FDAI ANGLES).

R0123 11. DO A PHASECHANGE.

R0124 12. DO A MANEUVER CALCULATION AND ICDU DRIVE ROUTINE TO ACHIEVE FINAL

R0125 GIMBAL ANGLES (GOMANUR).

R0126 13. AT END OF MANEUVER GO TO STEP 3.

R0127 IF SATISFACTORY MANEUVER STEP 5A EXITS R60.

R0128 FOR FURTHER ADJUSTMENT OF THE VEHICLE ATTITUDE ABOUT THE

R0129 DESIRED VECTOR, THE ROUTINE MAY BE PERFORMED AGAIN STARTING AT

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R0130 STEP 5C.

R0131 CALLING SEQUENCE: TC BANKCALL
R0132 CADR R60LEM

R0133 ERASABLE INITIALIZATION REQUIRED : SCAXIS, POINTVSM (FOR VECPOINT)
R0134 3AXISFLG.

R0135 SUBROUTINES CALLED: VECPOINT, BALLANGS, GOPERF2R, LINUS, GODSPER,
R0136 GOMANUR, DOWNFLAG, PHASCHNG, UPFLAG

R0137 NCRMAL EXIT MDDES: CAE TEMPR60 (CALLERS RETURN ADDRESS)
R0138 TC BANKJUMP

R0139 ALARMS: NONE

R0140 OUTPUT: NONE

R0141 DEBRIS: CPHI, CTHETA, CPSI, 3AXISFLG, TBASE2

0142 34,2000 BANK 34
0143 REF 1 26,2000 SETLOC MANUEVER
0144 26,2101 BANK

0145 REF 1 1164 EBANK= TEMPR60

0146 REF 1 CDUNT* \$\$/R06
0147 REF 2 LAST 286 26,2101 0 4645 1 R60LEM TC MAKECADR
0148 REF 2 LAST 486 26,2102 55'164 1 TS TEMPR60

0149 REF 1 26,2103 3 4746 0 REDMANN CAF 3AXISBIT
0150 REF 11 LAST 305 26,2104 7 0101 0 MASK FLAGWRD5 IS 3-AXIS FLAG SET
0151 REF 153 LAST 484 26,2105 10 000 0 CCS A
0152 REF 1 26,2106 1 2114 0 TCF TOBALL YES
0153 REF 27 LAST 401 26,2107 0 6036 1 TC INTPRET
0154 26,2110 77624 1 CALL
0155 REF 2 LAST 353 26,2111 56016 0 VECPOINT TO COMPUTE FINAL ANGLES
0156 REF 5 LAST 382 26,2112 00322 1 STORE CPHI STORE FINAL ANGLES - CPHI,CTHETA,CPSI
0157 26,2113 77776 1 EXIT

0158 REF 93 LAST 481 26,2114 0 4616 1 TOBALL TC BANKCALL
01585 REF 2 LAST 353 26,2115 54244 1 CADR BALLANGS TO CONVERT ANGLES TO FDAI
0159 REF 1 26,2116 3 2232 0 TOBALLA CAF V06N18
0160 REF 94 LAST 486 26,2117 0 4616 1 TC BANKCALL
0161 REF 1 26,2120 20563 0 CADR GOPERF2R DISPLAY PLEASE PERFORM AUTO MANEUVER
0162 REF 1 26,2121 0 2220 0 TC R61TEST
0163 REF 1 26,2122 0 2126 0 TC REDCMANC PROCEED
0164 REF 1 26,2123 0 2153 1 TC ENDMANUI ENTER I.E. FINISHED WITH R60

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0165	REF	1			26,2124	0 2157 0		CHKLINUS		TO CHECK FOR PRIORITY DISPLAYS
0166	REF	63	LAST	484	26,2125	0 5155 0	TC	ENDOFJOB		
0167	REF	2	LAST	486	26,2126	3 4746 0	REDO MANC	CAF	3AXISBIT	
0168	REF	12	LAST	486	26,2127	7 0101 0		MASK	FLAGWRD5	IS 3-AXIS FLAG SET
0169	REF	154	LAST	486	26,2130	10 000 0		CCS	A	
0170	REF	1			26,2131	1 2137 1		TCF	TOBALLC	YES
0171	REF	28	LAST	486	26,2132	0 6036 1		TC	INTPRET	
0172					26,2133	77624 1		CALL		
0173	REF	3	LAST	486	26,2134	56016 0			VECPPOINT	TO COMPUTE FINAL ANGLES
0174	REF	6	LAST	486	26,2135	00322 1		STORE	CPHI	STORE ANGLES
0175					26,2136	77776 1		EXIT		
0176	REF	95	LAST	486	26,2137	0 4616 1	TOBALLC	TC	BANKCALL	
01765	REF	3	LAST	486	26,2140	54244 1		CADR	BALLANGS	TO CONVERT ANGLES TO FDAI
0177	REF	1			26,2141	0 2233 1		TC	G+N,AUTO	CHECK AUTO MODE
0178	REF	155	LAST	487	26,2142	10 000 0		CCS	A	
0179	REF	1			26,2143	1 2116 1		TCF	TOBALLA	NOT AUTO, GO RFREQUEST AUTO MANEUVR.
0180	REF	2	LAST	486	26,2144	3 2232 0	AUTOMANV	CAF	VO6N18	STATIC DISPLAY DURING AUTO MANEUVER
0181	REF	96	LAST	487	26,2145	0 4616 1		TC	BANKCALL	
0182	REF	1			26,2146	20327 0		CADR	GODSPR	
0183	REF	2	LAST	487	26,2147	0 2157 0		TC	CHKLINUS	TO CHECK FOR PRIORITY DISPLAYS
0184	REF	97	LAST	487	26,2150	0 4616 1	STARTMNV	TC	BANKCALL	PERFORM MANEUVER VIA KALCMANU
0185	REF	1			26,2151	17723 1		CADR	GOMANUR	
0186	REF	2	LAST	487	26,2152	1 2116 1	ENDMANUV	TCF	TOBALLA	FINISHED MANEUVER.
0187	REF	27	LAST	401	26,2153	0 5516 0	ENDMANU1	TC	DOWNFLAG	RESET 3-AXIS FLAG
0188	REF	3	LAST	353	26,2154	00124 0		ADRES	3AXISFLG	
0189	REF	3	LAST	486	26,2155	31'164 0		CAE	TEMPR60	
0190	REF	6	LAST	458	26,2156	0 4640 1		TC	BANKJUMP	
0191	REF	3	LAST	278	26,2157	4 0100 1	CHKLINUS	CS	FLAGWRD4	
0192	REF	1			26,2160	7 4740 1		MASK	PDSPFBIT	IS PRIORITY DISPLAY FLAG SET?
0193	REF	156	LAST	487	26,2161	10 000 0		CCS	A	
0194	REF	143	LAST	478	26,2162	0 0002 0		TC	Q	NO - EXIT
0195	REF	144	LAST	487	26,2163	3 0002 0		CA	Q	
0196	REF	225	LAST	475	26,2164	54 156 1		TS	MPAC +2	SAVE RETURN
0197	REF	16	LAST	455	26,2165	4 6244 1		CS	THREE	OBTAIN LOCATION FOR RESTART
0198	REF	4	LAST	383	26,2166	6 0133 0		AD	BUF2	HOLDS Q OF LAST DISPLAY
0199	REF	1			26,2167	55'055 1		TS	TRASE2	
0200	REF	3	LAST	302	26,2170	0 5353 1		TC	PHASCHNG	
0201					26,2171	00132 1		OCT	00132	
0202	REF	27	LAST	483	26,2172	3 4745 0		CAF	BIT7	
0203	REF	1			26,2173	0 5464 1		TC	LINUS	GO SET BITS FOR PRIORITY DISPLAY
0204	REF	226	LAST	487	26,2174	0 0156 0		TC	MPAC +2	

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0205	REF	2	LAST	381	26,2175	3 7713 0	RELINUS	CAF	PRI026	RESTORE ORIGINAL PRIORITY
0206	REF	6	LAST	314	26,2176	0 5146 1		TC	PRI0CHNG	
0207	REF	3	LAST	302	26,2177	3 4747 1		CAF	TRACK8IT	DON'T CONTINUE R60 UNLESS TRACKFLAG ON.
0208	REF	13	LAST	308	26,2200	7 0075 1		MASK	FLAGWRD1	
0209	REF	157	LAST	487	26,2201	10 000 0		CCS	A	
0210	REF	1			26,2202	1 2215 1		TCF	RER60	
0211	REF	5	LAST	295	26,2203	3 4745 0		CAF	RNDVZBIT	IS IT P20?
0212	REF	19	LAST	302	26,2204	7 0074 0		MASK	FLAGWRD0	
0213	REF	158	LAST	488	26,2205	10 000 0		CCS	A	
0214					26,2206	0 2212 1		TC	+4	YES
0215	REF	4	LAST	487	26,2207	0 5353 1		TC	PHASCHNG	NO, MUST BE P25, SET 2.11 SPOT
0216					26,2210	40112 1		OCT	40112	
0217	REF	64	LAST	487	26,2211	0 5155 0		TC	ENDOFJ08	
0218	REF	5	LAST	488	26,2212	0 5353 1		TC	PHASCHNG	SET 2.7 SPOT FOR P20
0219					26,2213	40072 0		OCT	40072	
0220	REF	65	LAST	488	26,2214	0 5155 0		TC	ENDOFJOB	
0221	REF	12	LAST	313	26,2215	0 5504 0	RER60	TC	JPFLAG	SET PRI0 DISPLAY FLAG AFTER RESTART
0222	REF	1			26,2216	0 0077 1		ADRES	PDSPFLAG	
0223	REF	2	LAST	487	26,2217	0 1055 0		TC	T8ASE2	
0224	REF	9	LAST	471	26,2220	3 1011 0	R61TEST	CA	MODREG	IF WE ARE IN P00 IT MUST BE V49 OR V89
0225					26,2221	0 0006 1		EXTEND		
0226	REF	2	LAST	486	26,2222	1 2153 0		8ZF	ENDMANU1	THUS WE GO TO ENDEXT VIA USER
0227	REF	4	LAST	487	26,2223	3 0100 0		CA	FLAGWRD4	ARE WE IN R61 (P20 OR P25)
0228	REF	2	LAST	487	26,2224	7 4740 1		MASK	PDSPF81T	
0229					26,2225	0 0006 1		EXTEND		
0230	REF	6	LAST	276	26,2226	1 6001 1		8ZF	GOTOP00H	NO
0231	REF	1			26,2227	0 6022 1		TC	GOTGV56	YES
0232					26,2230	20100 1	8IT14+7	OCT	20100	
0233					26,2231	00203 0	OCT203	OCT	203	
0234					26,2232	01422 1	V06N18	VN	0618	
R0236					SUBROUTINE TO CHECK FOR G+N CONTROL, AUTO STABILIZATION					
R0237					RETURNS WITH C(A) = + IF NOT SET FOR G+N, AUTO					
R0238					RETURNS WITH C(A) = +0 IF SWITCHES ARE SET					
0239					26,2233	0 0006 1	G+N,AUTO	EXTEND		
0240	REF	3	LAST	199	26,2234	00 030 1		READ	CHAN30	
0241	REF	27	LAST	483	26,2235	7 4742 0		MASK	BIT10	
0242	REF	159	LAST	488	26,2236	10 000 0		CCS	A	
0243	REF	145	LAST	487	26,2237	0 0002 0		TC	Q	NOT IN G+N C(A) = +

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0244				26,2240	0 0006 1	ISIT AUTO	EXTEND	
0245	REF	2	LAST	296	26,2241	00 031 0	READ	CHAN31
0246	REF	46	LAST	477	26,2242	7 4736 0	MASK	BIT14
0247	REF	146	LAST	488	26,2243	0 0002 0	TC	Q

CHECK FOR AUTO MODE

(+) = NOT IN AUTO, (+0) = ACK

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R0248 PROGRAM DESCRIPTION BALLANGS
R0249 MOD NO. LOG SECTION R60,R62

R0250 WRITTEN BY RAMA M.AIYAWAR
R0251 FUNCTIONAL DESCRIPTION

R0252 COMPUTES LM FDAI BALL DISPLAY ANGLES
R0253 CALLING SEQUENCE

R0254 TC BALLANGS
R0255 NORMAL EXIT MODE

R0256 TC BALLEEXIT (SAVED Q)

R0257 ALARM OR EXIT MODE NIL
R0258 SUBROUTINES CALLED

R0259 CD*TR*G
R0260 ARCTAN

R0261 INPUT

R0262 CPHI,CTHETA,CPSI ARE THE ANGLES CORRESPONDING TO AOG,AIG,AMG. THEY ARE
R0263 SP,2S COMPLIMENT SCALED TO HALF REVOLUTION.
R0264 OUTPUT

R0265 FDAIX,FDAIY,FDAIZ ARE THE REQUIRED BALL ANGLES SCALED TO HALF REVOLUTION
R0266 SP,2S COMPLIMENT.
R0267 THESE ANGLES WILL BE DISPLAYED AS DEGREES AND HUNDREDTHS, IN THE ORDER ROLL, PITCH, YAW, USING NOUNS 18 & 19.

R0269 ERASABLE INITIALIZATION REQUIRED

R0270 CPHI,CTHETA,CPSI EACH A SP REGISTER
R0271 DEBRIS

R0272 A,L,Q,MPAC,SINCDU,COSCDU,PUSHLIST,BALLEEXIT

R0273 NOMENCLATURE: CPHI, CTHETA, & CPSI REPRESENT THE OUTER, INNER, & MIDDLE GIMBAL ANGLES, RESPECTIVELY; OR
R0275 EQUIVALENTLY, CDUX, CDUY, & CDUZ.

R0276 NOTE: ARCTAN CHECKS FOR OVERFLOW AND SHOULD BE ABLE TO HANDLE ANY SINGULARITIES.

0278 REF 2 LAST 352 26,2000 SETLOC BAWLANGS
0279 26,2244 BANK

0280	REF	1						COUNT* \$\$/BALL
0281	REF	3	LAST	486	26,2244	0 4645 1	BALLANGS	TC MAKECADR
0282	REF	1			26,2245	55*342 1		TS BALLEEXIT
0283	REF	7	LAST	487	26,2246	3 0321 1		CA CPHI

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0284	REF	7	LAST	268	26,2247	54 772 1	TS	CDUSPOT +4	
0285	REF	2	LAST	382	26,2250	3 0322 1	CA	CTHETA	
0286	REF	8	LAST	491	26,2251	54 766 1	TS	CDUSPOT	
0287	REF	3	LAST	382	26,2252	3 0323 0	CA	CPSI	
0288	REF	9	LAST	491	26,2253	54 770 0	TS	CDUSPOT +2	
0289	REF	29	LAST	487	26,2254	0 6036 1	TC	INTPRET	
0290					26,2255	45001 1	SETPD	CALL	
0291					26,2256	00001 0		OD	
0292	REF	1			26,2257	47447 0		CD*TR*G	
0293					26,2260	41345 0	DLOAD	DMP	
0294	REF	1			26,2261	00743 1		SINC DUX	SIN (OGA)
0295	REF	1			26,2262	00747 0		COSC DUX	COS (MGA)
0296					26,2263	57552 1	SL1	DCOMP	SCALE
0297					26,2264	65336 1	ARCSIN	PDDL	YAW = ARCSIN(-SXCZ) INTO 0 PD
0298	REF	1			26,2265	00741 0		SINC DUX	
0299	REF	4	LAST	336	26,2266	14023 0	STODL	SINTH	(SINTH = 18D IN PD)
0300	REF	2	LAST	491	26,2267	00747 0		COSC DUX	
0301					26,2270	72405 0	DMP	SL1	RESCALE
0302	REF	1			26,2271	00751 1		COSC DUX	
0303	REF	4	LAST	336	26,2272	34021 0	STCALL	COSTH	(COSTH= 16D IN PD)
0304	REF	1			26,2273	26510 1		ARCTAN	
0305					26,2274	41325 0	PDDL	DMP	ROLL = ARCTAN(SZ/CZCX) INTO 2 PD
0306	REF	2	LAST	491	26,2275	00741 0		SINC DUX	
0307	REF	2	LAST	491	26,2276	00743 1		SINC DUX	
0308					26,2277	41512 1	SL2	PUSH	SXSZ INTO 4 PD
0309					26,2300	65205 0	DMP	PDDL	SXSZCY INTO 4 PD
0310	REF	1			26,2301	00745 1		COSC DUY	
0311					26,2302	65205 0	DMP	PDDL	SXSZSY INTO 6 PD
0312	REF	1			26,2303	00737 1		SINC DUY	
0313	REF	2	LAST	491	26,2304	00751 1		COSC DUX	
0314					26,2305	72405 0	DMP	SL1	CXCY
0315	REF	2	LAST	491	26,2306	00745 1		COSC DUY	
0316					26,2307	45425 0	DSU	STADR	PULL UP FROM 6 PD
0317	REF	5	LAST	491	26,2310	63756 0	STODL	COSTH	COSTH = CXCY - SXSZSY
0318	REF	2	LAST	491	26,2311	00737 1		SINC DUY	
0319					26,2312	72405 0	DMP	SL1	
0320	REF	3	LAST	491	26,2313	00751 1		COSC DUX	CXSY
0321					26,2314	45415 0	DAD	STADR	PULL UP FROM 4 PD
0322	REF	5	LAST	491	26,2315	43754 0	STCALL	SINTH	SINTH = CXSY + SXSZCY
0323	REF	2	LAST	491	26,2316	26510 1		ARCTAN	RETURNS WITH D(MPAC) = PITCH
0324					26,2317	55525 0	PDDL	VDEF	PITCH INTO 2 PD, ROLL INTO MPAC FROM 2PD
0325					26,2320	77634 0	RTB		VDEF MAKES V(MPAC) = ROLL, PITCH, YAW
0326	REF	2	LAST	378	26,2321	21524 1		VISTO2S	
0327	REF	2	LAST	320	26,2322	02351 1	STORE	FDAIX	MODE IS TP
0328					26,2323	77776 1	EXIT		
0329	REF	2	LAST	490	26,2324	3 1342 0	ENDBALL	CA	BALLEEXIT

GAP: ASSEMBLE REVISION 069 OF AGC PROGRAM LUMINARY BY NASA 2021112-011

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03295 REF 7 LAST 487 26,2325 0 4640 1

TC BANK JUMP

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P0330 PROGRAM DESCRIPTION - VECPOINT

R0331 THIS INTERPRETIVE SUBROUTINE MAY BE USED TO POINT A SPACECRAFT AXIS IN A DESIRED DIRECTION. THE AXIS
 R0333 TO BE POINTED MUST APPEAR AS A HALF UNIT DOUBLE PRECISION VECTOR IN SUCCESSIVE LOCATIONS OF ERASABLE MEMORY
 R0335 BEGINNING WITH THE LOCATION CALLED SCAXIS. THE COMPONENTS OF THIS VECTOR ARE GIVEN IN SPACECRAFT COORDINATES.
 R0337 THE DIRECTION IN WHICH THIS AXIS IS TO BE POINTED MUST APPEAR AS A HALF UNIT DOUBLE PRECISION VECTOR IN
 R0339 SUCCESSIVE LOCATIONS OF ERASABLE MEMORY BEGINNING WITH THE ADDRESS CALLED POINTVSM. THE COMPONENTS OF THIS
 R0341 VECTOR ARE GIVEN IN STABLE MEMBER COORDINATES. WITH THIS INFORMATION VECPOINT COMPUTES A SET OF THREE GIMBAL
 R0343 ANGLES (2S COMPLEMENT) CORRESPONDING TO THE CROSS-PRODUCT ROTATION BETWEEN SCAXIS AND POINTVSM AND STORES THEM
 R0345 IN T(MPAC) BEFORE RETURNING TO THE CALLER.
 R0346 THIS ROTATION, HOWEVER, MAY BRING THE S/C INTO GIMBAL LOCK. WHEN POINTING A VECTOR IN THE Y-Z PLANE,
 R0348 THE TRANSPONDER AXIS, OR THE AOT FOR THE LEM, THE PROGRAM WILL CORRECT THIS PROBLEM BY ROTATING THE CROSS-
 R0350 PRODUCT ATTITUDE ABOUT POINTVSM BY A FIXED AMOUNT SUFFICIENT TO ROTATE THE DESIRED S/C ATTITUDE OUT OF GIMBAL
 R0352 LOCK. IF THE AXIS TO BE POINTED IS MORE THAN 40.6 DEGREES BUT LESS THAN 60.5 DEGREE FROM THE +X (OR -X) AXIS,
 R0354 THE ADDITIONAL ROTATION TO AVOID GIMBAL LOCK IS 35 DEGREES. IF THE AXIS IS MORE THAN 60.5 DEGREES FROM +X (OR -X)
 R0356 THE ADDITIONAL ROTATION IS 35 DEGREES. THE GIMBAL ANGLES CORRESPONDING TO THIS ATTITUDE ARE THEN COMPUTED AND
 R0358 STORED AS 2S COMPLIMENT ANGLES IN T(MPAC) BEFORE RETURNING TO THE CALLER.
 R0360 WHEN POINTING THE X-AXIS, OR THE THRUST VECTOR, OR ANY VECTOR WITHIN 40.6 DEG OF THE X-AXIS, VECPOINT
 R0362 CANNOT CORRECT FOR A CROSS-PRODUCT ROTATION INTO GIMBAL LOCK. IN THIS CASE A PLATFORM REALIGNMENT WOULD BE
 R0364 REQUIRED TO POINT THE VECTOR IN THE DESIRED DIRECTION. AT PRESENT NO INDICATION IS GIVEN FOR THIS SITUATION
 R0366 EXCEPT THAT THE FINAL MIDDLE GIMBAL ANGLE IN MPAC +2 IS GREATER THAN 59 DEGREES.

R0368 CALLING SEQUENCE -
 R0369 1) LOAD SCAXIS, POINTVSM
 R0370 2) CALL
 R0371 VECPOINT

R0372 RETURNS WITH

R0373 1) DESIRED OUTER GIMBAL ANGLE IN MPAC
 R0374 2) DESIRED INNER GIMBAL ANGLE IN MPAC +1
 R0375 3) DESIRED MIDDLE GIMBAL ANGLE IN MPAC +2

R0376 ERASABLES USED -

R0377 1) SCAXIS 6
 R0378 2) POINTVSM 6
 R0379 3) MIS 18
 R0380 4) DEL 18
 R0381 5) CDF 6
 R0382 6) VECQTEMP 1
 R0383 7) ALL OF VAC AREA 43

R0384 TOTAL 99

0385 REF 1 27,2000
 0386 27,2016

SETLOC VECPT
 BANK

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0387	REF	1				COUNT* \$\$/VECP	
0388	REF	11	LAST	379	E6,1674	E8ANK= BCDU	
0389					27,2016	40020 1	VECPPOINT STQ 80V
0390	REF	1			27,2017	03323 0	VECTEMP
0391	REF	1			27,2020	56021 1	VECLEAR
0392					27,2021	47164 1	VECLFAR AXC,2 RT8
0393	REF	10	LAST	378	27,2022	03244 0	MIS
0394	REF	2	LAST	364	27,2023	44403 0	READCDUK
0395					27,2024	34032 1	STCALL 25D
0396	REF	3	LAST	364	27,2025	44410 1	CDUTODCM
0397					27,2026	61375 1	VLOAD VXM
0398	REF	3	LAST	352	27,2027	03767 1	POINTVSM
0399	REF	11	LAST	494	27,2030	03245 1	MIS
0400					27,2031	77656 1	UNIT
0401					27,2032	00035 1	STORE 28D
A0402							
0403					27,2033	53435 0	VXV UNIT
0404	REF	10	LAST	353	27,2034	03761 1	SCAXIS
0405					27,2035	57400 1	BOV VCOMP
0406	RFF	1			27,2036	56146 1	PICKAXIS
0407	REF	40	LAST	377	27,2037	17267 1	STODL COF
0408					27,2040	00045 0	36D
0409					27,2041	50025 0	DSU 3MN
0410	REF	1			27,2042	14367 0	DPB-14
0411	REF	2	LAST	494	27,2043	56146 1	PICKAXIS
0412					27,2044	50375 0	VLOAD DOT
0413	REF	11	LAST	494	27,2045	03761 1	SCAXIS
0414					27,2046	00035 1	28D
0415					27,2047	65552 0	SL1 ARCCOS
0416					27,2050	77624 1	COMPMATX CALL
0417	REF	2	LAST	377	27,2051	44527 1	DELCOMP
0418					27,2052	75160 1	AXC,1
0419	RFF	12	LAST	494	27,2053	03244 0	MIS
0420	REF	11	LAST	378	27,2054	02234 0	KEL
0421					27,2055	77624 1	CALL
0422	REF	3	LAST	378	27,2056	44312 1	MXM3
0423					27,2057	51545 1	DLOAD ABS
0424					27,2060	00007 0	6
0425					27,2061	50025 0	DSU BMN
0426	REF	1			27,2062	14354 0	SINCMILC
0427	REF	1			27,2063	56136 0	FINDGIMB
A0428							
0429					27,2064	51545 1	DLOAD ABS
0430	REF	12	LAST	494	27,2065	03761 1	SCAXIS
0431					27,2066	51025 1	DSU BPL
0432	REF	1			27,2067	14356 1	SINVEC1

SAVE RETURN ADDRESS

AND CLEAR OVFIN

READ THE PRESENT CDU ANGLES AND STORE THEM IN PD25, 26, 27

S/C AXES TO STABLE MEMBER AXES (MIS)

RESOLVE THE POINTING DIRECTION VF INTO INITIAL S/C AXES (VF = POINTVSM)

PD 28 29 30 31 32 33

TAKE THE CROSS PRODUCT VF X VI WHERE VI = SCAXIS

CHECK MAGNITUDE OF CROSS PRODUCT VECTOR, IF LESS THAN 8-14 ASSUME UNIT OPERATION INVALID.

NOW COMPUTE THE TRANSFORMATION FROM FINAL S/C AXES TO INITIAL S/C AXES MFI

COMPUTE THE TRANSFORMATION FROM FINAL S/C AXES TO STABLE MEMBER AXES MFS = MIS MFI (IN PD LIST)

MFS6 = SIN(CPSI) \$2

= SIN(59 DEGS) \$2

/CPSI/ LESS THAN 59 DEGS

I.E. DESIRED ATTITUDE NOT IN GIMBAL LOCK

CHECK TO SEE IF WE ARE POINTING THE THRUST AXIS

SIN 49.4 DEGS \$2

L	R60,R62								USER'S PAGE NO. 11	E6 S3
0433	REF	2	LAST	494	27,2070	56136	0	FINDGIMB	IF SO, WE ARE TRYING TO POINT IT INTO	
0434					27,2071	77775	1	VLOAD	GIMBAL LOCK, ABORT COULD GO HERE	
0435					27,2072	77626	0	STADR		
0436	REF	13	LAST	494	27,2073	50516	0	STOVL	MIS +12D	
0437					27,2074	77626	0	STADR	STORE MFS (IN PD LIST) IN MIS	
0438	REF	14	LAST	495	27,2075	50524	1	STOVL	MIS +6	
0439					27,2076	77626	0	STADR		
0440	REF	15	LAST	495	27,2077	50532	0	STOVL	MIS	
0441	REF	16	LAST	495	27,2100	03253	0		MIS +6	
0442					27,2101	57444	1	BPL	VCOMP	
0443	REF	1			27,2102	56103	0		IGSAMEX	
0444					27,2103	50035	1	IGSAMEX	VXV	
0445	REF	13	LAST	494	27,2104	03761	1		BMN	
0446	REF	1			27,2105	56112	0		SCAXIS	
A0447									U=SCAXIS	
A0448										
0449					27,2106	57575	1	VLOAD	VCOMP	
0450	REF	14	LAST	495	27,2107	03761	1		SCAXIS	
0451	REF	41	LAST	494	27,2110	37267	0	STCALL	COF	
0452	REF	1			27,2111	56115	1		CHEKAXIS	
0453					27,2112	77775	1	U=SCAXIS	VLOAD	
0454	REF	15	LAST	495	27,2113	03761	1		SCAXIS	
0455	REF	42	LAST	495	27,2114	03267	1	STORE	COF	
0456					27,2115	51545	1	CHEKAXIS	DLOAD	
0457	REF	16	LAST	495	27,2116	03761	1		SCAXIS	
0458					27,2117	51025	1	DSU	BPL	
0459	REF	1			27,2120	14360	1		SINVEC2	
0460	REF	1			27,2121	56125	1		PICKANG1	
0461					27,2122	52145	0	DLOAD	GOTO	
0462	REF	1			27,2123	14364	0		VECANG2	
0463	REF	1			27,2124	56127	0		COMPMFSN	
A0464										
0465					27,2125	77745	1	PICKANG1	DLOAD	
0466	REF	1			27,2126	14362	0		VECANG1	
0467					27,2127	77624	1	COMPMFSN	CALL	
0468	REF	3	LAST	494	27,2130	44527	1		DELCOMP	
0469					27,2131	75160	1	AXC,1	AXC,2	
0470	REF	17	LAST	495	27,2132	03244	0		MIS	
0471	REF	12	LAST	494	27,2133	02234	0		KEL	
0472					27,2134	77624	1	CALL		
0473	REF	4	LAST	494	27,2135	44312	1		MXM3	
A0474										
A0475										
0476					27,2136	45160	1	FINDGIMB	AXC,1	
0477					27,2137	00000	1		0	
0478	REF	2	LAST	378	27,2140	44654	0		DCMTCODU	
0479					27,2141	40234	0	RTB	SETPD	
0480	REF	3	LAST	491	27,2142	21524	1		VISTO2S	
									CONVERT TO 2:S COMPLMENT	

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0481				27,2143	00001 0		0		
0482				27,2144	77650 1		GOTO		
0483	REF	2	LAST	494	27,2145	03323 0		VECTEMP	RETURN TO CALLER
0484				27,2146	50375 0	PICKAXIS	VLDAD	DDT	IF VF X VI = 0, FIND VF . VI
0485				27,2147	00035 1			28D	
0486	REF	17	LAST	495	27,2150	03761 1		SCAXIS	
0487				27,2151	72240 1		BMN	TLDAD	
0488	REF	1			27,2152	54326 1		ROT180	
0489				27,2153	00032 0			25D	
0490				27,2154	77650 1		GOTO		IF VF = VI, CDU DESIRED = PRESENT CDU
0491	REF	3	LAST	496	27,2155	03323 0		VECTEMP	PRESENT CDU ANGLES
0492				35,2000			BANK	35	
0493	REF	1			26,2000		SETLDC	MANUVER1	
0494				26,2326			BANK		
0495				26,2326	47375 0	RTD180	VLDAD	VXV	IF VF, VI ANTIPARALLEL, 108 DEG RDTATION
0496	REF	18	LAST	495	26,2327	03253 0		MIS +6	IS REQUIRED. Y STABLE MEMBER AXIS IN
0497	REF	1			26,2330	06422 0		HIDPHALF	INITIAL S/C AXES.
0498				26,2331	47256 0		UNIT	VXV	FIND Y(SM) X X(I)
0499	REF	18	LAST	496	26,2332	03761 1		SCAXIS	FIND UNIT(VI X UNIT(Y(SM) X X(I)))
0500				26,2333	40056 0		UNIT	BDV	I.E. PICK A VECTDR IN THE PLANE OF X(I),
0501	REF	1			26,2334	54350 0		PICKX	Y(SM) PERPENDICULAR TO VI
0502	REF	43	LAST	495	26,2335	17267 1	STDDL	CDF	
0503				26,2336	00045 0			36D	CHECK MAGNITUDE
0504				26,2337	50025 0		DSU	BMN	OF THIS VECTDR.
0505	REF	2	LAST	494	26,2340	14367 0		DPB-14	IF LESS THAN B-14,
0506	REF	2	LAST	496	26,2341	54350 0		PICKX	PICK X-AXIS.
0507				26,2342	77775 1		VLDAD		
0508	REF	44	LAST	496	26,2343	03267 1		COF	
0509	REF	45	LAST	496	26,2344	17267 1	XRDT	STDDL	CDF
0510	REF	2	LAST	496	26,2345	06422 0		HIDPHALF	
0511				26,2346	77650 1		GOTO		
0512	REF	1			26,2347	56050 1		CDMPMATX	
0513				26,2350	52175 0	PICKX	VLOAD	GOTO	PICK THE XAXIS IN THIS CASE
0514	REF	3	LAST	496	26,2351	06422 0		HIDPHALF	
0515	REF	1			26,2352	54344 0		XRDT	
0516				26,2353	15555 0	SINGIMLC	2DEC	.4285836003	=SIN(59) \$2
0517				26,2355	14113 1	SINVEC1	2DEC	.3796356537	=SIN(49.4) \$2
0518				26,2357	07701 0	SINVEC2	2DEC	.2462117800	=SIN(29.5) \$2
0519				26,2361	04343 1	VECAN1	2DEC	.1388888889	= 50 DEGREES \$360
0520				26,2363	03070 0	VECAN2	2DEC	.0972222222	= 35 DEGREES \$360
0521				26,2364	34344 0				
0522				26,2365	00000 1	IB1TDP	OCT	0	KEEP THIS BEFORE DPB(-14) *****
0523				26,2366	00001 0	DPB-14	OCT	00001	
				26,2367	00000 1		OCT	00000	

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P0524 ROUTINE FOR INITIATING AUTOMATIC MANEUVER VIA KEYBOARD (V49)

0525					34,2000			BANK	34		
0526	REF	1			23,2000			SETLOC	R62		
0527					23,2065			BANK			
0528	REF	12	LAST	494	E6,1674			EBANK=	BCDU		
0529	REF	1						COUNT*	\$/R62		
0530	REF	1			23,2065		R62DISP	EQUALS	R62FLASH		
0531	REF	1			23,2065	3 5010 0	R62FLASH	CAF	V06N22	FLASH V06N22 AND	
0532	REF	98	LAST	487	23,2066	0 4616 1		TC	BANKCALL	ICDU ANGLES	
0533	REF	6	LAST	394	23,2067	20351 1		CADR	GDFLASH		
0534	REF	30	LAST	390	23,2070	1 5472 1		TCF	ENDEXT	TERMINATE	
0535	REF	1			23,2071	1 2073 0		TCF	GOMOVE	PROCEED	
0536	REF	2	LAST	497	23,2072	1 2065 1		TCF	R62FLASH	ENTER	
A0537										ASTRONAUT MAY LOAD NEW ICDUS AT THIS	
A0538										POINT	
0539	REF	13	LAST	488	23,2073	0 5504 0	GOMOVE	TC	UPFLAG	SET FOR 3-AXIS MANEUVER	
0540	REF	4	LAST	487	23,2074	00124 0		ADRES	3AXISFLG		
0541	REF	99	LAST	497	23,2075	0 4616 1		TC	BANKCALL		
0542	REF	2	LAST	353	23,2076	54101 0		CADR	R60LEM		
0543	REF	31	LAST	497	23,2077	1 5472 1		TCF	ENDEXT	END R62	

L S-BAND ANTENNA FOR LM

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R2000 SUBROUTINE NAME: R05 - S-BAND ANTENNA FOR LM

R2001 MOD0 BY T. JAMES

R2002 MOD1 BY P. SHAKIR

R2003 FUNCTIONAL DESCRIPTION

R2004 THE S-BAND ANTENNA ROUTINE, R05, COMPUTES AND DISPLAYS THE PITCH AND
 R2005 YAW ANTENNA GIMBAL ANGLES REQUIRED TO POINT THE LM STEERABLE ANTENNA
 R2006 TOWARD THE CENTER OF THE EARTH. THIS ROUTINE IS SELECTED BY THE ASTRO-
 R2007 NALT VIA DSKY ENTRY DURING COASTING FLIGHT OR WHEN THE LM IS ON THE MOON
 R2008 SURFACE. THE EARTH OR MOON REFERENCE COORDINATE SYSTEM IS USED DEPENDING
 R2009 ON WHETHER THE LM IS ABOUT TO ENTER OR HAS ALREADY ENTERED THE MOON
 R2010 SPHERE OF INFLUENCE, RESPECTIVELY

R2011 TO CALL SUBROUTINE, ASTRONAUT KEYS IN V 64 E

R2012 SUBROUTINES CALLED-

R2013 R02BOTH
 R2014 INTPRET
 R2015 LCADTIME
 R2016 LEMCONIC
 R2017 LUNPOS
 R2018 CDUTRIG
 R2019 *SMNB*
 R2020 BANKCALL
 R2021 B5OFF
 R2022 ENDOFJOB
 R2023 BLANKET

R2024 RETURNS WITH

R2025 PITCH ANGLE IN PITCHANG REV. 80
 R2026 YAW ANGLE IN YAWANG REV. 80

R2027 ERASABLES USED

R2028 PITCHANG
 R2029 YAWANG
 R2030 RLM
 R2031 VAC AREA

2032			41,3731	BANK	41
2033	REF	4	LAST 302	42,2000	SETLOC SBAND
2034			42,3602	BANK	
2035	REF	4	LAST 164	E7,1467	EBANK= WHOCARES
2036	REF	2	LAST 61 TO 63:	2	COUNT* \$\$/R05
2037	REF	100	LAST 497	42,3602	0 4616 1 SBANDANT TC BANKCALL

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2038	REF	2	LAST	352	42,3603	11175	1	CADR	RO2BOTH	CHECK IF IMU IS ON AND ALIGNED
2039	REF	30	LAST	491	42,3604	0 6036	1	TC	INTPRET	
2040					42,3605	47001	0	SETPD	RTB	
2041					42,3606	00001	0		OD	
2042	REF	5	LAST	393	42,3607	21462	1		LOADTIME	PICK UP CURRENT TIME
2043	REF	6	LAST	352	42,3610	34041	0	STCALL	TDEC1	ADVANCE INTEGRATION TO TIME IN TDEC1
2044	REF	2	LAST	352	42,3611	27100	0		LEMCONIC	USING CONIC INTEGRATION
2045					42,3612	46135	1	SLOAD	BHIZ	
2046	REF	1			42,3613	00050	1		X2	X2 =0. EARTH SPHERE, X2 =2 MOON SPHERE
2047	REF	1			42,3614	65632	0		CONV4	
2048					42,3615	77775	1	VLOAD		
2049	REF	3	LAST	352	42,3616	00001	0		RATT	
2050	REF	1			42,3617	16211	1	STODL	RLM	
2051	REF	3	LAST	223	42,3620	00015	0		TAT	
2052					42,3621	77624	1	CONV3	CALL	
2053	REF	1			42,3622	33663	1		LUNPOS	UNIT POSITION VECTOR FROM EARTH TO MOON
2054					42,3623	74375	0	VLOAD	VXSC	
2055	REF	2	LAST	139	42,3624	02723	0		VMOON	
2056	REF	1			42,3625	24001	0		REMDIST	MEAN DISTANCE FROM EARTH TO MOON
2057					42,3626	53372	1	VSL1	VAD	
2058	REF	2	LAST	499	42,3627	02211	1		RLM	
2059					42,3630	77650	1	GOTO		
2060	REF	1			42,3631	65634	0		CONV5	
2061					42,3632	77775	1	CONV4	VLOAD	
2062	REF	4	LAST	499	42,3633	00001	0		RATT	UE = -UNIT(RATT) EARTH SPHERE
2063					42,3634	53401	1	CONV5	UNIT	UE = -UNIT((REM)(UEM) + RL) MOON SPHERE
2064					42,3635	00001	0		OD	SET PL POINTER TO 0
2065					42,3636	45076	1	VCOMP	CALL	
2066	REF	1			42,3637	47443	1		COUTRIG	COMPUTE SINES AND COSINES OF CDU ANGLES
2067					42,3640	76521	0	MXV	VSL1	TRANSFORM REF. COORDINATE SYSTEM TO
2068	REF	7	LAST	352	42,3641	01734	0		REFSMAT	STABLE MEMBER B-1 X B-1 X B+1 = B-1
2069					42,3642	71206	0	PUSH	DLQAD	80
2070	REF	2	LAST	314	42,3643	06424	0		H16ZEROS	
2071	REF	2	LAST	134	42,3644	02205	1	STORE	PITCHANG	
2072	REF	1			42,3645	26207	0	STOVL	YAWANG	ZERO OUT ANGLES
2073					42,3646	77624	1	CALL		
2074	REF	1			42,3647	47575	0		*SMNB*	
2075	REF	3	LAST	499	42,3650	16211	1	STODL	RLM	PRE-MULTIPLY RLM BY (NBSA) MATRIX(B0)
2076	REF	4	LAST	499	42,3651	02213	0		RLM +2	
2077					42,3652	45206	1	PUSH	DSU	
2078	REF	5	LAST	499	42,3653	02211	1		RLM	
2079					42,3654	77605	1	DMP		
2080	REF	1			42,3655	25765	1		10VSQRT2	
2081	REF	6	LAST	499	42,3656	16213	0	STODL	RLM +2	
2082					42,3657	41215	1	DAD	DMP	
2083	REF	7	LAST	499	42,3660	02211	1		RLM	
2084	REF	2	LAST	499	42,3661	25765	1		10VSQRT2	
2085	REF	8	LAST	499	42,3662	26211	1	STOVL	RLM	R B-1
2086	REF	9	LAST	499	42,3663	02211	1		RLM	
2087					42,3664	63256	0	UNIT	POVL	

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2088	REF	10	LAST	499	42,3665	02211 1	RLM		
2089					42,3666	72431 1	VPROJ	VSL2	PROJECTION OF R ONTO LM XZ PLANE
2090	REF	1			42,3667	06420 1		HIUNITY	
2091					42,3670	40045 1	BVSU	BOV	CLEAR OVERFLOW INDICATOR IF ON
2092	REF	11	LAST	500	42,3671	02211 1		RLM	
2093	REF	1			42,3672	65673 0		GOVCNV	
2094					42,3673	40056 0	COVCNV	UNIT	BOV
2095	REF	1			42,3674	65741 0		SBANDEX	
2096					42,3675	47206 0		PUSH	VXV
2097	REF	1			42,3676	06416 1		HIUNITZ	
2098					42,3677	57572 0		VSL1	VCOMP
2099	REF	12	LAST	500	42,3700	02211 1		STORE	RLM
2100					42,3701	63241 0		DOT	PDVL
2101	REF	2	LAST	500	42,3702	06420 1			HIUNITY
2102	REF	13	LAST	500	42,3703	02211 1			RLM
2103					42,3704	75246 0		ABVAL	SIGN
2104					42,3705	77736 0		ASIN	
2105	REF	3	LAST	499	42,3706	26205 1		STOVL	PITCHANG
2106	REF	1			42,3707	00007 0			URP
2107					42,3710	51041 0		DOT	BPL
2108	REF	2	LAST	500	42,3711	06416 1			HIUNITZ
2109	REF	1			42,3712	65717 0			NOADJUST
2110					42,3713	45345 1		DLOAD	DSU
2111	REF	4	LAST	496	42,3714	06422 0			HIDPHALF
2112	REF	4	LAST	500	42,3715	02205 1			PITCHANG
2113	REF	5	LAST	500	42,3716	02205 1		STORE	PITCHANG
2114					42,3717	47375 0		NOADJUST	VLOAD
2115	REF	1			42,3720	00001 0			UR
2116	REF	2	LAST	500	42,3721	00007 0			URP
2117					42,3722	77772 0		VSL1	
2118	REF	14	LAST	500	42,3723	16211 1		STOVL	RLM
2119	REF	6	LAST	500	42,3724	02205 1			PITCHANG
2120					42,3725	74356 1		SIN	VXSC
2121	REF	3	LAST	500	42,3726	06416 1			HIUNITZ
2122					42,3727	71525 0		PDDL	COS
2123	REF	7	LAST	500	42,3730	02205 1			PITCHANG
2124					42,3731	52361 1		VXSC	VSU
2125	REF	1			42,3732	06422 0			HIUNITX
2126					42,3733	63241 0		DOT	PDVL
2127	REF	15	LAST	500	42,3734	02211 1			RLM
2128	REF	16	LAST	500	42,3735	02211 1			RLM
2129					42,3736	75246 0		ABVAL	SIGN
2130					42,3737	77736 0		ASIN	
2131	REF	2	LAST	499	42,3740	02207 0		STORE	YAWANG
2132					42,3741	77776 1		SBANDEX	EXIT
2133	REF	7	LAST	315	42,3742	3 1044 0		CA	EXTVBACT
2134	REF	24	LAST	478	42,3743	7 4747 0		MASK	BIT5
2135					42,3744	0 0006 1		EXTEND	
2136	REF	32	LAST	497	42,3745	1 5472 1		BZF	ENDEXT
21362	REF	4	LAST	314	42,3746	3 5017 1		CAF	PRI05

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21364	REF	7	LAST	488	42,3747	0 5146 1	TC	PRIQCHNG	
2137	REF	1			42,3750	3 3763 0	CAF	V06N51	DISPLAY ANGLES
2138	REF	101	LAST	498	42,3751	0 4616 1	TC	BANKCALL	
2139	REF	4	LAST	314	42,3752	20231 0	CADR	GOMARKFR	
2140	REF	4	LAST	314	42,3753	0 5563 1	TC	B5OFF	TERMINATE
2141	REF	5	LAST	501	42,3754	0 5563 1	TC	B5OFF	PROCEED
2142	REF	66	LAST	488	42,3755	0 5155 0	TC	ENDOFJOB	RECYCLE
2143	REF	24	LAST	470	42,3756	3 4751 0	CAF	BIT3	IMMEDIATE RETURN
2144	RFF	8	LAST	314	42,3757	0 5464 1	TC	BLANKET	BLANK R3
2145	REF	4	LAST	314	42,3760	3 4740 0	CAF	PRIQ4	
2146	RFF	8	LAST	501	42,3761	0 5146 1	TC	PRIQCHNG	
2148	REF	2	LAST	295	42,3762	0 3604 0	TC	SBANDANT +2	YES, CONTINUE DISPLAYING ANGLES
2150					42,3763	01463 1	V06N51	VN	0651
2151					42,3764	26501 1	10VSQRT2	2DEC	.7071067815
2151					42,3765	07463 1			1/SQRT(2)
2152					0000		UR	EQUALS	0D
2153					0006		URP	EQUALS	6D
2154	REF	6	LAST	484	30,2000			SBANK=	LOWSUPER

*** END OF LEMONAID.070 ***

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0024	REF	1		25,2023	0 2047 0	DORSAMP	TC	VAFADAR	SELECTS VARIABLE RADAR CHANNEL.
0025	REF	102	LAST 501	25,2024	0 4616 1		TC	BANKCALL	
0076	REF	4	LAST 284	25,2025	17667 0		CADR	RADSTALL	
0027	REF	2	LAST 291	25,2026	25*762 0		INCR	RFAILCNT	ADVANCE FAIL COUNTER BUT ACCEPT BAD DATA
0028				25,2027	0 0004 0	DORSAMP2	INHINT		
00281	REF	13	LAST 487	25,2030	3 0101 1		CA	FLAGWRD5	DON'T UPDATE RSTACK IF IN R77.
00282	REF	2	LAST 295	25,2031	7 4741 0		MASK	R77FLBIT	
00283	REF	160	LAST 488	25,2032	10 000 0		CCS	A	
00284				25,2033	1 2037 0		TCF	+4	
0029	REF	2	LAST 119	25,2034	53*102 1		DXCH	SAMPLSUM	
0030	REF	5	LAST 502	25,2035	51*760 1		INDEX	RTSTLOC	
0031	REF	12	LAST 502	25,2036	53*605 1		DXCH	RSTACK	
0038	REF	6	LAST 502	25,2037	4 1760 0		CS	RTSTLOC	CYCLE RTSTLOC.
0039	REF	2	LAST 292	25,2040	6 1756 1		AD	RTSTMAX	
0040				25,2041	0 0006 1		EXTEND		

L RADAR LEADIN ROUTINES

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0041				25,2042	1 2045 0	BZF	+3
0042	REF	7	LAST	502	25,2043 3 1760 1	CA	RTSTLOC
0043	REF	32	LAST	471	25,2044 6 4752 0	AD	TWO
0044	REF	8	LAST	503	25,2045 55 760 0	TS	PTSTLOC
0045	REF	67	LAST	501	25,2046 1 5155 1	TCF	ENDOFJOB

STORAGE IS DP

CONTINUOUS SAMPLING AND 2N TRIES - GONE.

R0056 VARIABLE RADAR DATA CALLER FOR ONE MEASUREMENT ONLY.

0057	REF	60	LAST	483	25,2047 3 4753 1	VARADAR	CAF	ONE
0058	REF	5	LAST	487	25,2050 54 133 1		TS	BUF2
0059	REF	7	LAST	502	25,2051 51 755 1		INDEX	RTSTDEX
0060	REF	1			25,2052 3 2054 1		CAF	RDRLOCS
0061	REF	3	LAST	383	25,2053 1 4622 1		TCF	SWCALL

WILL BE SENT TO RADAR ROUTINE IN A BY
SWCALL.

NOT TOUCHING Q.

0062	REF	1			25,2054 53105 0	RDRLOCS	CADR	RRRANGE	=0
0063	REF	1			25,2055 53103 0		CADR	RRRDOT	=1
0064	REF	1			25,2056 53101 1		CADR	LRVELX	=2
0065	REF	1			25,2057 53077 1		CADR	LRVELY	=3
0066	REF	1			25,2060 53075 0		CADR	LRVELZ	=4
0067	REF	1			25,2061 53073 0		CADR	LRLAT	=5

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P0001 RENDEZVOUS NAVIGATION PROGRAM 20

R0002 PROGRAM DESCRIPTION

R0003 MOD NC - 2

R0004 BY P. VOLANTE

R0005 FUNCTIONAL DESCRIPTION

R0006

R0007 THE PURPOSE OF THIS PROGRAM IS TO CONTROL THE RENDEZVOUS RADAR FROM
R0008 STARTUP THROUGH ACQUISITION AND LOCKON TO THE CSM AND TO UPDATE EITHER

R0009 THE LM OR CSM STATE VECTOR (AS SPECIFIED BY THE ASTRONAUT BY OSKY ENTRY)

R0010 ON THE BASIS OF THE RR TRACKING DATA.

R0011 CALLING SEQUENCE -

R0012

R0013 ASTRONAUT REQUEST THROUGH OSKY V37E20E

R0014 SUBROUTINES CALLED

R0015 R02B0TH (IMU STATUS CHECK)

FLAGUP

R0016 GOFASH (PINBALL-DISPLAY)

FLAGDOWN

R0017 R23LEM (MANUAL ACQUISITION)

BANKCALL

R0018 LS201 (LOS DETERMINATION)

TASKOVER

R0019 LS202 (RANGE LIMIT TEST)

R0020 R61LEM (PREFERRED TRACKING ATTITUDE)

R0021 R21LEM (RR DESIGNATE)

ENDOFJOB

R0022 R22LEM (DATA READ)

GOPERF1

R0023 R31LEM (RENDEZVOUS PARAMETER DISPLAY)

R0024 PRICLARM (PRIORITY DISPLAY)

R0025 NORMAL EXIT MODES-

R0026 P20 MAY BE TERMINATED IN TWO WAYS-ASTRONAUT SELECTION OF IDLING

R0027 PROGRAM (PC0) BY KEYING V37E00E OR BY KEYING IN V56E

R0028 ALARM OR ABORT EXIT MODES-

R0029 RANGE GREATER THAN 400 NM DISPLAY

R0030 OUTPUT

R0031 TRKMKCNT = NO OF RENDEZVOUS TRACKING MARKS TAKEN (COUNTER)

R0032 ERASABLE INITIALIZATION REQUIRED

R0033 FLAGS SET + RESET

R0034 SRCOPT, RNDVZFLG, ACMOOF LG, VEHUPFLG, UPDATFLG, TRACKFLG,

R0035 DEBRIS

R0036 CENTRALS-A,Q,L

0037 REF 7 LAST 501 30,2000

SBANK= LOWSUPER

FOR LOW 2CADR'S.

0038 33,2045

BANK 33

0039 REF 1 24,2000

SETLOC P20S

0040 24,2022

BANK

0041 REF 7 LAST 2B4 E7,1454

EBANK= LOSCUNT

0042 REF 1 24,2023

COUNT* \$\$/P20

00421 REF 2 LAST 249 24,2022

PROG22

= PROG20

0043 REF 1 24,2022 0 5327 1

PROG20

TC 2PHSCHNG

0044 24,2023 00004 0

OCT 4

0045 24,2024 05022 1

OCT 05022

0046 24,2025 26000 0

OCT 26000

0047 REF 1 24,2026 0 2714 1

TC LUNSECHK

PRIORITY 26

CHECK IF ON LUNAR SURFACE

L

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0048	REF	1		24,2027	0 2031 1	TC	DRBCHG0	YES
0049	REF	1		24,2030	0 2060 0	TC	PROG20A -2	NO - CONTINUE WITH P20
0050	REF	14	LAST 497	24,2031	0 5504 0	TC	JPFLAG	SET VEHUPFLG - CSM STATE
0051	REF	3	LAST 304	24,2032	00026 0	ADRES	VEHUPFLG	VECTOR TO BE UPDATED
0052	REF	61	LAST 503	24,2033	3 4753 1	CAF	DNE	SET R2 FOR OPTION CSM WILL NDT
0053	REF	1		24,2034	55 145 1	TS	OPTION2	CHANGE PRESENT ORBIT
0054	REF	1		24,2035	3 2342 0	CAF	ACT00012	
0055	REF	103	LAST 502	24,2036	0 4616 1	TC	BANKCALL	DISPLAY ASSUMED CSM ORBIT OPTION
0056	REF	1		24,2037	20506 0	CADR	GOPERF4	
0057	REF	7	LAST 488	24,2040	0 6001 0	TC	GOTOPOOH	TERMINATE
0058	REF	1		24,2041	0 2043 1	TC	ORBCHG1	PROCEED VALUE OF ASSUMED OPTION OK
0059				24,2042	0 2035 0	TC	-5	R2 LOADED THRU DSKY
0060	REF	1		24,2043	4 2343 0	CS	P22ONE	
0061	REF	2	LAST 505	24,2044	6 1145 0	AD	OPTION2	
0062				24,2045	0 0006 1	EXTEND		
0063	REF	2	LAST 505	24,2046	1 2062 0	BZF	PROG20A	
0064	REF	1		24,2047	3 2346 1	CAF	V06N33*	
0065	REF	104	LAST 505	24,2050	0 4616 1	TC	BANKCALL	FLASH VERB-NOUN TO REQUEST ESTIMATED
0066	REF	7	LAST 497	24,2051	20351 1	CADR	GOFFLASH	TIME OF LAUNCH
0067	REF	8	LAST 505	24,2052	0 6001 0	TC	GOTOPOOH	TERMINATE
0068	REF	1		24,2053	0 2055 0	TC	ORBCHG2	PROCEED VALUES OK
0069				24,2054	0 2047 0	TC	-5	TIME LOADED THRU DSKY
0070	REF	31	LAST 499	24,2055	0 6036 1	TC	INTPRET	
0071				24,2056	77650 1	GOTO		
0072	REF	1		24,2057	64227 1		ORBCHG3	
0073				32,2227		BANK	32	
0074	REF	1		32,2000		SETLOC	P20S4	
0075				32,2227		BANK		
0076	REF	1				COUNT*	\$/P20	
0077				32,2227	77624 1	ORBCHG3	CALL	
0078	REF	5	LAST 312	32,2230	27412 0		INTSTALL	
0079				32,2231	77745 1	DLOAD		
0080	REF	8	LAST 321	32,2232	03440 1		TIG	
00801	REF	2	LAST 163	32,2233	03657 0	STORE	LNCHTM	
0081	REF	7	LAST 499	32,2234	00041 1	STORE	TDEC1	ESTIMATED LAUNCH TIME
0082				32,2235	43014 0	CLEAR	CLEAR	
0083	REF	4	LAST 252	32,2236	01674 0		VINTFLAG	LM INTEGRATION
0084	REF	1		32,2237	01673 1		INTYPFLG	PRECISION - ENCKE
0085				32,2240	43014 0	CLEAR	CLEAR	
0086	REF	3	LAST 251	32,2241	01676 1		DIMOFFLAG	NO W-MATRIX
0087	REF	2	LAST 251	32,2242	01675 1		D6QR9FLG	
0088				32,2243	77624 1	CALL		
0089	REF	3	LAST 251	32,2244	27134 1		INTEGRV	PLANETARY INERTIAL ORIENTATION
0090				32,2245	77624 1	CALL		
0091	REF	1		32,2246	11165 0		GRP2PC	
0092				32,2247	77775 1	VLOAD		
0093	REF	2	LAST 224	32,2250	00017 1		RATT1	
0094	REF	2	LAST 163	32,2251	17627 1	STOOL	RSUBL	SAVE LM POSITION
0095	REF	4	LAST 499	32,2252	00015 0		TAT	

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0096	REE	8	LAST	505	32,2253	34041 0	STCALL	TDEC1	
0097	REE	6	LAST	505	32,2254	27412 0		INTSTALL	
0098					32,2255	43014 0	SET	CLEAR	
0099	REF	5	LAST	505	32,2256	01474 1		VINTEL AG	CSM INTEGRATION
0100	REF	2	LAST	505	32,2257	01673 1		INTYPELG	
0101					32,2260	43014 0	CLEAR	BOFF	
0102	REF	4	LAST	505	32,2261	01676 1		DIMOE LAG	
0103	REF	3	LAST	251	32,2262	02756 1		RENDWELG	W MATRIX VALID
0104	REF	1			32,2263	64267 0		NOWMATX	NO
0105					32,2264	43014 0	SET	SET	YES - SET FOR W MATRIX
0106	REF	5	LAST	506	32,2265	01476 0		DIMOF LAG	
0107	REF	3	LAST	505	32,2266	01475 0		D6OR9ELG	
0108					32,2267	77624 1	NOWMATX CALL		
0109	REE	4	LAST	505	32,2270	27134 1		INTEGRV	CSM INTEGRATION
0110					32,2271	77624 1	CALL		
0111	REE	2	LAST	505	32,2272	11165 0		GRP2PC	
0112					32,2273	77775 1	VLOAD		
0113	REF	6	LAST	224	32,2274	00025 0		VATT1	
0114	REF	1			32,2275	25761 0	STOVL	VSUBC	SAVE CSM VELOCITY
0115	REE	3	LAST	505	32,2276	00017 1		RATT1	
0116	REF	1			32,2277	01102 0	STORE	RSUBC	SAVE CSM POSITION
0117					32,2300	53435 0	VXV	UNIT	COMPUTE NORMAL TO CSM ORBITAL PLANE
0118	REF	2	LAST	506	32,2301	01761 0		VSUBC	NSUB1=UNIT(R(ICM) CROSS V(ICM)
0119					32,2302	24025 0	STOVL	20D	SAVE NSUB1
0120	REF	3	LAST	505	32,2303	03627 1		RSUB1	COMPUTE ESTIMATED ORBITAL
0121					32,2304	53435 0	VXV	UNIT	PLANE CHANGE
0122					32,2305	00025 0		20D	UCSM = UNIT(R(ICM) CROSS NSUB1)
0123	REF	2	LAST	163	32,2306	27635 1	STOVL	UCSM	
0124	REE	2	LAST	506	32,2307	01102 0		RSUBC	COMPUTE ANGLE BETWEEN UCSM
0125					32,2310	50256 0	UNIT	DOT	AND RSUBC
0126	REE	3	LAST	506	32,2311	03635 1		UCSM	COS A = UCSM DOT UNIT (R(ICM))
0127					32,2312	77752 1	SL1		
0128	REE	2	LAST	140	32,2313	02732 0	STORE	CSTH	SAVE DOE TIME-THETA SUBROUTINE
0129					32,2314	44316 0	DSQ	BDSU	COMPUTE SINE A
0130	REF	1			32,2315	10345 1		ONEB-2	
0131					32,2316	77766 0	SQRT		
0132	REE	2	LAST	140	32,2317	26730 1	STOVL	SNTH	SAVE FOR TIME-THETA SUBROUTINE
0133	REF	3	LAST	506	32,2320	01102 0		RSUBC	POSITION OF CSM AT EST. LAUNCH
0134	REF	1			32,2321	26655 0	STOVL	RVEC	TIME FOR TIME-THETA B-27
0135	REF	3	LAST	506	32,2322	01761 0		VSUBC	VELOCITY OF CSM AT EST. LAUNCH
01351					32,2323	77676 0	VCOMP		
0136	REF	2	LAST	140	32,2324	02744 1	STORE	VVEC	TIME FOR TIME THETA B-5
0137					32,2325	45014 0	CLEAR	CALL	
0138	REE	1			32,2326	03666 1		RVSU	
0139	REF	1			32,2327	24745 1		TIMETHFT	
01391					32,2330	77676 0	VCOMP		
0140	REE	2	LAST	163	32,2331	03643 0	STORE	NEWVEL	TERMINAL VELOCITY OF CSM
01401					32,2332	77745 1	DLOAD		
01402	REF	1			32,2333	00037 0		T	
01403	REE	2	LAST	163	32,2334	27661 0	STOVL	TRANSTM	TRANSEER TIME

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01404	REF	3	LAST	506	32,2335	03643 0		NEWVEL	
0141					32,2336	77646 0	ABVAL		
01411					32,2337	24025 0	STOVL	20D	
0142					32,2340	00001 0		0D	
0143	REF	2	LAST	163	32,2341	03651 0	STORE	NEWPOS	TERMINAL POSITION OF CSM
0144					32,2342	53435 0	VXV	UNIT	COMPUTE NORMAL TO CSM ORBITAL PLANE
0145	REF	4	LAST	506	32,2343	03627 1		RSUBL	NSUB2 = UNIT(NEWPOS CROSS R(LM))
0146					32,2344	53435 0	VXV	UNIT	ROTATE TERMINAL VEL INTO DESIRED
0147	REF	3	LAST	507	32,2345	03651 0		NEWPOS	ORBITAL PLANE
0148					32,2346	76561 1	VXSC	VSL1	VSUBC = ABVAL(NEWVEL) \$ UNIT(NSUB2
0149					32,2347	00025 0		20D	
0150	REF	1			32,2350	37663 0	STCALL	NCSMVEL	NEW CSM VELOCITY
0151	REF	3	LAST	506	32,2351	11165 0		GRP2PC	
0152					32,2352	77624 1	CALL		
0153	REF	7	LAST	506	32,2353	27412 0		INTSTALL	
0154					32,2354	44345 0	DLOAD	BDSU	
0155	REF	3	LAST	506	32,2355	03661 0		TRANSTM	LAUNCH TIME - TRANSFER TIME
01551	REF	3	LAST	505	32,2356	03657 0		LNCHTM	
0156	REF	4	LAST	334	32,2357	25517 0	STOVL	TET	
0157	REF	4	LAST	507	32,2360	03651 0		NEWPOS	
0158	REF	4	LAST	335	32,2361	01535 0	STORE	RCV	
0159	REF	2	LAST	126	32,2362	25503 0	STOVL	RRECT	
0160	REF	2	LAST	507	32,2363	03663 1		NCSMVEL	
0161	REF	2	LAST	126	32,2364	35511 1	STCALL	VRECT	
0162	REF	1			32,2365	23361 1		MINIRECT	
01621					32,2366	45174 1	AXT,2	CALL	
01622					32,2367	00002 0		2	
0163	REF	2	LAST	36	32,2370	26661 1		ATOPCSM	
0164					32,2371	77624 1	CALL		
0165	REF	1			32,2372	27425 1		INTWAKE0	
0166					32,2373	77776 1	EX1T		
0167	REF	105	LAST	505	32,2374	0 4616 1	TC	BANKCALL	
0168	REF	3	LAST	505	32,2375	50062 0	CADR	PROG20A	
0169					24,2060		BANK	24	
0170	REF	2	LAST	504	24,2000		SETLOC	P20S	
0171					24,2060		BANK		
0172	REF	2	LAST	504 TO 505:	30	30*	COUNT*	\$\$/P20	
0173	REF	28	LAST	487	24,2060	0 5516 0	TC	DOWNFLAG	RESET VEHUPFLG- LM STATE VECTOR
0174	REF	4	LAST	505	24,2061	00026 0	ADRES	VEHUPFLG	TO BE UPDATED
0175	REF	106	LAST	507	24,2062	0 4616 1	TC	BANKCALL	
0176	REF	3	LAST	499	24,2063	11175 1	CADR	R02BOTH	
0177	REF	15	LAST	505	24,2064	0 5504 0	TC	UPFLAG	
0178	REF	2	LAST	302	24,2065	00027 1	ADRES	UPDATEFLG	SET UPDATE FLAG
0179	REF	16	LAST	507	24,2066	0 5504 0	TC	UPFLAG	
0180	REF	2	LAST	302	24,2067	00031 0	ADRES	TRACKFLG	SET TRACK FLAG
0181	REF	17	LAST	507	24,2070	0 5504 0	TC	UPFLAG	
0182	REF	2	LAST	302	24,2071	00010 0	ADRES	RNDVZFLG	SET RENDEZVOUS FLAG
0183	REF	29	LAST	507	24,2072	0 5516 0	TC	DOWNFLAG	
0184	REF	1			24,2073	00037 0	ADRES	SRCHOPTN	INSURE SEARCH OPTION OFF

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0185	REF	30	LAST	507	24,2074	0 5516 0	TC	DOWNFLAG	ALSO MANUAL ACQUISITION FLAG RESFT
0186	REF	1			24,2075	00040 0	ADRES	ACMODFLG	
0187	REF	31	LAST	508	24,2076	0 5516 0	TC	DOWNFLAG	TURN OFF R04FLAG TO ENSURE GETTING
0188	REF	5	LAST	294	24,2077	00063 1	ADRES	R04FLAG	ALARM 521 IF CANT READ RADAR
0189	REF	32	LAST	508	24,2100	0 5516 0	TC	DOWNFLAG	ENSURE R25 GIMBAL MONITOR IS ENABLED
0190	REF	3	LAST	286	24,2101	00126 1	ADRES	NORRMON	(RESET NORRMON FLAG)
0191	REF	33	LAST	508	24,2102	0 5516 0	TC	DOWNFLAG	RESFT LOS BEING COMPUTED FLAG
0192	REF	1			24,2103	00041 1	ADRES	LOSCMFLG	
0195	REF	6	LAST	488	24,2104	0 5353 1	TC	PHASCHNG	
0196					24,2105	04022 0	OCT	04022	
0197	REF	106	LAST	484	24,2106	3 4755 1	CAF	ZFR0	ZERO MARK COUNTER
0198	REF	1			24,2107	551460 0	TS	MARKCTR	
0199	REF	32	LAST	505	24,2110	0 6036 1	TC	INTPRET	LOS DETERMINATION ROUTINE
0200					24,2111	77634 0	RTB		
0201	REF	6	LAST	499	24,2112	21462 1		LOADTIME	
0202	REF	9	LAST	506	24,2113	34041 0	STCALL	TDEC1	
0203	REF	1			24,2114	51151 0		LPS20.1	
0204					24,2115	77624 1	CALL		
0205	REF	1			24,2116	53565 1		LPS20.2	TEST RANGE ROUTINE
0206					24,2117	77776 1	EXIT		
0207	REF	227	LAST	487	24,2120	50 154 1	INDEX	MPAC	
0208					24,2121	0 2122 1	TC	+1	
0209	REF	1			24,2122	0 2132 0	TC	P20LEMA	NORMAL RETURN WITHIN 400 N M
0210	REF	1			24,2123	3 2336 0	CAF	ALRM526	ERROR EXIT - RANGE > 400 N. MI.
0211	REF	107	LAST	507	24,2124	0 4616 1	TC	BANKCALL	
0212	REF	1			24,2125	21451 1	CADR	PRIOLARM	
0213	REF	2	LAST	488	24,2126	0 6022 1	TC	GOTOV56	TERMINATE EXITS P20 VIA V56 CODING
0214					24,2127	0 2123 0	TC	-4	PROC ILLEGAL
0215	REF	1			24,2130	0 2104 0	TC	P20LEM1	ENTER RECYCLE
0216	REF	68	LAST	503	24,2131	0 5155 0	TC	ENOOFJOB	
0217	REF	7	LAST	508	24,2132	0 5353 1	TC	PHASCHNG	
0218					24,2133	04022 0	OCT	04022	
0219	REF	2	LAST	504	24,2134	0 2714 1	TC	LUNSFCHK	CHECK LUNAR SURFACE FLAG (P22 FLAG)
0220	REF	1			24,2135	0 2140 0	TC	P20LEMB	
0221	REF	108	LAST	508	24,2136	0 4616 1	TC	BANKCALL	
0222	REF	1			24,2137	46100 1	CADR	P61LEM	PREFERRED TRACKING ATTITUDE ROUTINE
0223	REF	8	LAST	508	24,2140	0 5353 1	TC	PHASCHNG	
0224					24,2141	05022 1	OCT	05022	RESTART AT PRIORITY 10 TO ALLOW V37
0225					24,2142	10000 0	OCT	10000	REQUESTED PROGRAM TO RUN FIRST
0226	REF	3	LAST	488	24,2143	3 7713 0	CAF	PRI026	RESTORE PRIORITY 26
0227	REF	9	LAST	501	24,2144	0 5146 1	TC	PRI0CHNG	
02272	REF	14	LAST	488	24,2145	3 0075 0	CA	FLAGWRD1	IS THE TRACK FLAG SET
02274	REF	4	LAST	488	24,2146	7 4747 0	MASK	TRACKBIT	
02276					24,2147	0 0006 1	EXTEND		
02278	REF	1			24,2150	1 2262 1	BZF	P20LEMWT	BRANCH - NO - WAIT FOR IT TO BE SET
0228	REF	28	LAST	470	24,2151	3 4752 0	CAF	BIT2	IS RR AUTO MODE DISCRETE PRESENT
0229					24,2152	0 0006 1	EXTEND		
0230	REF	7	LAST	431	24,2153	02 033 0	RAND	CHAN33	

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0231					24,2154	0 0006	1		EXTEND		
0232	REF	1			24,2155	1 2211	0		BZF	P20LEMB3	YES - 00 AUTOMATIC ACQUISITION (R21)
0233	REF	5	LAST	310	24,2156	4 6007	1	P20LEMB5	CS	OCT24	RADAR NOT IN AUTO CHECK IF
0234	REF	10	LAST	488	24,2157	6 1011	0		AD	MOOREG	MAJOR MODE IS 20
0235					24,2160	0 0006	1		EXTEND		
0236	REF	1			24,2161	1 2174	0		BZF	P20LEMB6	BRANCH - YES-OK TO 00 PLEASE PERFORM
02363	REF	3	LAST	417	24,2162	6 7745	0		AD	NEG2	ALSO CHECK FOR P22
02366					24,2163	0 0006	1		EXTEND		
02369	REF	2	LAST	509	24,2164	1 2174	0		BZF	P20LEMB6	BRANCH - YES OK TO DO PLEASE PERFORM
0241	REF	1			24,2165	3 2340	1		CAF	ALRM514	TRACK FLAG SET-FLASH PRIORITY ALARM 514-
0242	REF	109	LAST	508	24,2166	0 4616	1		TC	BANKCALL	RADAR GOES OUT OF AUTO MODE WHILE IN USE
0243	REF	2	LAST	508	24,2167	21451	1		CAOR	PRIOLARM	
0244	REF	3	LAST	508	24,2170	0 6022	1		TC	GOTOV56	TERMINATE EXITS VIA V56
0245	REF	2	LAST	508	24,2171	0 2140	0		TC	P20LEMB	PROCEED AND ENTER BOTH GO BACK
0246	REF	3	LAST	509	24,2172	0 2140	0		TC	P20LEMB	TO CHECK AUTO MODE AGAIN
0247	REF	69	LAST	508	24,2173	0 5155	0		TC	ENDOFJOB	
0248	REF	1			24,2174	3 2337	1	P20LEMB6	CAF	OCT201	REQUEST RR AUTO MODE SELECTION
0249	REF	110	LAST	509	24,2175	0 4616	1		TC	BANKCALL	
0250	REF	1			24,2176	20476	0		CADR	GOPERF1	
0251	REF	4	LAST	509	24,2177	0 6022	1		TC	GOTOV56	TERMINATE EXITS P20 VIA V56 CODING
0252	REF	4	LAST	509	24,2200	0 2140	0		TC	P20LEMB	PROCEED CHECKS AUTO MODE DISCRETE AGAIN
0253	REF	3	LAST	508	24,2201	0 2714	1		TC	LUNSFCHK	ENTER INDICATES MANUAL ACQUISITION (R23)
0254	REF	1			24,2202	0 2207	0		TC	P20LEMB2	YES - R23 NOT ALLOWED-TURN ON OPR ERROR
0255	REF	1			24,2203	0 3027	1		TC	R23LEM	NO - DO MANUAL ACQUISITION
0256	REF	18	LAST	507	24,2204	0 5504	0	P20LEMB1	TC	UPFLAG	RETURN FROM R23 - LOCKON ACHIEVED
0257	REF	2	LAST	508	24,2205	00040	0		ADRES	ACMOOFLG	SET MANUAL FLAG AND GO BACK TO CHECK
0258	REF	5	LAST	509	24,2206	0 2140	0		TC	P20LEMB	RR AUTO MODE
0259	REF	6	LAST	459	24,2207	0 4364	1	P20LEMB2	TC	FALTON	TURNS ON OPERATOR ERROR LIGHT ON DSKY
0260	REF	6	LAST	509	24,2210	0 2140	0		TC	P20LEMB	AND GOES BACK TO CHECK AUTO MODE
0261	REF	31	LAST	483	24,2211	4 0110	0	P20LEMB3	CS	RADMODES	ARE RR COUNTS BEING ZEROED
0262	REF	23	LAST	437	24,2212	7 4737	1		MASK	BIT13	(BIT 13 RADMODES EQUAL ONE)
0263					24,2213	0 0006	1		EXTEND		
0264	REF	1			24,2214	1 2226	1		BZF	P20LEMB4	BRANCH - YES - WAIT
0265	REF	5	LAST	308	24,2215	3 4355	0		CAF	BIT13-14	IS SEARCH OR MANUAL ACQUISITION FLAG SET
0266	REF	7	LAST	347	24,2216	7 0076	1		MASK	FLAGWR02	
0267					24,2217	0 0006	1		EXTEND		
0268	REF	1			24,2220	1 2232	1		BZF	P20LEMC3	ZERO MEANS AUTOMATIC RR ACQUISITION
0269	REF	34	LAST	508	24,2221	0 5516	0		TC	DOWNFLAG	RESET TO AUTO MODE
0270	REF	2	LAST	507	24,2222	00037	0		ADRES	SRCHOPTM	
0271	REF	35	LAST	509	24,2223	0 5516	0		TC	DOWNFLAG	

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0272	REF	3	LAST	509	24,2224	00040 0		ADRES	ACMODFLG		
0273	REF	2	LAST	508	24,2225	0 2262 0		TC	P20LEMT	WAIT 2.5 SECONDS THEN GO TO RR DATA READ	
0274	REF	1			24,2226	3 2335 0	P20LEMB4	CAF	25JDEC		
0275	REF	111	LAST	509	24,2227	0 4616 1		TC	BANKCALL	WAIT 2.5 SECONDS WHILE RR CDUS ARE BEING	
0276	REF	8	LAST	315	24,2230	01735 1		CADR	DELAYJOB	ZEROED-THEN GO BACK AND CHECK AGAIN	
0277	REF	2	LAST	509	24,2231	0 2211 1		TC	P20LEMB3		
027705	REF	33	LAST	508	24,2232	0 6036 1	P20LEMC3	TC	INTPRET		
02771					24,2233	77624 1		CALL		DO A PERMANENT MEMORY PRECISION	
027715	REF	1			24,2234	50347 1			UPPSV	INTEGRATION TO ESTABLISH AN UP-TO-DATE	
02772					24,2235	77214 0		BOFF	VLOAD	BASE FOR CONICS (KEPLER) IN R21	
027725	REF	4	LAST	268	24,2236	04347 0			SURFLAG		
02773	REF	1			24,2237	50246 1			P20LEMC4		
027735	REF	1			24,2240	01661 1			RCVLEM	WHEN ON LUNAR SURFACE	
02774					24,2241	77742 0		VSR2		SCALE B-29	
02776	REF	2	LAST	135	24,2242	26356 0		STOVL	LMPOS		
02778	REF	1			24,2243	01667 1			VCVLFM		
027783					24,2244	77742 0		VSR2			
027785	REF	1			24,2245	02364 1		STORE	LMVEL		
02779					24,2246	77776 1	P20LEMC4	EXIT			
0278	REF	9	LAST	508	24,2247	0 5353 1	P20LEMC	TC	PHASCHNG		
0279					24,2250	04022 0		OCT	04022		
0280	REF	20	LAST	488	24,2251	30 074 1		CAE	FLAGWRD0	IS THE RENDEZVOUS FLAG SET	
0281	REF	6	LAST	488	24,2252	7 4745 1		MASK	RNDVZBIT		
0282					24,2253	0 0006 1		EXTEND			
0283	REF	70	LAST	509	24,2254	1 5155 1		BZF	ENDOFJOB	NO - EXIT P20	
0284	REF	15	LAST	508	24,2255	30 075 0		CAE	FLAGWRD1	IS TRACK FLAG SET (BIT 5 FLAGWORD 1)	
0285	REF	5	LAST	508	24,2256	7 4747 0		MASK	TRACKBIT		
0286					24,2257	0 0006 1		EXTEND			
0287	REF	1			24,2260	1 2315 0		BZF	P20LEMD	BRANCH-TRACK FLAG NOT ON-WAIT 15 SECONDS	
0288	REF	1			24,2261	0 2721 1	P20LEMF	TC	R21LEM		
0291	REF	2	LAST	510	24,2262	3 2335 0	P20LEMT	CAF	25JDEC		
0292					24,2263	0 0004 0		INHINT			
0293	REF	5	LAST	397	24,2264	0 5173 1		TC	IWIDDLE	USE INSTEAD OF WAITLIST SINCE SAME BANK	
0294	REF	2	LAST	255	24,2265	02275 0		ADRES	P20LFMC1	WAIT 2.5 SECONDS	
0295	REF	16	LAST	510	24,2266	30 075 0		CAE	FLAGWRD1	IS TRACK FLAG SET	
0296	REF	6	LAST	510	24,2267	7 4747 0		MASK	TRACKBIT		
0297					24,2270	0 0006 1		EXTEND			
0298	REF	71	LAST	510	24,2271	1 5155 1		BZF	ENDOFJOB	NO-EXIT WITHOUT DOING 2.7 PHASE CHANGE	
0299	REF	10	LAST	510	24,2272	0 5353 1	P20LMWT1	TC	PHASCHNG		
0300					24,2273	40072 0		OCT	40072		
0301	REF	72	LAST	510	24,2274	0 5155 0		TC	ENDOFJOB		
0302	REF	21	LAST	510	24,2275	30 074 1	P20LEMC1	CAF	FLAGWRD0	IS RENDEZVOUS FLAG SET	

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0303	REF	7	LAST	510	24,2276	7 4745 1	MASK	RNDVZBIT	
0304					24,2277	0 0006 1	EXTEND		
0305	REF	17	LAST	502	24,2300	1 5261 0	BZE	TASKOVER	NO - EXIT P20/R22
0306	REF	17	LAST	510	24,2301	30 075 0	CAE	FLAGWRD1	IS TRACK FLAG SET
0307	REF	7	LAST	510	24,2302	7 4747 0	MASK	TRACKBIT	
0308					24,2303	0 0006 1	EXTEND		
0309	REF	1			24,2304	1 2312 1	BZF	P20LEMC2	NO-DONT SCHEDULE R22 JOB
0310	REF	4	LAST	508	24,2305	3 7713 0	CAF	PRI026	YES-SCHEDULE P22 JOB (RR DATA READ)
0311	REF	17	LAST	474	24,2306	0 5105 0	TC	FINDVAC	
0312	REF	8	LAST	504	E7,1454		FBANK=	LOSCOUNT	
0313	REF	1			24,2307	02477 1	2CADR	R22LEM	
0313	REF	1			24,2310	50067 0			
0314	REF	18	LAST	511	24,2311	0 5261 1	TC	TASKOVER	
0315	REF	1			24,2312	0 5221 0	P20LEMC2	TC	FIXDELAY
0316					24,2313	02734 0	DEC	1500	TRACK FLAG NOT SET ,WAIT 15 SECONDS AND CHECK AGAIN
0317	REF	3	LAST	510	24,2314	0 2275 0	TC	P20LEMC1	
0318	REF	1			24,2315	3 2712 1	P20LEMD	CAF	1500DEC
0319	REF	6	LAST	510	24,2316	0 5173 1	TC	TWIDDLE	WAITLIST FOR 15 SECONDS
0320	REF	1			24,2317	02321 0	ADRES	P20LEMD1	
0321	REF	73	LAST	510	24,2320	0 5155 0	TC	ENDOFJOB	
0322	REF	18	LAST	511	24,2321	30 075 0	P20LEMD1	CAE	FLAGWRD1
0323	REF	8	LAST	511	24,2322	7 4747 0	MASK	TRACKBIT	IS TRACK FLAG SET
0324	REF	161	LAST	502	24,2323	10 000 0	CCS	A	
0325	REF	1			24,2324	1 2330 1	TCF	P20LEMD2	YES-SCHEDULE DESIGNATE JOB
0326	REF	2	LAST	511	24,2325	0 5221 0	TC	FIXDELAY	NO-WAIT 15 SECONDS
0327					24,2326	02734 0	DEC	1500	
0328	REF	2	LAST	511	24,2327	0 2321 0	TC	P20LEMD1	
0329	REF	5	LAST	511	24,2330	3 7713 0	P20LEMD2	CAF	PRI026
0330	REF	18	LAST	511	24,2331	0 5105 0	TC	FINDVAC	SCHEDULE JOB TO DO R21
0331	REF	9	LAST	511	E7,1454		FBANK=	LOSCOUNT	
0332	REF	2	LAST	509	24,2332	02232 0	2CADR	P20LEMC3	START AT PERM. MEMORY INTEGRATION
0332					24,2333	50067 0			
0333	REF	19	LAST	511	24,2334	0 5261 1	TC	TASKOVER	
0334					24,2335	00372 1	250DEC	DEC	250
0335					24,2336	00526 0	ALRM526	OCT	00526
0336					24,2337	00201 1	OCT201	OCT	00201
0337					24,2340	00514 1	ALRM514	OCT	514
0338					24,2341	00074 1	MAXTRIES	DEC	60
0339					24,2342	00012 1	OCT00012	OCT	00012
0340					24,2343	00001 0	P22ONE	OCT	00001

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0341				24,2344	10000 0	ONEB-2	2DEC	1.0 B-2	
0341				24,2345	00000 1				
03415				24,2346	01441 1	V06N33*	VN	0633	
0342				24,2347	45020 1	UPPSV	STQ	CALL	UPDATES PERMANENT STATE VECTORS
0343	REF	1		24,2350	01757 0			LS21X	TO PRESENT TIME
0344	RFF	8	LAST	507	24,2351			INSTALL	
0345				24,2352	77624 1		CALL		
0346	REF	2	LAST	251	24,2353			SETIFLG	
0347				24,2354	43014 0		BOF	SET	IF W-MATRIX INVALID, DONT INTEGRATE IT
0348	REF	4	LAST	506	24,2355			RENDWFLG	
0349	REF	1		24,2356	50367 0			UPPSV1	
0350	REF	6	LAST	506	24,2357			DIMOF	SET DIMOF
0351				24,2360	43014 0		BOF	SET	SET DIMOF
0352	REF	5	LAST	510	24,2361			SURFFLAG	IF ON LUNAR SURFACE W IS 6X6
0353	REF	1		24,2362	50364 0			UPPSV5	
0354	REF	4	LAST	506	24,2363			D6OR9FLG	OTHERWISE 9X9
0355				24,2364	77614 1	UPPSV5	BOF		
0356	REF	5	LAST	507	24,2365			VEHUPFLG	
0357	REF	1		24,2366	50411 0			UPPSV3	
0358				24,2367	47014 1	UPPSV1	SET	RTB	CSM STATE BEING CORRECTED
0359	REF	6	LAST	506	24,2370			VINTFLAG	
0360	REF	7	LAST	508	24,2371			LOADTIME	
0361	REF	10	LAST	508	24,2372		STCALL	TDEC1	INTEGRATE CSM STATE WITH W-MATRIX
0362	REF	5	LAST	506	24,2373			INTEGRV	
0363				24,2374	77624 1		CALL		GROUP 2 PHASE CHANGE
0364	REF	4	LAST	507	24,2375			GRP2PC	TO PROTECT INTEGRATION
0365				24,2376	77624 1		CALL		
0366	REF	9	LAST	512	24,2377			INTSTALL	
0367				24,2400	43145 0		DLOAD	CLEAR	GET TETCSM TO STORE IN TDEC FOR LM INT.
0368	REF	4	LAST	251	24,2401			TETCSM	
0369	REF	7	LAST	512	24,2402			VINTFLAG	
0370				24,2403	77624 1	UPPSV4	CALL		INTEGRATE OTHER VEHICLE
0371	REF	3	LAST	512	24,2404			SETIFLG	WITHOUT W-MATRIX
0372	RFF	11	LAST	512	24,2405		STCALL	TDEC1	
0373	REF	6	LAST	512	24,2406			INTFGRV	
0374				24,2407	77650 1		GOTO		
0375	REF	2	LAST	512	24,2410			LS21X	
0376				24,2411	47014 1	UPPSV3	CLEAR	RTB	
0377	REF	8	LAST	512	24,2412			VINTFLAG	
0378	REF	8	LAST	512	24,2413			LOADTIME	
0379	REF	12	LAST	512	24,2414		STCALL	TDEC1	INTEGRATE LM STATE WITH W-MATRIX
0380	REF	7	LAST	512	24,2415			INTEGRV	
0381				24,2416	77624 1		CALL		
0382	REF	5	LAST	512	24,2417			GRP2PC	
0383				24,2420	77624 1		CALL		
0384	REF	10	LAST	512	24,2421			INTSTALL	
0385				24,2422	71214 0		SET	DLOAD	
0386	REF	9	LAST	512	24,2423			VINTFLAG	

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0387	REF	2	LAST	127	24,2424	01643	1
0388					24,2425	77650	1
0389	REF	1			24,2426	50403	0

TETLEM
GOTO
UPPSV4

GET TETLEM TO STORE IN TDEC FOR CSM INT.

0390	REF	10	LAST	511	E7,1454
0391	REF	1			

EBANK= LOSCOUNT
COUNT* \$\$/P22

L P20-P25

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R0392 PROGRAM DESCRIPTION
 R0393 PREFERRED TRACKING ATTITUDE PROGRAM P25
 R0394 MOD NO - 3
 R0395 BY P. VOLANTE
 R0396 FUNCTIONAL DESCRIPTION

R0397
 R0398 THE PURPOSE OF THIS PROGRAM IS TO COMPUTE THE PREFERRED TRACKING
 R0399 ATTITUDE OF THE LM TO CONTINUOUSLY POINT THE LM TRACKING BEACON AT THE
 R0400 CSM AND TO PERFORM THE MANEUVER TO THE PREFERRED TRACKING ATTITUDE AND
 R0401 CONTINUOUSLY MAINTAIN THIS ATTITUDE WITHIN PRESCRIBED LIMITS

R0402 CALLING SEQUENCE -
 R0403 ASTRONAUT REQUEST THROUGH DSKY V37E25E
 R0404 SUBROUTINES CALLED -

R0405 BANKCALL FLAGUP
 R0406 R02BOTH (IMU STATUS CHECK) ENDOFJOB
 R0407 R61LEM (PREF TRK ATT ROUT) WAITLIST
 R0408 TASKOVER FINDVAC
 R0409 NORMAL EXIT MODES -

R0410 P25 MAY BE TERMINATED IN TWO WAYS-ASTRONAUT SELECTION OF IDLING

R0411 PROGRAM(P00) BY KEYING V37E00E OR BY KEYING IN V56E

R0412 ALARM OR ABORT EXIT MODES -

R0413 NONE

R0414 OUTPUT

R0415 ERASABLE INITIALIZATION REQUIRED

R0416 FLAGS SET + RESET

R0417 TRACKFLG,P25FLAG

R0418 DEBRIS

R0419 NCNE

R0420 REF 11 LAST 513 E7,1454

R0421 REF 1

R0422 REF 2 LAST 504 24,2427 0 5327 1 PROG25

R0423 24,2430 00004 0

R0424 24,2431 05022 1

R0425 24,2432 26000 0

EBANK= LOSC COUNT

COUNT* \$\$/P25

TC 2PHSCHNG

OCT 4

OCT 05022

OCT 26000

MAKE GROUP 4 INACTIVE (VERB 37)

PRIORITY 26

R0426 REF 112 LAST 510 24,2433 0 4616 1

R0427 REF 4 LAST 507 24,2434 11175 1

R0428 REF 19 LAST 509 24,2435 0 5504 0

R0429 REF 3 LAST 507 24,2436 00031 0

R0430 REF 20 LAST 514 24,2437 0 5504 0

R0431 REF 2 LAST 302 24,2440 00006 1

R0432 REF 11 LAST 510 24,2441 0 5353 1 P25LEM1

R0433 24,2442 04022 0

R0434 REF 2 LAST 243 24,2443 3 4743 0

R0435 REF 31 LAST 254 24,2444 7 0074 0

R0436 24,2445 0 0006 1

R0437 REF 74 LAST 511 24,2446 1 5155 1

R0438 REF 9 LAST 511 24,2447 3 4747 1

R0439 REF 32 LAST 514 24,2450 7 0075 1

R0440 24,2451 0 0006 1

TC BANKCALL

CADR R02BOTH

TC UPFLAG

ADRES TRACKFLG

TC JPFLAG

ADRES P25FLAG

TC PHASCHNG

OCT 04022

CAF P25FLBIT

MASK STATE

EXTEND

BZF ENDOFJOB

CAF TRACKBIT

MASK STATE +1

EXTEND

IMU STATUS CHECK

SET TRACK FLAG

SET P25FLAG

IS P25FLAG SET

IS TRACKFLAG SET?

L P20-P25

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0441	REF	1		24,2452	1 2462	1	BZF	P25LMWT1	NO-SKIP PHASE CHANGE AND WAIT 1 MINUTE
0442	REF	7	LAST	469	24,2453	3 4757	0	CAF	SEVEN
04425	REF	1			24,2454	55'743	1	TS	R65CNTR
0443	REF	113	LAST	514	24,2455	0 4616	1	TC	BANKCALL
0444	REF	1			24,2456	46105	1	CADR	P65LEM
0445	REF	2	LAST	255	24,2457	0 2441	1	TC	P25LEM1
0446	RFF	12	LAST	514	24,2460	0 5353	1	P25LEMWT	PHASCHNG
0447					24,2461	00112	0	OCT	00112
0448	REF	1			24,2462	3 2474	1	P25LMWT1	60SCNDS
0449					24,2463	0 0004	0	INHINT	
0450	REF	7	LAST	511	24,2464	0 5173	1	TC	TWIDDLE
0451	REF	1			24,2465	02467	0	ADRES	P25LEM2
0452	REF	75	LAST	514	24,2466	0 5155	0	TC	FND0FJOB
0453	REF	1			24,2467	3 5024	1	P25LEM2	CAF
0454	REF	19	LAST	511	24,2470	0 5105	0	TC	FINDVAC
0455	REF	12	LAST	514	E7,1454			EBANK =	LOSCOUNT
0456	REF	3	LAST	515	24,2471	02441	1	2CADR	P25LEM1
0456					24,2472	50067	0		
0457	REF	20	LAST	511	24,2473	0 5261	1	TC	TASKOVER
0458					24,2474	13560	0	60SCNDS	DEC
0460					24,2475	77776	1	P25OK	EXIT
0461	REF	1			24,2476	0 2460	1	TC	P25LEMWT

WAIT ONE MINUTE THEN CHECK AGAIN

L P20-P25

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P0462 DATA READ ROUTINE 22 (LEM)

R0463 PROGRAM DESCRIPTION

R0464 MCD NC - 2

R0465 BY P VOLANTE

R0466 FUNCTIONAL DESCRIPTION

R0467

R0468 TO PROCESS AUTOMATIC RR MARK DATA TO UPDATE THE STATE VECTOR OF EITHER

R0469 LM OR CSM AS DEFINED IN THE RENDEZVOUS NAVIGATION PROGRAM (P20)

R0470 CALLING SEQUENCE -

R0471 TC BANKCALL

R0472 CADR R22LEM

R0473 SUBROUTINES CALLED -

R0474 LSR22.1 GOFLASH WAITLIST

R0475 LSR22.2 PRIOLARM BANKCALL

R0476 LSR22.3 R61LEM

R0477 NORMAL EXIT MODES-

R0478 R22 WILL CONTINUE TO RECYCLE,UPDATING STATE VECTORS WITH RADAR DATA

R0479 UNTIL P20 CEASES TO OPERATE (RENDEZVOUS FLAG SET TO ZERO) AT WHICH TIME

R0480 R22 WILL TERMINATE SELF.

R0481 ALARM OR ABORT EXIT MODES-

R0482 PRIORITY ALARM

R0483 PRIORITY ALARM 525 LOS NOT WITHIN 3 DEGREE LIMIT

R0484 OUTPUT

R0485 SEE OUTPUT FROM LSR22.3

R0486 ERASABLE INITIALIZATION REQUIRED

R0487 SEE LSR22.1,LSR22.2,LSR22.3

R0488 FLAGS SET + RESET

R0489 NOANGFLG

R0490 DEBRIS

R0491 SEE LSR22.1,LSR22.2,LSR22.3

0492 REF 2 LAST 161 E7,1735

0493 REF 1

0494 REF 13 LAST 515 24,2477 0 5353 1 R22LEM

0495 24,2500 04022 0

0496 REF 8 LAST 511 24,2501 3 4745 0

0497 REF 33 LAST 514 24,2502 7 0074 0

0498 24,2503 0 0006 1

0499 REF 76 LAST 515 24,2504 1 5155 1

0500 REF 10 LAST 514 24,2505 3 4747 1

0501 REF 34 LAST 516 24,2506 7 0075 1

0502 24,2507 0 0006 1

0503 REF 1 24,2510 1 2664 0

0504 REF 48 LAST 502 24,2511 3 4736 1 R22LEM12

0505 24,2512 0 0006 1

0506 REF 23 LAST 481 24,2513 02 012 0

0507 24,2514 0 0006 1

0508 REF 2 LAST 508 24,2515 1 2132 1

0509 REF 29 LAST 508 24,2516 3 4752 0

0510 24,2517 0 0006 1

0511 REF 8 LAST 508 24,2520 02 033 0

EBANK= LRS22.1X

COUNT* \$\$/R22

TC PHASCHNG

OCT 04022

CAF RNDVZBIT

MASK STATE

EXTEND

BZF ENDOFJOB

CAF TRACKBIT

MASK STATE +1

EXTEND

BZF R22WAIT

CAF BIT14

EXTEND

RAND CHAN12

EXTEND

BZF P20LEMA

CAF BIT2

EXTEND

RAND CHAN33

IS RENDESVOUS FLAG SET?

NO-EXIT R22 AND P20

IS TRACKFLAG SET?

NO WAIT

IS RR AUTO TRACK ENABLE DISCRETE STILL

ON (A MONITOR REPOSITION BY R25 CLEARST

NO - RETURN TO P20

YES

IS RR AUTO MODE DISCRETE PRESENT

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0512				24,2521	0 0006	1	EXTEND		
0513				24,2522	1 2524	1	BZF	+2	YES CONTINUE
0514	REF	1		24,2523	0 2156	1	TC	P20LEMB5	NO - SET IT
0515	REF	32	LAST	509	24,2524	4 0110	CS	RADMODES	ARE RR CDUS BEING ZEROED
0516	REF	24	LAST	509	24,2525	7 4737	MASK	BIT13	(BIT 13 RADMODES EQUAL ONE)
0517				24,2526	0 0006	1	EXTEND		
0518	REF	1		24,2527	1 2655	1	BZF	R22LFM42	CDUS BEING ZEROED
05183	REF	14	LAST	516	24,2530	0 5353	1	TC	PHASCHNG
05186				24,2531	00152	1	OCT	00152	IF A RESTART OCCURS, AN EXTRA RADAR
0519	REF	114	LAST	515	24,2532	0 4616	1	TC	BANKCALL
0520	REF	1		24,2533	64376	1	CADR	LRS22.1	READING IS TAKEN, SO BAD DATA ISN'T USED
0521	REF	228	LAST	508	24,2534	50 154	1	INDEX	MPAC
0522				24,2535	0 2536	0	TC	+1	YES READ DATA + CALCULATE LOS
0523	REF	1		24,2536	0 2557	1	TC	R22LEM2	DATA READ SUBROUTINE
0524	REF	1		24,2537	0 2247	1	TC	P20LEMC	NORMAL RETURN (GOOD DATA)
0525	REF	1		24,2540	3 2707	0	CAF	ALRM525	COULD NOT READ RADAR-TRY TO REDESIGNATE
0526	REF	115	LAST	517	24,2541	0 4616	1	TC	BANKCALL
0527	REF	3	LAST	509	24,2542	21451	1	CADR	PRIOLARM
0528	REF	5	LAST	509	24,2543	0 6022	1	TC	GOTOV56
0529	REF	1		24,2544	0 2547	0	TC	R22LEM1	TERMINATE EXITS P20 VIA V56 CODING
0530				24,2545	0 2540	1	TC	-5	PROC (DISPLAY DELTA THETA)
0531	REF	77	LAST	516	24,2546	0 5155	0	TC	ENDOFJOB
0532	REF	15	LAST	517	24,2547	0 5353	1	R22LEM1	TC
0533				24,2550	04022	0	OCT	04022	PHASCHNG
0534	REF	1		24,2551	3 2710	0	CAF	V06N05	DISPLAY DELTA THETA
0535	REF	116	LAST	517	24,2552	0 4616	1	TC	BANKCALL
0536	REF	1		24,2553	20362	1	CADR	PRIODSP	
0537	REF	6	LAST	517	24,2554	0 6022	1	TC	GOTOV56
0538	REF	2	LAST	517	24,2555	0 2557	1	TC	R22LEM2
0539	REF	2	LAST	517	24,2556	0 2247	1	TC	P20LFMC
0540	REF	16	LAST	517	24,2557	0 5353	1	R22LEM2	TC
0541				24,2560	04022	0	OCT	04022	PHASCHNG
0542	REF	4	LAST	509	24,2561	0 2714	1	TC	LUNSFCHK
0543	REF	1		24,2562	0 2577	0	TC	R22LEM3	CHECK IF ON LUNAR SURFACE (P22FLAG SET)
0544	REF	19	LAST	511	24,2563	3 0075	0	CA	FLAGWRD1
0545	REF	11	LAST	516	24,2564	7 4747	0	MASK	TRACKBIT
0546				24,2565	0 0006	1	EXTEND		YES-BYPASS FLAG CHECKS AND LRS22.2
0547	REF	2	LAST	516	24,2566	1 2664	0	BZF	P22WAIT
0548	REF	117	LAST	517	24,2567	0 4616	1	TC	BANKCALL
0549	REF	1		24,2570	51230	1	CADR	LRS22.2	IS TRACK FLAG SET
0550	REF	229	LAST	517	24,2571	50 154	1	INDEX	MPAC
0551				24,2572	0 2573	1	TC	+1	NO - WAIT
0552	REF	2	LAST	517	24,2573	0 2577	0	TC	R22LEM3
0553	REF	118	LAST	517	24,2574	0 4616	1	TC	BANKCALL
0554	REF	2	LAST	508	24,2575	46100	1	CADR	R6ILEM
0555	REF	3	LAST	517	24,2576	0 2664	1	TC	R22WAIT
0556	REF	20	LAST	517	24,2577	4 0075	1	R22LEM3	CS
0557	REF	1		24,2600	7 4746	1	MASK	NOUPFBIT	NOT WITHIN 30 DEG OF Z-AXIS
									SHOULD WE BYPASS STATE VECTOR UPDATE
									(IS NOUPDATE FLAG SET?)

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0558				24,2601	0 0006	1	EXTEND		
0559	REF	2	LAST	517	24,2602	1 2655	1	BZF R22LEM42	BRANCH=YES
0560	REF	21	LAST	517	24,2603	3 0075	0	CA FLAGWRD1	IS UPDATE FLAG SET
0561	REF	1			24,2604	7 4745	1	MASK JPDATBIT	
0562					24,2605	0 0006	1	EXTEND	
0563	REF	3	LAST	518	24,2606	1 2655	1	BZF R22LEM42	UPDATE FLAG NOT SET
0564	REF	6	LAST	511	24,2607	3 7713	0	CAF PRI026	INSURE HIGH PRIO IN RESTART
0565	REF	2	LAST	244	24,2610	55'056	1	TS PHSPRDT2	
0566	REF	34	LAST	510	24,2611	0 6036	1	TC INTPPET	
0567					24,2612	77650	1	GOTO	
0568	REF	1			24,2613	54370	1		LSR22.3
0569					24,2614	77776	1	R22LEM93 EXIT	NORMAL EXIT FROM LSR22.3
05693	REF	17	LAST	517	24,2615	0 5353	1	TC PHASCHNG	PHASE CHANGE TO PROTECT AGAINST
05696					24,2616	04022	0	OCT 04022	CONFLICT WITH GRP2PC ERASEABLE
0570	REF	1			24,2617	1 2650	1	TCF P22LEM44	
0571					24,2620	77776	1	R22LEM96 EXIT	
0572	REF	107	LAST	508	24,2621	3 4755	1	CAF ZERO	SET N49FLAG = ZERO TO INDICATE
0573	REF	2	LAST	167	24,2622	55'744	0	TS N49FLAG	V06 N49 DISPLAY HASNT BEEN ANSWERED
0574	REF	18	LAST	518	24,2623	0 5353	1	TC PHASCHNG	
0575					24,2624	04022	0	OCT 04022	TO PROTECT DISPLAY
0576	REF	2	LAST	207	24,2625	3 7714	1	CAF PRI027	PROTECT DISPLAY
0577	REF	10	LAST	502	24,2626	0 5072	1	TC NOVAC	
0578	REF	3	LAST	518	E7,1744			EBANK= N49FLAG	
0579	REF	1			24,2627	02670	1	2CADR N49DSP	
0579	REF	1			24,2630	50067	0		
0580	REF	35	LAST	518	24,2631	0 6036	1	TC INTPPET	
0581					24,2632	77735	0	SLOAD	
0582	REF	4	LAST	518	24,2633	03745	1		N49FLAG
0583					24,2634	50054	0	BZE BMN	LOOP TO CHECK IF FLAG
0584					24,2635	50632	0	-3	SETTING CHANGED-BRANCH - NO
0585	REF	1			24,2636	50644	1	R22LEM7	PROCEED
0586					24,2637	77776	1	EXIT	DISPLAY ANSWERED BY RECYCLE
0587	REF	5	LAST	517	24,2640	0 2714	1	TC LUNSFCHK	ARE WE ON LUNAR SURFACE
0588	REF	4	LAST	517	24,2641	0 2664	1	TC R22WAIT	YES - 15 SECOND DELAY
0589	REF	108	LAST	518	24,2642	3 4755	1	CA ZERO	NO - SET R65COUNTER = 0, DO FINE
0590	REF	1			24,2643	0 2660	0	TC R22LFM45	TRACKING TAKE ANOTHER RADAR READING
0591					24,2644	77624	1	R22LEM7 CALL	PROCEED
0592	REF	6	LAST	512	24,2645	11165	0		PHASE CHANGE AND
0593					24,2646	77650	1	GOTO	GO TO INCORPORATE DATA.
0594	REF	1			24,2647	55374	1		ASTOK
0595	REF	2	LAST	508	24,2650	25'460	1	R22LEM44 INCR	INCREMENT COUNT OF MARKS INCORPORATED.
0596	REF	6	LAST	518	24,2651	0 2714	1	TC	ARE WE ON LUNAR SURFACE
0597	REF	1			24,2652	0 2666	0	TC R22LEM46	YES - WAIT 2 SECONDS
0598	REF	10	LAST	439	24,2653	3 4756	1	CA FIVE	NOT ON LUNAR SURFACE
0599	REF	2	LAST	518	24,2654	0 2660	0	TC R22LFM45	R65COUNTER = 5
0600	REF	7	LAST	518	24,2655	0 2714	1	R22LEM42 TC	CHECK IF ON LUNAR SURFACE (P22FLAG SET)
0601	REF	2	LAST	518	24,2656	0 2666	0	TC R22LEM46	YES - WAIT 2 SECONDS
0602	REF	33	LAST	503	24,2657	3 4752	0	CA TWO	NO-SET R65COUNTER = 2
0603	REF	2	LAST	515	24,2660	55'743	1	R22LFM45 TS	R65CNTR

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0604	REF	119	LAST	517	24,2661	0 4616 1	TC	BANKCALL
0605	REF	2	LAST	515	24,2662	46105 1	CADR	R65LFM
0606	REF	2	LAST	511	24,2663	0 2477 1	TC	R22LEM
0607	REF	2	LAST	511	24,2664	3 2712 1	R22WAIT CAF	1500DEC
0608	REF	3	LAST	510	24,2665	0 2263 1	TC	P20LEMWT +1

FINE PREFERRED TRACKING ATTITUDE

06083	REF	2	LAST	293	24,2666	3 5000 1	R22LEM46 CAF	2SECS
06086	REF	4	LAST	519	24,2667	0 2263 1	TC	P20LEMWT +1

0609	REF	1			24,2670	3 2711 1	N49DSP	CAF	V06N49NB
0610	REF	120	LAST	519	24,2671	0 4616 1	TC	BANKCALL	
0611	REF	2	LAST	517	24,2672	20362 1	CADR	PRIDOSP	
0612	REF	7	LAST	517	24,2673	0 6022 1	TC	GOTOV56	
0613	REF	62	LAST	505	24,2674	4 4753 0	CS	ONE	
0614	REF	5	LAST	518	24,2675	55744 0	TS	N49FLAG	
0615	REF	78	LAST	517	24,2676	0 5155 0	TC	ENDOFJOB	
0616	REF	19	LAST	518	24,2677	0 5353 1	R22RSTRT	PHASCHNG	
0617					24,2700	00152 1	OCT	00152	
0618	REF	121	LAST	519	24,2701	0 4616 1	TC	BANKCALL	
0619	REF	2	LAST	503	24,2702	53103 0	CADR	RPRDOT	
0620	REF	122	LAST	519	24,2703	0 4616 1	TC	BANKCALL	
0621	REF	5	LAST	502	24,2704	17667 0	CADR	RADSTALL	
0622	REF	3	LAST	517	24,2705	0 2247 1	TC	P20LEMC	
0623	REF	3	LAST	519	24,2706	0 2477 1	TC	R22LEM	

EXCESSIVE STATE VECTOR UPDATE - FLASH
 VERB 06 NOUN 49 R1=DELTA R, R2=DELTA V
 TERMINATE - EXIT R22 AND P20
 PROCEED - N49FLAG = -1
 RECYCLE - N49FLAG = + VALUE

IF A RESTART OCCURS WHILE READING RADAR
 COME HERE TO TAKE A RANGE-RATE READING
 WHICH ISNT USED TO PREVENT TAKING A BAD
 READING AND TRYING TO INCORPORATE THE
 BAD DATA
 WAIT FOR READ COMPLETE
 COULD NOT READ RADAR-TRY TO REDESIGNATE
 READ SUCCESSFUL-CONTINUE AT R22

0624					24,2707	00525 0	ALRM525	OCT	00525
0625					24,2710	01405 1	V06N05	VN	00605
0626					24,2711	01461 0	V06N49NB	VN	00649
0627					24,2712	02734 0	1500DEC	DEC	1500
0629					24,2713	10624 0	45SECNDS	DEC	4500

R0631 LUNSFCHK-CLOSED SUBROUTINE TO CHECK IF ON LUNAR SURFACE (P22FLAG)
 R0632 RETURNS TO CALLER +1 IF P22FLAG SET
 R0633 TO CALLER +2 IF P22FLAG NOT SET

0634	REF	2	LAST	513 TO	514:	0	0*	COUNT*	\$\$/P22	
0635	REF	4	LAST	349	24,2714	4 0104 0	LUNSFCHK	CS	FLAGWRD8	CHECK IF ON LUNAR SURFACE
0636	REF	3	LAST	349	24,2715	7 4744 0		MASK	SURFFBIT	IS SURFFLAG SET?
0637	REF	162	LAST	511	24,2716	10 000 0		CCS	A	BRANCH - P22FLAG SET
0638	REF	147	LAST	489	24,2717	24 002 0		INCR	Q	NOT SET
0639	REF	148	LAST	519	24,2720	0 0002 0		TC	0	RETURN

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R0640 RR DESIGNATE ROUTINE (R21LEM)
 R0641 PROGRAM DESCRIPTION
 R0642 MOD NC - 2
 R0643 BY P VOLANTE
 R0644 FUNCTIONAL DESCRIPTION

R0645
 R0646 TO POINT THE RENDEZVOUS RADAR AT THE CSM UNTIL AUTOMATIC ACQUISITION
 R0647 OF THE CSM IS ACCOMPLISHED BY THE RADAR. ROUTINE IS CALLED BY P20.
 R0648 CALLING SEQUENCE -

R0649 TC BANKCALL
 R0650 CADR R21LEM

R0651 SUBROUTINES CALLED -

R0652	FINDVAC	FLAGUP	ENDOFJOB	PRIOLARM
R0653	NOVAC	INTPRET	LPS20.1	PHASCHNG
R0654	WAITLIST	JOBSLEEP	JOBWAKE	FLAGDOWN
R0655	TASKOVER	BANKCALL	RAOSTALL	RROESSM

R0656 NORMAL EXIT MOOES

R0657 WHEN LOCK-ON IS ACHIEVED, BRANCH WILL BE TO P20 WHERE R22 (DATA READ
 R0658 WILL BE SELECTED OR A NEED FOR A MANEUVER (BRANCH TO P20LEMA)
 R0659 ALARM OR ABORT EXIT MOOES-

R0660 PRIORITY ALARM 503 WHEN LOCK-ON HASN'T BEEN ACHIEVED AFTER 30SECS -
 R0661 THIS REQUIRES ASTRONAUT INTERFACE- SELECTION OF SEARCH OPTION OF
 R0662 ACQUISITION

R0663 OUTPUT

R0664 SEE LPS20.1, RROESSM

R0665 ERASABLE INITIALIZATION REQUIRED

R0666 RRTARGET, RADMODES ARE USED BY LPS20.1 AND RROESSM

R0667 FLAGS SET + RESET

R0668 LSCMFLG LOKONSW

R0669 DEBRIS

R0670 SEE LPS20.1, RROESSM

0671 REF 13 LAST 515 E7,1454

0672 REF 1

0673 REF 1 24,2721 3 2341 0 R21LEM

0674 REF 1 24,2722 55'114 0

067405 REF 8 LAST 51B 24,2723 0 2714 1

06741 REF 1 24,2724 0 2731 0

067415 REF 109 LAST 51B 24,2725 3 4755 1

06742 REF 4 LAST 330 24,2726 55'107 1

067425 REF 5 LAST 520 24,2727 55'110 1

06743 REF 1 24,2730 0 2735 1

067435 REF 2B LAST 483 24,2731 3 4735 1 R21LEM5

06744 REF 6 LAST 520 24,2732 55'107 1

067445 REF 4 LAST 386 24,2733 4 4736 0

06745 REF 7 LAST 520 24,2734 55'110 1

067455 REF 36 LAST 509 24,2735 0 5516 0 R21LEM6

06746 REF 3 LAST 286 24,2736 00012 1

067465 REF 123 LAST 519 24,2737 0 4616 1

06747 REF 2 LAST 2B4 24,2740 52475 0

067475 24,2741 0 2742 1

EBANK= LSCOUNT
 COUNT* \$\$/R21

CAF MAXTRIFS

TS OESCOUNT

TC LUNSFCHK

TC R21LEM5

CAF ZERO

TS TANG

TS TANG +1

TC R21LFM6

CAF BIT15

TS TANG

CS HALF

TS TANG +1

TC DOWNFLAG

ADRES LOKONSW

TC BANKCALL

CAOR RROESNB

TC +1

ALLOW 60 PASSES (APPROX 45 SECS.) TO
 DESIGNATE AND LOCKON

COMMAND ANTENNA TO MOOE CENTER
 IF NOT ON SURFACE-MOOE 1-(T=0,S=0)

IF ON LUNAR SURFACE-MOOE 2-(T=1B0,S=-90)

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06748	REF	124	LAST	520	24,2742	0 4616	1	TC	BANKCALL	
067485	REF	6	LAST	519	24,2743	17667	0	CADR	RADSTALL	
06749	REF	1			24,2744	0 2777	1	TC	R21-503	BAD RETURN FROM DESIGNATE -ISSUE ALARM
067493	REF	21	LAST	514	24,2745	0 5504	0	TC	UPFLAG	INDICATES LOS TO BE COMPUTED
067496	REF	2	LAST	508	24,2746	00041	1	ADRES	LOSCMFLG	EVERY FOURTH PASS THRU DODES
0675	REF	49	LAST	516	24,2747	4 4736	0	CS	BIT14	REMOVE RR SELF TRACK ENABLE
0676					24,2750	0 0006	1	EXTEND		
0677	REF	24	LAST	516	24,2751	03 012	1	WAND	CHAN12	
0678	REF	17	LAST	487	24,2752	3 6244	0	R21LEM2	CAF	THREE
0679	REF	14	LAST	520	24,2753	55*454	1	TS	LOSCOUNT	
0703	REF	36	LAST	518	24,2754	0 6036	1	R21LEM1	TC	INTPRET
0704					24,2755	43234	0	RTB	DAD	
0705	REF	9	LAST	512	24,2756	21462	1		LOADTIME	
07055	REF	1			24,2757	11026	0		HALF SEC	EXTRAPOLATE TO PRESENT TIME + .5 SEC.
0706	REF	13	LAST	512	24,2760	34041	0	STCALL	TDEC1	LOS DETERMINATION ROUTINE
0707	REF	2	LAST	508	24,2761	51151	0		LPS20.1	
0708					24,2762	77776	1	EXIT		
0709	REF	22	LAST	521	24,2763	0 5504	0	R21LEM3	TC	UPFLAG
0710	REF	4	LAST	520	24,2764	00012	1	ADRES	LOKONSW	SET LOKONSW TO RADAR-ON DESIRED
0711	REF	37	LAST	521	24,2765	0 6036	1	TC	INTPRET	
0712					24,2766	77624	1	CALL		INPUT (RRTARGET UPDATED BY LPS20.1)
0713	REF	1			24,2767	52373	1		RRJESSM	DESIGNATE ROUTINE
0714					24,2770	77776	1	EXIT		
0715	REF	1			24,2771	0 3016	0	TC	R21LEM4	LOS NOT IN MODE 2 COVERAGE
A0716										ON LUNAR SURFACE
0717	REF	3	LAST	516	24,2772	0 2132	0	TC	P20LEMA	VEHICLE MANEUVER REQUIRED.
0718	REF	125	LAST	521	24,2773	0 4616	1	TC	BANKCALL	NO VEHICLE MANEUVER REQUIRED
0719	REF	7	LAST	521	24,2774	17667	0	CADR	RADSTALL	WAIT FOR DESIGNATE COMPLETE - LOCKON OR
0720					24,2775	0 2777	1	TC	+2	BADEND-LOCKON NOT ACHIEVED IN 60 TRIES
0721	REF	1			24,2776	0 3006	1	TC	R21END	EXIT ROUTINE RETURN TO P20 (LOCK-ON)
0722	REF	1			24,2777	3 3014	1	R21-503	CAF	ISSUE ALARM 503
0723	REF	126	LAST	521	24,3000	0 4616	1	TC	BANKCALL	
0724	REF	4	LAST	517	24,3001	21451	1	CADR	PRICLARM	
0725	REF	8	LAST	519	24,3002	0 6022	1	TC	GOTOV56	TERMINATE EXITS P20 VIA V56 CODING
0726	REF	1			24,3003	0 3011	1	TC	R21SRCH	PROC
0727	REF	3	LAST	511	24,3004	0 2232	0	TC	P20LEMC3	
0728	REF	79	LAST	519	24,3005	0 5155	0	TC	ENDOFJOB	
0729	REF	37	LAST	520	24,3006	0 5516	0	R21END	TC	DOWNFLAG
0730	REF	3	LAST	521	24,3007	00041	1	ADRES	LOSCMFLG	RESET LOSCMFLG
0731	REF	5	LAST	519	24,3010	0 2262	0	TC	P20LEMWT	EXIT R21 TO PERFORM DATA READ
0732	REF	20	LAST	519	24,3011	0 5353	1	R21SRCH	TC	PHASCHNG
0733					24,3012	04022	0	OCT	04022	
0734	REF	1			24,3013	0 3100	0	TC	P24LEM	SEARCH ROUTINE
0735					24,3014	00503	1	ALRM503	OCT	00503
0736					24,3015	00527	1	ALRM527	OCT	527
0737	REF	1			24,3016	3 3015	0	R21LEM4	CAF	ALRM527
0738	REF	127	LAST	521	24,3017	0 4616	1	TC	BANKCALL	ALARM 527-LOS NOT IN MODE 2 COVERAGE
0739	REF	5	LAST	521	24,3020	21451	1	CADR	PRICLARM	ON LUNAR SURFACE

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0740	REF	9	LAST	521	24,3021	0 6022 1	TC	GOTOV56	TERMINATE EXITS P20 VIA V56 CODING
0741	REF	4	LAST	521	24,3022	0 2232 0	TC	P20LEMC3	
0742					24,3023	0 3016 0	TC	-5	ENTER
0743	REF	80	LAST	521	24,3024	0 5155 0	TC	ENDOFJOB	
07435					24,3025	00000 1	HALFSEC	2DEC	50
07435					24,3026	00062 0			

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R0744 MANUAL ACQUISITION ROUTINE R23LEM
 R0745 PROGRAM DESCRIPTION
 R0746 MOD NO - 2
 R0747 BY P VOLANTE
 R0748 FUNCTIONAL DESCRIPTION
 R0749

R0750 TO ACQUIRE THE CSM BY MANUAL OPERATION OF THE RENOEZVOUS RADAR
 R0751 CALLING SEQUENCE -
 R0752 TC R23LEM

R0753 SUBROUTINES CALLED
 R0754 BANKCALL R61LEM
 R0755 SETMINDB GOPERF1

R0756 NORMAL EXIT MODES -
 R0757 IN RESPONSE TO THE GOPERF1 ,SELECTION OF ENTER WILL RECYCLE R23
 R0758 ,SELECTION OF PROC WILL CONTINUE R23
 R0759 ,SELECTION OF TERM WILL TERMINATE R23 +P20

R0760 ALARM OR ABORT EXIT MODES -
 R0761 SEE NORMAL EXIT MODES ABOVE

R0762 OUTPUT

R0763 N.A.

R0764 ERASABLE INITIALIZATION REQUIRED-

R0765 ACDMODFLG MUST BE SET TO 1 (MANUAL MODE)

R0766	REF	1			1143		EBANK= GENRET	
R0767	REF	1					COUNT* \$\$/R23	
R0768	REF	23	LAST	521	24,3027	0 5504 0	R23LEM TC UPFLAG	SET NO ANGLE MONITOR FLAG
R0769	REF	4	LAST	508	24,3030	00126 1	ADRES NORRMON	
R0770					24,3031	0 0004 0	INHINT	
R0771	REF	17	LAST	347	24,3032	0 4674 0	TC IBNKCALL	SELECT MINIMUM DEAOBAND
R0772	REF	1			24,3033	40140 0	CADR SETMINDB	
R0773					24,3034	0 0003 1	RELINT	
R0774	REF	50	LAST	521	24,3035	3 4736 1	R23LEM1 CAF BIT14	ENABLE TRACKER
R0775					24,3036	0 0006 1	EXTEND	
R0776	REF	25	LAST	521	24,3037	05 012 1	WOR CHAN12	
R0777	REF	1			24,3040	3 3077 1	CAF OCT205	
R0778	REF	128	LAST	521	24,3041	0 4616 1	TC BANKCALL	
R0779	REF	2	LAST	509	24,3042	20476 0	CADR GOPERF1	
R0780	REF	1			24,3043	0 3070 0	TC R23LEM2	TERMINATE
R0781	REF	1			24,3044	0 3046 0	TC R23LFM1	PROCEDURE
R0782	REF	1			24,3045	0 3073 0	TC R23LFM3	ENTER- DO ANOTHER MANUEVER
R0783					24,3046	0 0004 0	R23LEM11 INHINT	
R0786	REF	2	LAST	202	24,3047	0 4523 1	TC RRLIMCHK	YES - CHECK IF ANTENNA IS WITHIN LIMITS
R0787	REF	4	LAST	330	24,3050	00035 1	ADRES CDUT	
R0788	REF	1			24,3051	0 3060 1	TC DUTOFIM	NOT WITHIN LIMITS
R07883	REF	18	LAST	523	24,3052	0 4674 0	TC IBNKCALL	RESTORE DEAOBAND TO
R07886	REF	4	LAST	310	24,3053	40123 0	CADR RESTORD8	ASTRONAUT SELECTED VALUE
R0789					24,3054	0 0003 1	RELINT	
R0790	REF	38	LAST	521	24,3055	0 5516 0	TC DOWNFLAG	CLEAR NO ANGLE MONITOR FLAG
R0791	REF	5	LAST	523	24,3056	00126 1	ADRES NORRMON	
R0792	REF	1			24,3057	0 2204 0	TC P20LEM81	RADAR IS LOCKED ON CONTINUE IN P20
R0793					24,3060	0 0003 1	DUTOFIM RELINT	

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0794 REF 1 24,3061 3 3076 0
 0795 REF 129 LAST 523 24,3062 0 4616 1
 0796 REF 6 LAST 521 24,3063 21451 1
 0797 REF 2 LAST 523 24,3064 0 3070 0
 0798 REF 2 LAST 523 24,3065 0 3061 0
 0799 REF 2 LAST 523 24,3066 0 3073 0
 0800 REF 81 LAST 522 24,3067 0 5155 0
 0801 REF 39 LAST 523 24,3070 0 5516 0
 0802 REF 6 LAST 523 24,3071 00126 1
 0803 REF 10 LAST 522 24,3072 0 6022 1
 0804 REF 130 LAST 524 24,3073 0 4616 1
 0805 REF 3 LAST 517 24,3074 46100 1
 0806 RFF 1 24,3075 0 3035 1

CAF OCT501PV
 TC BANKCALL
 CADR PRICLARM
 TC R23LEM2
 TC OUTOFLIM +1
 TC R23LEM3
 TC FND0FJOB
 R23LEM2 TC DOWNFLAG
 ADRES NORRMON
 TC GOTOV56
 R23LEM3 TC BANKCALL
 CADR R61LEM
 TC R23LEM1

ISSUE ALARM - RR ANTENNA NOT WITHIN
 LIMITS
 TERMINATE - EXIT R23 TO R00 (GO TO POOH)
 PROCEED ILLEGAL
 RECYCLE- DO ANOTHER MANUVER
 CLEAR NO ANGLE MONITOR FLAG
 AND EXIT VIA V56

0807 24,3076 00501 0 OCT501PV OCT 501
 0808 24,3077 00205 0 OCT205 OCT 205

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R0809 SEARCH ROUTINE P24LFM
 R0810 PROGRAM DESCRIPTION
 R0811 MOD NO - 2
 R0812 8Y P. VOLANTE
 R0813 FUNCTIONAL DESCRIPTION

R0814
 R0815 TO ACQUIRE THE CSM 8Y A SEARCH PATTERN WHEN THE RENDEZVOUS RADAR HAS
 R0816 FAILED TO ACQUIRE THE CSM IN THE AUTOMATIC TRACKING MODE AND TO ALLOW
 R0817 THE ASTRONAUT TO CONFIRM THAT REACQUISITION HAS NOT BEEN BY SIDELobe.
 R0818 CALLING SEQUENCE

R0819 CAF PRIONN
 R0820 TC FINDVAC
 R0821 EBANK= DATAGOOD
 R0822 ZCAOR R24LEM

R0823 SUBROUTINES CALLED
 R0824 FLAGUP FLAGDOWN BANKCALL
 R0825 R61LEM GOFLASHR FINDVAC
 R0826 ENDCFJOB NOVAC LSR24.1

R0827 NORMAL EXIT MODES-
 R0828 ASTRONAUT RESPONSE TO DISPLAY OF OMEGA AND DATAGOOD. HE CAN EITHER
 R0829 REJECT BY TERMINATING (SEARCH OPTION AND RESELECTING P20) OR ACCEPT BY
 R0830 PROCEEDING (EXIT ROUTINE AND RETURN TO AUTO MODE IN P20)

R0831 ALARM OR ABORT EXIT MODES-
 R0832 SEE NORMAL EXIT MODES ABOVE

R0833 OUTPUT -
 R0834 SEE OUTPUT FROM LSR24.1 + R61LEM
 R0835 ERASABLE INITIALIZATION REQUIRED

R0836 SEE INPUT FOR LSR24.1

R0837 FLAGS SET + RESET

R0838 SRCHOPT, ACMOOFLG

R0839	REF	3	LAST	331	E7,1731		EBANK= DATAGOOD
R0840	RFF	1					COUNT* 66/R24
R0841	REF	24	LAST	523	24,3100	0 5504 0	R24LEM TC UPFLAG
R0842	RFF	3	LAST	509	24,3101	0 0037 0	ADRES SRCHOPTN
R08423	REF	40	LAST	524	24,3102	0 5516 0	TC DOWNFLAG
R08426	REF	4	LAST	521	24,3103	00041 1	ADRES LOSCMFLG
R0843	REF	110	LAST	520	24,3104	3 4755 1	R24LEM1 CAF ZFRO
R0844	RFF	4	LAST	525	24,3105	55*731 1	TS DATAGOOD
R0845	REF	2	LAST	331	24,3106	55*732 1	TS OMEGAD
R0846	REF	3	LAST	525	24,3107	55*733 0	TS OMEGAD +1
R0847	REF	21	LAST	521	24,3110	0 5353 1	R24LEM2 TC PHASCHNG
R0848					24,3111	04022 0	OCT 04022
R0849	REF	1			24,3112	3 3150 0	CAF V16N80
R0850	RFF	131	LAST	524	24,3113	0 4616 1	TC BANKCALL
R0851	REF	1			24,3114	20357 1	CAOR PRIODSPR
R0852	RFF	11	LAST	524	24,3115	0 6022 1	TC GOTOV56
R0853	REF	1			24,3116	0 3122 0	TC R24END

SET SRCHOPT FLAG
 RESET LOS BEING COMPUTED FLAG TO MAKE
 SURE MODES DOESN'T GO TO R21
 ZERO OUT DATA INDICATOR
 ZERO OMEGA DISPLAY REGS
 ZERO OMEGA DISPLAY REGS

PROCEED EXIT P24 TO P20LEM1

0854 REF 1 24,3117 0 3127 0

TC R24LEM3

RECYCLE - CALL R61 TO MANEUVER S/C

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0855	REF	132	LAST	525	24,3120	0 4616	1		TC	BANKCALL
0856	REF	1			24,3121	55405	0		CADR	LRS24.1
0857					24,3122	0 0004	0	R24END	INHINT	
0858	REF	1			24,3123	0 6027	1		TC	KILL TASK
0859	REF	1			24,3124	55605	1		CADR	CALLDGCH
0860	REF	5	LAST	303	24,3125	0 6011	1		TC	CLRADMOD
0861	REF	2	LAST	508	24,3126	1 2104	1		TCF	P20LEM1

CLEAR BITS 10 & 15 OF RADMODES.
AND GO TO 400 MI. RANGE CHECK IN P20.

08612					6011				BLOCK	3
08614	REF	1			6000				SETLOC	FFTAG6
08616					6011				BANK	
08618	REF	1							COUNT*	\$\$/R24

0862	REF	1			6011	4 6021	0	CLRADMOD	CS	8IT10+15
0863					6012	0 0004	0		INHINT	
0864	REF	33	LAST	517	6013	7 0110	0		MASK	RADMODES
0865	REF	34	LAST	526	6014	54 110	0		TS	RADMODES
0866	REF	30	LAST	516	6015	4 4752	1		CS	BIT2
0867					6016	0 0006	1		EXTEND	
0868	REF	26	LAST	523	6017	03 012	1		WAND	CHAN12

DISABLE RR ERROR COUNTERS

USER WILL RELINT

0869	REF	149	LAST	519	6020	0 0002	0		TC	Q
------	-----	-----	------	-----	------	--------	---	--	----	---

08692					6021	41000	1	BIT10+15	OCT	41000
08694					24,3127				BANK	24
08696	REF	3	LAST	507	24,2000				SETLOC	P20S
08698					24,3127				BANK	
08699	REF	2	LAST	525 TO	526:	23	23*		COUNT*	\$\$/R24

0870	REF	22	LAST	525	24,3127	0 5353	1	R24LEM3	TC	PHASCHNG
0871					24,3130	04022	0		OCT	04022
0872					24,3131	0 0004	0		INHINT	
0873	REF	2	LAST	526	24,3132	0 6027	1		TC	KILL TASK
0874	REF	2	LAST	526	24,3133	55605	1		CADR	CALLDGCH
0876	REF	6	LAST	526	24,3134	0 6011	1		TC	CLRADMOD
0877					24,3135	0 0003	1		RELINT	
0878	REF	1			24,3136	3 4774	1		CAF	.5SFC
0879	REF	133	LAST	526	24,3137	0 4616	1		TC	BANKCALL
0880	REF	9	LAST	510	24,3140	01735	1		CADR	DELAYJOP
0881	REF	9	LAST	520	24,3141	0 2714	1		TC	LUNSFCHK
0882	REF	1			24,3142	0 3110	1		TC	R24LEM2
0885	REF	134	LAST	526	24,3143	0 4616	1		TC	BANKCALL
0886	REF	4	LAST	524	24,3144	46100	1		CADR	R61LEM
0887	REF	111	LAST	525	24,3145	3 4755	1		CAF	ZERO
0888	REF	2	LAST	237	24,3146	55'306	1		TS	RADCAADR
A08885										
0889	REF	2	LAST	526	24,3147	0 3110	1		TC	R24LEM2

KILL WAITLIST FOR NEXT POINT IN PATTERN
CLEAR BITS 10 + 15 OF RADMODES TO KILL
HALF SECOND DESIGNATE LOOP

WAIT FOR DESIGNATE LOOP TO DIE

CHECK IF ON LUNAR SURFACE
YES-DONT DO ATTITUDE MANEUVER
CALL R61 TO DO PREFERRED TRACKING
ATTITUDE MANEUVER
ZERO OUT RADCAADR (WHICH WAS SET BY
ENDRADADR WHEN DESIGNATE STOPPED) SO THAT
RRDESSM WILL RETURN TO CALLER
AND GO BACK TO PUT UP V16 N80 DISPLAY

GAP: ASSEMBLE REVISION-069 OF AGC PROGRAM LUMINARY BY NASA 2021112-011

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0891

24,3150 04120 0 V16N80 VN 01680

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R0892 PREFERRED TRACKING ATTITUDE ROUTINE R61LEM
 R0893 PROGRAM DESCRIPTION
 R0894 MOD NC : 3 DATE : 4-11-67
 R0895 MOD BY : P VOLANTE SDC

R0896 FUNCTIONAL DESCRIPTION-
 R0897 TO COMPUTE THE PREFERRED TRACKING ATTITUDE OF THE LM TO ENABLF RR
 R0898 TRACKING OF THE CSM AND TO PERFORM THE MANEUVER TO THE PREFERRED
 R0899 ATTITUDE.
 R0900 CALLING SEQUENCE-
 R0901 TC BANKCALL
 R0902 CADR R61LEM
 R0903 SUBROUTINES CALLED
 R0904 LPS20.1 VECPOINT
 R0905 KALCMAN3

R0906 NORMAL EXIT MODES-
 R0907 NCRMAL RETURN IS TO CALLER + 1
 R0908 ALARM OR ABORT EXIT MODES-
 R0909 TERMINATE P20 + R61 BY BRANCHING TO P20END IF BOTH TRACKFLAG +
 R0910 RENDEZVOUS FLAG ARE NOT SET.
 R0911 OUTPUT -
 R0912 SEE OUTPUT FOR LPS20.1 + ATTITUDE MANEUVER ROUTINE (R60)
 R0913 ERASABLE INITIALIZATION REQUIRED
 R0914 GENRET USED TO SAVE Q FOR RETURN
 R0915 FLAGS SET + RESET
 R0916 3AXISFLG
 R0917 DEBRIS
 R0918 SEE SUBROUTINES

R0919	REF	1		23,2000			SETLOC R61	
R0920				23,2100			BANK	
R0921	REF	15	LAST	521	E7,1454		EBANK= LQSCCUNT	
R0922	REF	1					COUNT* \$\$/R61	
R0923	REF	4	LAST	490	23,2100	0 4645 1	R61LEM TC MAKECADR	
R0924	REF	2	LAST	523	23,2101	55'143 1	TS GENRET	
R0925	RFF	25	LAST	525	23,2102	0 5504 0	TC UPFLAG	SET R61 FLAG
R0926	REF	1			23,2103	00024 1	ADRES R61FLAG	
R0927	REF	1			23,2104	0 2111 1	TC R61C+L01	
R0928	REF	5	LAST	528	23,2105	0 4645 1	R65LEM TC MAKECADR	
R0929	REF	3	LAST	528	23,2106	55'143 1	TS GENRET	
R0930	REF	41	LAST	525	23,2107	0 5516 0	TC DOWNFLAG	RESET R61 FLAG
R0931	REF	2	LAST	528	23,2110	00024 1	ADRES R61FLAG	
R0932	REF	12	LAST	517	23,2111	3 4747 1	R61C+L01 CAF TRACK81T	TRACKFLAG
R0933	RFF	35	LAST	516	23,2112	7 0075 1	MASK STATE +1	
R0934					23,2113	0 0006 1	EXTEND	
R0935	REF	1			23,2114	1 2262 1	BZF R61C+L1	NOT SET
R0936	REF	38	LAST	521	23,2115	0 6036 1	R61C+L03 TC INTPRET	SET
R0937					23,2116	77775 1	VLOAD	

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0938	REF	4	LAST	500	23,2117	06416 1	HIUNITZ		
0939	REF	19	LAST	496	23,2120	03761 1	SCAXIS	TRACK AXIS UNIT VECTOR	
0940					23,2121	77634 0	STORE		
0941					23,2122	21462 1	RTB		
09411	REF	10	LAST	521	23,2123	77615 0		LOADTIME	PRESENT TIME
09412	REF	1			23,2124	15654 1	DAD		EXTRAPULATE FORWARD FORWARD TO CENTER OF
0942	REF	14	LAST	521	23,2125	34041 0		3SECONDS	SIX SECOND PERIOD.
0943	REF	3	LAST	521	23,2126	51151 0	STCALL	TDEC1	
0944					23,2127	77775 1		LPS20.1	LOS DETERMINATION + VEH ATTITUDE
0945	REF	2	LAST	119	23,2130	01102 0	VLOAD		
0946	REF	4	LAST	494	23,2131	03767 1		RRTARGET	
0947					23,2132	77624 1	STORE	POINTVSM	DIRECTION IN WHICH TRACK AXIS IS TO BE
0948	RFF	4	LAST	487	23,2133	56016 0	CALL		
0949	RFF	8	LAST	490	23,2134	00322 1		VECPPOINT	TO COMPUTE FINAL ANGLES
0950					23,2135	77776 1	STORE	CPHI	STORE FINAL ANGLES - CPHI,CTHETA,CPSI
0951	REF	23	LAST	526	23,2136	0 5353 1	EXIT		
0952					23,2137	04022 0	TC	PHASCHNG	
09522	REF	13	LAST	528	23,2140	3 4747 1	OCT	04022	
09524	REF	22	LAST	518	23,2141	7 0075 1	CAF	TRACKBIT	IS TRACK FLAG SET
09526					23,2142	0 0006 1	MASK	FLAGWRDI	
09528	REF	2	LAST	528	23,2143	1 2262 1	EXTEND		
0953					23,2144	0 0006 1	BZF	R61C+L1	BRANCH - NO SKIP THIS CYCLE OF R61/65
0954	REF	4	LAST	488	23,2145	00 030 1	EXTEND		
0955	REF	28	LAST	488	23,2146	7 4742 0	READ	CHAN30	CHECK AUTO MODE
0956	REF	163	LAST	519	23,2147	10 000 0	MASK	BIT10	
0957	REF	1			23,2150	0 2255 1	CCS	A	
0958					23,2151	0 0006 1	TC	R61C+L04	NOT IN G+N C(A) = +
0959	REF	3	LAST	489	23,2152	00 031 0	EXTEND		
0960	REF	51	LAST	523	23,2153	7 4736 0	READ	CHAN31	
0961	REF	164	LAST	529	23,2154	10 000 0	MASK	BIT14	(+) = NOT IN AUTO, (+0) = AOK
0962	REF	2	LAST	529	23,2155	0 2255 1	CCS	A	
0963	REF	39	LAST	528	23,2156	0 6036 1	TC	R61C+L04	NOT IN AUTO MODE
0964					23,2157	45175 0	TC	INTPRET	
0965	REF	3	LAST	529	23,2160	01102 0	VLOAD	CALL	
0966	REF	1			23,2161	47552 0		RRTARGET	
0967					23,2162	65545 0		CDU*SMNB	
0968	RFF	230	LAST	517	23,2163	00162 1	DLOAD	ACDS	
0969	RFF	1			23,2164	14025 0		MPAC +5	
0970	REF	1			23,2165	06271 0	STODL	PHI	
0976					23,2166	51021 0		TENDEG	
0977	REF	2	LAST	529	23,2167	00025 0	BDSU	BPL	
0978	REF	1			23,2170	46206 1		PHI	
0979	REF	9	LAST	382	E6,1633			R61C+L05	PHI GRE 10DEG
0980					23,2171	77776 1	EBANK=	CDUXD	
0981	REF	1			23,2172	3 2273 0	EXIT		
0982	REF	13	LAST	469	23,2173	54 006 0	CAF	CDUBANK	
0983					23,2174	0 0004 0	TS	BBANK	
0984					23,2175	0 0006 1	INHINT		
0985	RFF	9	LAST	529	23,2176	3 0322 1	EXTEND		
0986	REF	10	LAST	529	23,2177	537634 0	DCA	CPHI	
							DXCH	CDUXD	

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0987	REF	4	LAST	491	23,2200	3 0323 0	CA	CPSI	
0988	REF	2	LAST	382	23,2201	55*635 1	TS	CDUZO	
0989					23,2202	0 0003 1	RELINT		
0990	REF	16	LAST	528	E7,1454		EBANK=	LOSCOUNT	
0991	REF	1			23,2203	3 2274 1	CAF	R618ANK	
0992	REF	14	LAST	529	23,2204	54 006 0	TS	BBANK	
0993	REF	1			23,2205	0 2231 0	TC	R61C+L06	
0994					23,2206	77776 1	R61C+L05	EXIT	
09941					23,2207	0 0004 0	INHINT		
09942	REF	19	LAST	523	23,2210	0 4674 0	TC	18NKCALL	
09943	REF	3	LAST	376	23,2211	40153 1	FCADR	ZATTEROR	
09944	REF	20	LAST	530	23,2212	0 4674 0	TC	1BNKCALL	
09945	REF	2	LAST	523	23,2213	40140 0	FCADR	SETMINDR	REDUCE ATTITUDE ERROR
0995	REF	42	LAST	528	23,2214	0 5516 0	TC	DOWNFLAG	
0996	REF	5	LAST	497	23,2215	00124 0	ADRES	3AX1SFLG	
0997	REF	26	LAST	528	23,2216	0 5504 0	TC	UPFLAG	
0998	REF	2	LAST	488	23,2217	00077 1	ADRES	PDSPFLAG	SET PRIORITY DISPLAY FLAG
0999	REF	135	LAST	526	23,2220	0 4616 1	TC	8ANKCALL	
1000	REF	3	LAST	497	23,2221	54101 0	CADR	R60LFM	
10001					23,2222	0 0004 0	INHINT		
10002	REF	21	LAST	530	23,2223	0 4674 0	TC	1BNKCALL	
10003	REF	5	LAST	523	23,2224	40123 0	FCADR	RESTORD8	
1001	REF	24	LAST	529	23,2225	0 5353 1	TC	PHASCHNG	
1002					23,2226	04022 0	OCT	04022	
1003	REF	43	LAST	530	23,2227	0 5516 0	TC	DOWNFLAG	
1004	REF	3	LAST	530	23,2230	00077 1	ADRES	PDSPFLAG	RESET PRIORITY DISPLAY FLAG
1005	REF	1			23,2231	3 4742 1	R61C+L06	CAF	R61FLBIT
1006	REF	36	LAST	528	23,2232	7 0075 1	MASK	STATE +1	
1007					23,2233	0 0006 1	EXTEND		
1008					23,2234	1 2236 0	BZF	+2	
1009	REF	1			23,2235	0 2260 1	TC	R61C+L4	
1010	REF	3	LAST	518	23,2236	3 1743 0	CA	R65CNTR	
1011	REF	165	LAST	529	23,2237	10 000 0	CCS	A	
1012					23,2240	0 2242 1	TC	+2	
1013	REF	2	LAST	530	23,2241	0 2260 1	TC	R61C+L4	R65CNTR = 0 - EXIT ROUTINE
1014	REF	4	LAST	530	23,2242	55*743 1	TS	R65CNTR	
1015	REF	1			23,2243	3 2272 1	CAF	06SEC	
1016					23,2244	0 0004 0	INHINT		
1017	REF	8	LAST	515	23,2245	0 5173 1	TC	TWIDDLE	
1018	REF	1			23,2246	02250 1	ADRES	R61C+L2	
1019	REF	82	LAST	524	23,2247	0 5155 0	TC	ENDOFJCB	
1020	REF	7	LAST	518	23,2250	3 7713 0	R61C+L2	CAF	PRID26
1021	REF	20	LAST	515	23,2251	0 5105 0	TC	FINDVAC	
1022	REF	17	LAST	530	E7,1454		EBANK=	LOSCOUNT	
1023	REF	2	LAST	528	23,2252	02111 1	2CADR	R61C+L01	
1023					23,2253	46067 1			
1024	REF	21	LAST	515	23,2254	0 5261 1	TC	TASKOVER	
1025	REF	136	LAST	530	23,2255	0 4616 1	R61C+L04	BANKCALL	TO CONVERT ANGLES TO FDI
1026	REF	4	LAST	487	23,2256	54244 1	CADR	8ALLANGS	
1027	REF	2	LAST	530	23,2257	0 2231 0	TC	R61C+L06	

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1028	REF	4	LAST	528	23,2260	31'143 0	R61C+L4	CAE	GFNRFT	
1029	REF	8	LAST	492	23,2261	1 4640 0		TCF	BANK JUMP	EXIT R61
1030	REF	1			23,2262	3 2267 0	R61C+L1	CAF	BIT7+9PV	IS RENDEZVOUS OR P25FLAG SET
1031	RFF	37	LAST	530	23,2263	7 0074 0		MASK	STATF	
1032					23,2264	0 0006 1		EXTEND		
1033	REF	83	LAST	530	23,2265	1 5155 1		BZF	ENDOFJOB	NO-EXIT ROUTINE AND PROGRAM.
1034	REF	3	LAST	530	23,2266	0 2231 0		TC	R61C+L06	YES EXIT ROUTINE
1035					23,2267	00500 1	BIT7+9PV	OCT	00500	
1037					23,2270	00707 1	TENDEG	2DEC	.02777777	SCALED UNITS OF REVOLUTION 80
1037					23,2271	03432 1				
1038					23,2272	01130 1	06SEC	DEC	600	
1039					0024		PHI	EQUALS	20D	
1040	REF	11	LAST	529	E6,1633			EBANK=	CDUXD	
1041	RFF	2	LAST	529	23,2273	46066 0	CDUBANK	BBCON	R61C+L05	
1042	REF	18	LAST	530	E7,1454			EBANK=	LOSCOUNT	
1043	REF	3	LAST	531	23,2274	46067 1	R61BANK	BBCON	R61C+L05	
1044					4512			BLOCK	02	
1045	REF	1			4000			SETLOC	RADARFF	
1046					4512			BANK		
1047	REF	19	LAST	531	E7,1454			EBANK=	LOSCOUNT	
1048	REF	1						COUNT*	\$\$/RRSUB	

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P1049 THE FOLLOWING SUBROUTINE RETURNS TO CALLER + 2 IF THE ABSOLUTE VALUE OF VALUE OF C(A) IS GREATER THAN THE
 R1051 NEGATIVE OF THE NUMBER AT CALLER +1. OTHERWISE IT RETURNS TO CALLER +3. MAY BE CALLED IN RUPT OR UNDER EXEC.

1053				4512	0	0006	1	MAGSUB	EXTEND		
1054				4513	6	4515	1		BZMF	+2	
1055				4514	1	4516	0		TCF	+2	
1056				4515	4	0000	0		COM		
1057	REF	150	LAST	526	4516	50	002	0	INDEX	0	
1058					4517	6	0000	1	AD	0	
1059					4520	0	0006	1	EXTEND		
1060	REF	1			4521	6	6740	1	BZMF	Q+2	ABS(A) <= CONST GO TO L+3
1061	REF	3	LAST	283	4522	1	6736	1	TCF	Q+1	ABS(A) > CONST GO TO L+2

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P1062 PROGRAM NAME_ RRLIMCHK

ARE IN THE LIMITS OF THE CURRENT MODE.

R1064 FUNCTIONAL DESCRIPTION
 R1065 RRLIMCHK CHECKS RR DESIRED GIMBAL ANGLES TO SEE IF THEY ARE WITHIN
 R1066 THE LIMITS OF THE CURRENT MODE. INITIALLY THE DESIRED TRUNNION AND
 R1067 SHAFT ANGLES ARE STORED IN ITEM1 AND ITEM2. THE CURRENT RR
 R1068 ANTENNAE MODE (RADMODES BIT 12) IS CHECKED WHICH IS = 0 FOR
 R1069 MODE 1 AND =1 FOR MODE 2.
 R1070 MODE 1 - THE TRUNNION ANGLE IS CHECKED AT MAGSUB TO SEE IF IT IS
 R1071 BETWEEN -55 AND +55 DEGREES. IF NOT, RETURN TO L +2. IF WITHIN LIMITS,
 R1072 THE SHAFT ANGLE IS CHECKED TO SEE IF IT IS BETWEEN -70 AND +59 DEGREES.
 R1073 IF NOT, RETURN TO L +2. IF IN LIMITS, RETURN TO L +3.
 R1074 MODE 2 - THE SHAFT ANGLE IS CHECKED AT MAGSUB TO SEE IF IT IS
 R1075 BETWEEN -139 AND -25 DEGREES. IF NOT, RETURN TO L +2. IF WITHIN
 R1076 LIMITS, THE TRUNNION ANGLE IS CHECKED TO SEE IF IT IS BETWEEN +125
 R1077 AND -125 (+235) DEGREES. IF NOT, RETURN TO L +2. IF IN LIMITS, RETURN
 R1078 TO L +3.

R1079 CALLING SEQUENCE:
 R1080 L TC RRLIMCHK (WITH INTERRUPT INHIBITED)
 R1081 L +1 ADRES T,S (DESIRED TRUNNION ANGLE ADDRESS)

R1082 ERASABLE INITIALIZATION REQUIRED:
 R1083 RADMODES, MODEA, MODEB (OR DESIRED TRUNNION AND SHAFT
 R1084 ANGLES ELSEWHERE IN CONSECUTIVE LOCATIONS - UNSWITCHED ERASABLE OR
 R1085 CURRENT EBANK).

R1086 SUBROUTINES CALLED_ MAGSUB

R1087 JOBS OR TASKS INITIATED_ NONE

R1088 ALARMS_ NCNE

R1089 EXIT_ L + 2 (EITHER OR BOTH ANGLES NOT WITHIN LIMITS OF CURRENT MODE)
 R1090 L + 3 (BOTH ANGLES WITHIN LIMITS OF CURRENT MODE)

1091				4523	0 0006 1	RRLIMCHK	EXTEND	
1092	REF 151	LAST 532		4524	5 0002 0		INDEX Q	
1093				4525	5 0000 1		INDEX 0	
1094				4526	3 0001 0		DCA 0	
1095	REF 152	LAST 533		4527	24 002 0		INCR Q	
1096	REF 6	LAST 273		4530	52 062 1		DXCH ITEM1	
1097	REF 153	LAST 533		4531	22 002 0		LXCH Q	
								L(CALLER +2) TO L.
1098	REF 22	LAST 466		4532	3 4740 0	CAF	BIT12	SEE WHICH MODE RR IS IN.
1099	REF 35	LAST 526		4533	7 0110 0	MASK	RADMODES	
1100	REF 166	LAST 530		4534	10 000 0	CCS	A	
1101	REF 1			4535	1 4550 1	TCF	MODE2CHK	
1102	REF 7	LAST 533		4536	3 0061 0	CA	ITEM1	MODE 1 IS DEFINED AS

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1103	REF	1		4537	0 4512	0	TC	MAGSUB	1. ABS(T) L 55 DEGS.
1104				4540	66161	1	DEC	-.30555	2. ABS(S + 5.5 DEGS) L 64.5 DEGS
1105	REF	63	LAST	4541	0 0001	0	TC	L	(SHAFT LIMITS AT +59, -70 DEGS)
1106	REF	1		4542	3 4562	1	CAF	5.50DEGS	
1107	REF	3	LAST	4543	6 0062	0	AD	ITEMP2	S
1108	REF	2	LAST	4544	0 4512	0	TC	MAGSUB	
1109				4545	64420	0	DEC	-.35833	64.5 DEGS
1110	REF	64	LAST	4546	0 0001	0	TC	L	
1111	REF	1		4547	0 4560	0	TC	RRLIMOK	IN LIMITS.
1112	REF	1		4550	3 4563	0	MODE2CHK CAF	82DEGS	MODE 2 IS DEFINED AS
1113	REF	4	LAST	4551	6 0062	0	AD	ITEMP2	1. ABS(T) G 125 DEGS.
1114	REF	3	LAST	4552	0 4512	0	TC	MAGSUB	2. ABS(S + 82 DEGS) L 57 DEGS
1115				4553	65673	0	DEC	-.31667	(SHAFT LIMITS AT -25, -139 DEGS)
1116	REF	65	LAST	4554	0 0001	0	TC	L	
1117	REF	8	LAST	4555	3 0061	0	CA	ITEMP1	
1118	REF	4	LAST	4556	0 4512	0	TC	MAGSUB	
1119				4557	51615	1	DEC	-.69444	125 DEGS
1120	REF	66	LAST	4560	50 001	0	RRLIMOK INDEX	L	
1121	REF	67	LAST	4561	0 0001	0	TC	L	(= TC 1)
1122				4562	00765	0	5.50DEGS DEC	.03056	
1123				4563	16450	1	82DEGS DEC	.45556	

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P1124 PROGRAM NAME_ SETTRKF

. IF EITHER:

R1126 FUNCTIONAL DESCRIPTION
 R1127 SETTRKF UPDATES THE TRACKER FAIL LAMP ON THE DSKY.
 R1129 INITIALLY THE LAMP TEST FLAG (IMODES33 BIT 1) IS CHECKED.
 R1130 IF A LAMP TEST IS IN PROGRESS, THE PROGRAM EXITS TO L +1.
 R1131 IF NO LAMP TEST THE FOLLOWING IS CHECKED SEQUENTIALLY_
 R1132 1) RR CDU:S BEING ZEROED, RR CDU OK, AND RR NOT IN
 R1133 AUTO MODE (RADMODES BITS 13, 7, 2).
 R1134 2) LR VEL DATA FAIL AND NO LR POS DATA (RADMODES BITS
 R1135 8,5)
 R1136 3) NO RR DATA (RADMODES BIT 4)
 R1137 THE ABSENCE OF ALL THREE SIMULTANEOUSLY IN (1), THE PRESENCE OF BOTH
 R1138 IN (2), AND THE PRESENCE OF (3) RESULTS IN EITHER THE TRACKER FAIL
 R1139 LAMP (DSPTAB +11D BIT 8) BEING TURNED ON OR LEFT ON. OTHERWISE,
 R1140 THE TRACKER FAIL LAMP IS TURNED OFF OR IS LEFT OFF. THEREFORE, THE
 R1141 TRACKER FAIL LAMP IS TURNED ON IF_
 R1142 A) RR CDU FAILED WITH RR IN AUTO MODE AND RR CDU:S NOT BEING ZEROED.
 R1143 B) N SAMPLES OF LR DATA COULD NOT BE TAKEN IN 2N TRIES WITH
 R1144 EITHER THE ALT OR VEL INFORMATION
 R1145 C) N SAMPLES OF RR DATA COULD NOT BE OBTAINED FROM 2N TRIES
 R1146 WITH EITHER THE AL

HER THE ALT OR VEL INFORMATION.

R1147 CALLING SEQUENCE:
 R1148 L TC SETTRKF

R1149 ERASABLE INITIALIZATION REQUIRED: IMODES33, RADMODES, DSPTAB +11D
 R1150 SUBROUTINES CALLED_ NONE

R1151 JOBS-OR-TASKS INITIATED_ NONE

R1152 ALARMS_ TRACKER FAIL LAMP

R1153 EXIT_ L +1 (ALWAYS)

ED.

1155	REF	26	LAST	480	4564	3	4753	1	SETTRKF	CAF	BIT1	
1156	REF	25	LAST	483	4565	7	1303	1		MASK	IMODES33	
1157	REF	167	LAST	533	4566	10	000	0		CCS	A	
1158	REF	154	LAST	533	4567	0	0002	0		TC	Q	

NO ACTION IF DURING LAMP TEST.

1159	REF	25	LAST	347	4570	3	4744	1	RRTRKF	CA	BIT8	
1160	REF	68	LAST	534	4571	54	001	1		TS	L	

1161	REF	1			4572	3	4615	1		CAF	13,7,2	
1162	REF	36	LAST	533	4573	7	0110	0		MASK	RADMODES	
1163					4574	0	0006	1		EXTEND		
1164	REF	1			4575	1	4601	0		BZF	TRKFLON	

SEE IF CDU FAILED.

CONDITION 3 ABOVE.

1165	REF	23	LAST	481	4576	3	4750	1	RRCHECK	CAF	BIT4	
1166	REF	37	LAST	535	4577	7	0110	0		MASK	RADMODES	

SEE IF RR DATA FAILED.

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1167	REF	168	LAST	535	4600	10 000 0		CCS	A	
1168	REF	69	LAST	535	4601	3 0001 0	TRKFLO	CA	L	
1169	REF	39	LAST	484	4602	6 1036 0		AD	DSPTAB +11D	HALF ADD DESIPED AND PRESENT STATES.
1170	REF	70	LAST	536	4603	7 0001 1		MASK	L	
1171					4604	0 0006 1		EXTEND		
1172	REF	4	LAST	289	4605	1 6741 1		BZF	TCQ	NO CHANGE.
1173	REF	40	LAST	536	4606	3 1036 0	FLIP	CA	DSPTAB +11D	CANT USE LXCH DSPTAB +11D (RFSTART PROB)
1174					4607	0 0006 1		EXTEND		
1175	REF	10	LAST	274	4610	06 001 0		RXOR	LCHAN	
1176	REF	11	LAST	445	4611	7 4733 0		MASK	POSMAX	
1177	REF	29	LAST	520	4612	6 4735 1		AD	BIT15	
1178	REF	41	LAST	536	4613	55*036 1		IS	DSPTAB +11D	
1179	REF	155	LAST	535	4614	0 0002 0		TC	Q	
1180					4615	10102 0	13,7,2	OCT	10102	
1181					4616		ENDRMODF	EQUALS		

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P1182 PROGRAM NAME_ RRTURNON

R1183 FUNCTIONAL DESCRIPTION_

R1184 RRTURNON IS THE TURN-ON SEQUENCE WHICH, ALONG WITH
 R1185 RRZEROSB, ZEROS THE CDU'S AND DETERMINES THE RR MODE.
 R1186 INITIALLY, CONTROL IS TRANSFERRED TO RRZEROSB FOR THE
 R1187 ACTUAL TURN-ON SEQUENCE. UPON RETURN THE PROGRAM
 R1188 WAITS 1 SECOND BEFORE REMOVING THE TURN-ON FLAG
 R1189 (RADMODES BIT1) SO THE REPOSITION ROUTINE WON'T
 R1190 INITIATE PROGRAM ALARM 00501. A CHECK IS THEN MADE
 R1191 TO SEE IF A PROGRAM IS USING THE RR (STATE BIT 7). IF
 R1192 SO, THE PROGRAM EXITS TO ENDRADAR SO THAT THE RR CDU
 R1193 FAIL FLAG (RADMODES BIT 7) CAN BE CHECKED BEFORE
 R1194 RETURNING TO THE WAITING PROGRAM. IF NOT, THE PROGRAM EXITS
 R1195 TO TASKOVER.

R1196 CALLING SEQUENCE: WAITLIST TASK FROM RRAUTCHK IF THE RR POWER ON AUTO
 R1197 BIT (CHAN 33 BIT 2) CHANGES TO 0 AND NO PROGRAM WAS USING
 R1198 THE RR (STATE BIT 7).

R1199 ERASABLE INITIALIZATION REQUIRED:
 R1200 RADMODES, STATE

R1201 SUPERROUTINES CALLED_ RRZEROSB, FIXDELAY, TASKOVER, ENDRADAR

R1202 JOBS OR TASKS INITIATED_
 R1203 NCNE

R1204 ALARMS_ NCNE (SEE RRZEROSB)

R1205 EXIT_ TASKOVER, ENDRADAR (WAITING PROGRAM)

1206				24,3151		BANK	24
1207	REF	1		25,2000		SETLOC	P20S1
1208				25,2062		BANK	
1209	REF	20	LAST	531	E7,1454	EBANK=	LOSCOUNT
1210	REF	1				COUNT*	\$\$/RSUB
1211	REF	1		25,2062	0 2071 0	RRTURNON	TC RRZEROSB
1212	REF	3	LAST	511	25,2063 0 5221 0	TC	FIXDELAY
1213				25,2064	00144 0	DEC	100
1214	REF	27	LAST	535	25,2065 4 4753 0	CS	BIT1
1215	REF	38	LAST	535	25,2066 7 0110 0	MASK	RADMODES
1216	REF	39	LAST	537	25,2067 54 110 0	TS	RADMODES
1217	REF	22	LAST	530	25,2070 1 5261 0	TCF	TASKOVER

WAIT 1 SEC BEFORE REMOVING TURN ON FLAG
 SO A MONITOR REPOSITION WONT ALARM.

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P1218 PROGRAM NAME_ RRZEROSB

R1219 FUNCTIONAL DESCRIPTION_

R1220 RRZEROSB IS A CLOSED SUBROUTINE TO ZERO THE RR COU: S,
 R1221 DETERMINE THE RR MOOE, AND TURNS ON THE TRACKER FAIL
 R1222 LAMP IF REQUIRED. INITIALLY THE RR COU ZERO BIT (CHAN 12
 R1223 BIT 1) IS SET. FOLLOWING A 20 MILLISECOND WAIT, THE LGC
 R1224 RR COU COUNTERS (OPTY, OPTX) ARE SET = 0 AFTER
 R1225 WHICH THE RR COU ZERO DISCRETE (CHAN 12 BIT 1) IS
 R1226 REMOVED. A 4 SECOND WAIT IS SET TO ALL THE RR COU: S
 R1227 TC REPEAT THE ACTUAL TRUNNION AND SHAFT ANGLES. THE
 R1228 RR COU ZERO FLAG (RAOMOOES BIT 13) IS REMOVED. THE
 R1229 CCNTENTS OF OPTY IS THEN CHECKED TO SEE IF THE TRUNNION
 R1230 ANGLE IS LESS THAN 90 DEGREES. IF NOT, BIT 12 OF
 R1231 RAOMOOES IS SET = 1 TO INDICATE RR ANTENNA MODE 2.
 R1232 IF LESS THAN 90 DEGREES, BIT 12 OF RAOMOOES IS SET = 0 TO
 R1233 INDICATE RR ANTENNA MOOE 1. SETTRKF IS THEN CALLED TO
 R1234 SEE IF THE TRACKER FAIL LAMP SHOULD BE TURNED ON.

R1235 CALLING SEQUENCE: L TC RRZEROSB (FROM RRTURNON AND RRZERO)

R1236 ERASABLE INITIALIZATION REQUIRED:

R1237 RAOMOOES (BIT 13 SET), OSPTAB +110

R1238 SUBROUTINES CALLED_ FIXDELAY, MAGSUB, SETTRKF

R1239 JCBS CR TASKS INITIATED_

R1240 NCNE

R1241 ALARMS_ TRACKER FAIL

R1242 EXIT_ L +1 (ALWAYS)

1243				25,2071	0 0006 1	RRZEROSB	EXTEND		
1244	REF	2	LAST	122	25,2072	23'315 1	QXCH	RRRET	
1245	REF	28	LAST	537	25,2073	3 4753 1	CAF	BIT1	BIT 13 OF RADMODES MUST BE SET BEFORE
1246					25,2074	0 0006 1	EXTEND		COMING HERE.
1247	REF	27	LAST	526	25,2075	05 012 1	WOR	CHAN12	TURN ON ZERO RR COU
1248	REF	4	LAST	537	25,2076	0 5221 0	TC	FIXOELAY	
1249					25,2077	00002 0	OEC	2	
1250	REF	112	LAST	526	25,2100	3 4755 1	CAF	ZERO	
1251	REF	5	LAST	523	25,2101	54 035 0	TS	CDUI	
1252	REF	4	LAST	330	25,2102	54 036 0	TS	CDUS	
1253	REF	63	LAST	519	25,2103	4 4753 0	CS	DNE	REMOVE ZEROING BIT.
1254					25,2104	0 0006 1	EXTEND		
1255	REF	28	LAST	538	25,2105	03 012 1	WANO	CHAN12	
1256	REF	5	LAST	538	25,2106	0 5221 0	TC	FIXOELAY	
1257					25,2107	01750 1	DEC	1000	RESET FAIL INHIBIT IN 10 SECS - D.281
1258	REF	25	LAST	517	25,2110	4 4737 1	CS	BIT13	REMOVE ZEROING IN PROCESS BIT.

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1259	REF	40	LAST	537	25,2111	7 0110 0	MASK	RADMODES	
1260	REF	41	LAST	539	25,2112	54 110 0	TS	RADMODFS	
1261	REF	6	LAST	538	25,2113	3 0035 1	CA	CDUT	
1262	REF	5	LAST	534	25,2114	0 4512 0	TC	MAGSUB	
1263					25,2115	57777 1	DEC	- .5	
1264					25,2116	1 2121 0	TCF	+3	IF MODE 2.
1265	REF	113	LAST	538	25,2117	3 4755 1	CAF	ZFRO	
1266					25,2120	1 2122 0	TCF	+2	
1267	REF	23	LAST	533	25,2121	3 4740 0	CAF	BIT12	
1268	REF	42	LAST	539	25,2122	56 110 1	XCH	RADMODES	
1269	REF	1			25,2123	7 7740 1	MASK	-BIT12	
1270	REF	43	LAST	539	25,2124	26 110 0	ADS	RADMODES	
1271	REF	2	LAST	200	25,2125	0 4564 1	TC	SETTRKF	TRACKER LAMP MIGHT GO ON NOW.
1272	REF	3	LAST	538	25,2126	0 1315 1	TC	RRRET	DONE.
1273	REF	1			7740	-BIT12	EQUALS	-1/8	IN SPROOT

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P1274 PRDGRAM NAME_ DORREPOS
 R1275 FUNCTIONAL DESCRIPTION_
 R1276 DORREPOS IS A SEQUENCE OF TASKS TO DRIVE THE RENDEZVOUS RADAR
 R1277 TO A SAFE POSITION. INITIALLY SETRRECR IS CALLED WHERE THE RR
 R1278 ERROR COUNTERS (CHAN 12 BIT 2) ARE ENABLED AND LASTYCMD
 R1279 AND LASTXCMD SET = 0 TO INDICATE THE DIFFERENCE BETWEEN THE
 R1280 DESIRED STATE AND PRESENT STATE OF THE COMMANDS. THE RR
 R1281 TURN-ON FLAG (RADMODES BIT 1) IS CHECKED AND IF NOT PRESENT,
 R1282 PROGRAM ALARM 00501 IS REQUESTED BEFORE CONTINUING. IN EITHER
 R1283 CASE, FOLLOWING A 20 MILLISECOND WAIT THE PRDGRAM CHECKS THE CURRENT
 R1284 RR ANTENNA MODE (RADMODES BIT 12). RRONLY IS THEN CALLED
 R1285 TO DRIVE THE TRUNNION ANGLE TO 0 DEGREES IF IN MODE 1 AND TO 180
 R1286 DEGREES IF IN MODE 2. UPON RETURN, THE CURRENT RR ANTENNA
 R1287 MODE (RADMODES BIT 12) IS AGAIN CHECKED. RRSDONLY IS THEN
 R1288 CALLED TO DRIVE THE SHAFT ANGLE TO 0 DEGREES IF IN MODE 1 AND TO
 R1289 -90 DEGREES IF IN MODE 2. IF DURING RRONLY OR RRSDONLY A
 R1290 REMDDE HAS BEEN REQUESTED (RADMODES BIT 14), AND ALWAYS
 R1291 FOLLOWING COMPLETION OF RRONLY, CONTRL IS TRANSFERRED TO
 R1292 REPDSRPT. HERE THE REPOSITION FLAG (RADMODES BIT 11) IS
 R1293 REMDVED. A CHECK IS THEN MADE ON THE DESIGNATE FLAG (RADMODES
 R1294 BIT 10). IF PRESENT, CONTRL IS TRANSFERRED TO BEGDES. IF NOT PRESENT
 R1295 INDICATING NO FURTHER ANTENNA CONTRDL REQUIRED, THE RR ERROR
 R1296 COUNTER BIT (CHAN 12 BIT 2) IS REMOVED AND THE ROUTINE EXITS TO
 R1297 TASKDVER.

R1298 CALLING SEQUENCE:
 R1299 WAITLIST CALL FROM RRGIMON IF TRUNNION AND SHAFT CDU ANGLES
 R1300 NOT WITHIN LIMITS OF CURRENT MODE.

R1301 ERASABLE INITIALIZATION REQUIRED:
 R1302 RADMODES

R1303 SUBROUTINES CALLED_
 R1304 RRONLY, RRONLY, BEGDES (EXIT)

R1305 JCBS CR TASKS INITIATED_
 R1306 NCNE

R1307 ALARMS- NCNE

R1308 EXIT_ TASKDVER, BEGDES

1309 REF 1 25,2127 0 2156 1 DDRREPOS TC SETRRECR SET UP RR CDU ERROR COUNTERS.

R1310 ALARM 501 DELETED IN DANCE 279 PER PCR 97.

1311 REF 6 LAST 538 25,2130 0 5221 0 TC FIXDELAY
 1312 25,2131 00002 0 DEC 2

1313 REF 24 LAST 539 25,2132 3 4740 0 CAF BIT12 MANEUVER TRUNNION ANGLE TO NOMINAL POS.

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1314	REF	44	LAST	539	25,2133	7 0110 0	MASK	RADMODES	
1315	REF	169	LAST	536	25,2134	10 000 0	CCS	A	
1316	REF	30	LAST	536	25,2135	3 4735 1	CAF	BIT15	0 FOR MODE 1 AND 180 FOR MODE 2.
1317	REF	1			25,2136	0 2241 1	TC	RRONLY	
1318	REF	25	LAST	540	25,2137	3 4740 0	CAF	BIT12	
1319	REF	45	LAST	541	25,2140	7 0110 0	MASK	RADMODES	NOW PUT SHAFT IN RIGHT POSITION.
1320	REF	170	LAST	541	25,2141	10 000 0	CCS	A	
1321	REF	5	LAST	520	25,2142	4 4736 0	CS	HALF	-90 FOR MODE 2.
1322	REF	1			25,2143	0 2244 1	TC	RRONLY	
1323	REF	22	LAST	444	25,2144	4 4741 0	REPOS RPT CS	BIT11	RETURNS HERE FROM RRIAXIS IF REMODE REQUESTED DURING REPOSITION.
A1324									REMOVE REPOSITION BIT.
1325	REF	46	LAST	541	25,2145	7 0110 0	MASK	RADMODES	
1326	REF	47	LAST	541	25,2146	54 110 0	TS	RADMODES	
1327	REF	29	LAST	529	25,2147	7 4742 0	MASK	BIT10	SEE IF SOMEONE IS WAITING TO DESIGNATE.
1328	REF	171	LAST	541	25,2150	10 000 0	CCS	A	
1329	REF	1			25,2151	1 2573 0	TCF	REGDES	
1330	REF	31	LAST	526	25,2152	4 4752 1	CS	BIT2	IF NO FURTHER ANTENNA CONTROL REQUIRED, REMOVE ERROR COUNTER ENABLE.
1331					25,2153	0 0006 1	EXTEND		
1332	REF	29	LAST	538	25,2154	03 012 1	WAND	CHAN12	
1333	REF	23	LAST	537	25,2155	1 5261 0	TCF	TASKOVER	
1334	REF	32	LAST	541	25,2156	3 4752 0	SETRRECR CAF	BIT2	SET UP RR ERROR COUNTERS.
1335					25,2157	0 0006 1	EXTEND		
1336	REF	30	LAST	541	25,2160	02 012 0	RAND	CHAN12	
1337	REF	172	LAST	541	25,2161	10 000 0	CCS	A	DO NOT CLEAR LAST COMMAND IF
1338	REF	156	LAST	536	25,2162	0 0002 0	TC	Q	ERROR COUNTERS ARE ENABLED.
1339	RFF	7	LAST	217	25,2163	54 112 1	TS	LASTXCMD	
1340	RFF	1			25,2164	54 113 0	TS	LASTXCMD	
1341	RFF	33	LAST	541	25,2165	3 4752 0	CAF	BIT2	
1342					25,2166	0 0006 1	EXTEND		
1343	REF	31	LAST	541	25,2167	05 012 1	WOR	CHAN12	ENABLE RR CDU ERROR COUNTERS.
1344	REF	157	LAST	541	25,2170	0 0002 0	TC	Q	

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P1345 PROGRAM NAME_ REMODE

IVES SHAFT TO -45, AND FINALLY DRIVES

S DONE WITH SINGLE AXIS ROTATIONS (SEE

R1347 FUNCTIONAL DESCRIPTION
 R1349 REMODE IS THE GENERAL REMODING SUBROUTINE. IT DRIVES THE
 R1350 TRUNNION ANGLE TO 0 DEGREES IF THE CURRENT MODE IS MODE 1,
 R1351 180 DEGREES FOR MODE 2, THEN DRIVES THE SHAFT ANGLE TO -45
 R1352 DEGREES, AND FINALLY DRIVES THE TRUNNION ANGLE TO -130 DEGREES,
 R1353 TO PLACE THE RR IN MODE 2, -50 DEGREES FOR MODE 1, BEFORE
 R1354 INITIATING 2-AXIS CONTROL. ALL REMODING IS DONE WITH SINGLE
 R1355 AXIS ROTATIONS (RR1AXIS). INITIALLY THE RR ANTENNA MODE FLAG
 R1356 (RADMCDES BIT 12) IS CHECKED. CONTROL IS THEN TRANSFERRED TO
 R1357 RRTONLY TO DRIVE THE TRUNNION ANGLE TO 0 DEGREES IF IN MODE 1
 R1358 OR 180 DEGREES IF IN MODE 2. RRSONLY IS THEN CALLED TO DRIVE
 R1359 THE SHAFT ANGLE TO -45 DEGREES. THE RR ANTENNA MODE FLAG
 R1360 (RADMCDES BIT 12) IS CHECKED AGAIN. CONTROL IS AGAIN
 R1361 TRANSFERRED TO RRTONLY TO DRIVE THE TRUNNION ANGLE TO -130
 R1362 DEGREES TO PLACE THE RR IN MODE 2 IF CURRENTLY IN MODE 1 OR TO
 R1363 -50 DEGREES IF IN MODE 2 TO PLACE THE RR IN MODE 1. RMODINV
 R1364 IS THEN CALLED TO SET RADMODES BIT 12 TO INDICATE THE NEW
 R1365 RR ANTENNA MODE. THE REMODE FLAG (RADMODES BIT 14)
 R1366 IS REMOVED TO INDICATE THAT REMODING IS COMPLETE. THE PROGRAM
 R1367 THEN EXITS TO STDESIG TO BEGIN 2-AXIS CONTROL.

R1368 CALLING SEQUENCE:
 R1369 FROM BEGDES WHEN REMODE FLAG (RADMODES BIT 14) IS SET.
 R1370 THIS FLAG MAY BE SET IN RREDSM AND RREDSNB IF RRLIMCHK
 R1371 DETERMINES THAT THE DESIRED ANGLES ARE WITHIN THE LIMITS OF THE
 R1372 OTHER MODE.

R1373 ERASABLE INITIALIZATION REQUIRED:
 R1374 RADMODES

R1375 SUBROUTINES CALLED_
 R1376 RRTONLY, RRSONLY, RMODINV (ACTUALLY PART OF)

R1377 JOBS OR TASKS INITIATED_
 R1378 NCNE

R1379 ALARMS_ NCNE

R1380 EXIT_ STDESIG

1381	REF	26	LAST	541	25,2171	3 4740 0	REMODE	CAF	BIT12	DRIVE TRUNNION TO 0 (180).
1382	REF	48	LAST	541	25,2172	7 0110 0		MASK	RADMODES	(ERROR COUNTER ALREADY ENABLED)
1383	REF	173	LAST	541	25,2173	10 000 0		CCS	A	
1384	REF	31	LAST	541	25,2174	3 4735 1		CAF	BIT15	
1385	RFF	2	LAST	541	25,2175	0 2241 1		TC	RRTONLY	
1386	REF	1			25,2176	3 7737 0		CAF	-45DEGSR	
1387	REF	2	LAST	541	25,2177	0 2244 1		TC	RRSONLY	

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1388 REF 49 LAST 542 25,2200 4 0110 0
 1389 RFF 27 LAST 542 25,2201 7 4740 1
 1390 REF 174 LAST 542 25,2202 10 000 0
 1391 RFF 1 25,2203 3 2232 0
 1392 REF 1 25,2204 6 2231 0
 1393 REF 3 LAST 542 25,2205 0 2241 1

CS RADMODES
 MASK BIT12
 CCS A
 CAF -80DEGSR
 AD -50DEGSR
 TC RRONLY

GO TO T = -130 (-50).

13931 REF 50 LAST 543 25,2206 4 0110 0
 13932 REF 28 LAST 543 25,2207 7 4740 1
 13933 RFF 175 LAST 543 25,2210 10 000 0
 13934 RFF 32 LAST 542 25,2211 3 4735 1
 13935 REF 4 LAST 543 25,2212 0 2241 1

CS RADMODES
 MASK BIT12
 CCS A
 CAF BIT15
 TC RRONLY

GO TO T = -180 (+0).

13936 REF 51 LAST 543 25,2213 4 0110 0
 13937 REF 29 LAST 543 25,2214 7 4740 1
 13938 REF 176 LAST 543 25,2215 10 000 0
 13939 REF 6 LAST 541 25,2216 4 4736 0
 13935 REF 3 LAST 542 25,2217 0 2244 1

CS RADMODES
 MASK BIT12
 CCS A
 CS HALF
 TC RRONLY

GO TO S = -90 (+0).

1394 RFF 1 25,2220 0 2233 1

TC RMODINV

1395 REF 52 LAST 529 25,2221 4 4736 0
 1396 REF 52 LAST 543 25,2222 7 0110 0
 1397 REF 53 LAST 543 25,2223 54 110 0

CS BIT14
 MASK RADMODES
 TS RADMODES

END OF REMODE.

1398 REF 30 LAST 541 25,2224 3 4742 1
 1399 RFF 54 LAST 543 25,2225 7 0110 0
 1400 25,2226 0 0006 1
 1401 RFF 1 25,2227 1 3555 0
 1402 REF 1 25,2230 0 2602 1
 1403 REF 2 LAST 297 7737
 1404 25,2231 67070 1
 1405 25,2232 61615 1

CAF BIT10
 MASK RADMODES
 EXTEND
 BZF RG00DEND
 TC STDE SIG
 -45DEGSR = 13,14,15
 -50DEGSR DEC - .27778
 -80DEGSR DEC - .44444

WAS REMODE CALLED DURING DESIGNATE
 (BIT10 RADMODES = 1)

NO-RETURN TO CALLER WAITING IN RADSTALL
 YES - RETURN TO DESIGNATE

1406 REF 55 LAST 543 25,2233 22 110 1
 1407 REF 30 LAST 543 25,2234 3 4740 0
 1408 25,2235 0 0006 1
 1409 REF 11 LAST 536 25,2236 06 001 0
 1410 RFF 56 LAST 543 25,2237 54 110 0
 1411 REF 158 LAST 541 25,2240 0 0002 0

RMODINV LXCH RADMODES
 CAF BIT12
 EXTEND
 RXOR LCHAN
 TS RADMODES
 TC Q

INVERT THE MODE STATUS.

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P1412 PROGRAM NAMES_ RRONLY, RRONLY

R1413 FUNCTIONAL DESCRIPTION
 R1414 RRONLY AND RRONLY ARE SUBROUTINES FOR DOING SINGLE AXIS
 R1415 RR MANEUVERS FOR REMODE AND REPOSITION. IT DRIVES TO
 R1416 WITHIN 1 DEGREE. INITIALLY, AT RRIAX2, THE REMODE AND REPOSITION
 R1417 FLAGS (RADMODES BITS 14, 11) ARE CHECKED. IF BOTH EXIST,
 R1418 THE PROGRAM EXITS TO REPOSRT (SEE DORREPOS). THIS INDICATES
 R1419 THAT SOMEONE POSSIBLY REQUESTED A DESIGNATE (RADMODES BIT 10)
 R1420 WHICH REQUIRES A REMODE (RADMODES BIT 14) AND THAT A
 R1421 REPOSITION IS IN PROGRESS (RADMODES BIT 11). IF NONE
 R1422 OR ONLY ONE OF THE FLAGS EXIST, REMODE OR REPOSITION, MAGSUB
 R1423 IS CALLED TO SEE IF THE APPROPRIATE ANGLE IS WITHIN 1 DEGREE. IF YES,
 R1424 CONTROL RETURNS TO THE CALLING ROUTINE. IF NOT, CONTROL IS
 R1425 TRANSFERRED TO RROUT FOR SINGLE AXIS MANEUVERS WITH THE OTHER
 R1426 ANGLE SET = 0. FOLLOWING A .5 SECOND WAIT, THE ABOVE PROCEDURE IS
 R1427 REPEATED.

R1428 CALLING SEQUENCE: L-1 CAF *ANGLE* (DESIRED ANGLE SCALED PI)
 R1429 L TC RRONLY (TRUNION ONLY)
 R1430 RRONLY (SHAFT ONLY)
 R1431 RRONLY IS CALLED BY PREPOS29;
 R1432 RRONLY AND RRONLY ARE CALLED BY DORREPOS AND REMODE

R1433 ERASABLE INITIALIZATION REQUIRED:
 R1434 C(A) = DESIRED ANGLE, RADMODES

R1435 SUBROUTINES CALLED_
 R1436 FIXDELAY, REPOSRT, MAGSUB, RROUT

R1437 JOBS OR TASKS INITIATED_
 R1438 NONE

R1439 ALARMS_ NONE

R1440 EXIT_ REPOSRT (REMODE AND REPOSITION FLAGS PRESENT - RADMODES
 R1441 BITS 14, 11)
 R1442 L+1 (ANGLE WITHIN ONE DEGREE OR RR OUT OF AUTO MODE)

1443	REF	2	LAST	122	25,2241	55*316 0	RRONLY	TS	RDES	
1444	REF	114	LAST	539	25,2242	3 4755 1		CAF	ZERO	
1445	REF	1			25,2243	1 2246 1		TCF	RRIAXIS	
1446	REF	3	LAST	544	25,2244	55*316 0	RRONLY	TS	RDES	
1447	REF	64	LAST	538	25,2245	3 4753 1		CAF	DNE	
1448	REF	1			25,2246	55*317 1	RRIAXIS	TS	RPINDEX	
1449					25,2247	0 0006 1		EXTEND		
1450	REF	4	LAST	539	25,2250	23*315 1		QXCH	RRPET	
1451	REF	1			25,2251	1 2254 1		TCF	RRIAX2	

DESIRED TRUNION ANGLE.

SHAFT COMMANDS ARE UNRESOLVED SINCE THIS ROUTINE ENTERED ONLY WHEN T = 0 OR 180.

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1452	REF	7	LAST	540	25,2252	0 5221 0	NXTRRIAX	TC	EIXDELAY	
1453					25,2253	00062 0		DEC	50	2 SAMPLES PER SECOND.
1454	REF	57	LAST	543	25,2254	4 0110 0	RP1AX2	CS	RADMODES	IE SOMEONE REQUESTES AS DESIGNATE WHICH
1455	REF	2	LAST	305	25,2255	7 7707 1		MASK	PRI022	REQUIRES A REMODE AND A REPOSITION IS IN
1456					25,2256	0 0006 1		EXTEND		PROGRESS, INTERRUPT IT AND START THE
1457	REF	1			25,2257	1 2144 0		BZF	REPOSRT	REMODE IMMEDIATELY.
1458	REF	4	LAST	544	25,2260	3 1316 1		CA	RDES	
1459					25,2261	0 0006 1		EXTEND		
1460	REF	2	LAST	544	25,2262	5 1317 0		INDEX	RRINDEX	
1461	REF	7	LAST	539	25,2263	20 035 0		MSU	CDUT	
1462	REE	9	LAST	534	25,2264	54 061 1		TS	ITEMP1	SAVE ERROR SIGNAL.
1463					25,2265	0 0006 1		EXTEND		
1464	REF	1			25,2266	7 2305 1		MP	RRSPGAIN	TRIES TO NULL .7 OE ERROR OVER NEXT .5
1465	REF	71	LAST	536	25,2267	54 001 1		TS	L	
1466	REE	58	LAST	545	25,2270	3 0110 1		CA	RADMODES	
1467	REE	34	LAST	541	25,2271	7 4752 1		MASK	BIT2	
1468	REE	10	LAST	545	25,2272	56 061 0		XCH	ITEMP1	STORE RR-OUT-OF-AUTO-MODE BIT.
1469	REF	6	LAST	539	25,2273	0 4512 0		TC	MAGSUB	SEE IF WITHIN ONE DEGREE.
1470					25,2274	77644 1		DEC	-.00555	SCALED IN HALF-REVS.
1471	REE	11	LAST	545	25,2275	10 061 1		CCS	ITEMP1	NO. IE RR OUT OF AUTO MODE, EXIT.
1472	REF	5	LAST	544	25,2276	0 1315 1		TC	RRRET	RETURN TO CALLER.
1473	REF	3	LAST	545	25,2277	11 317 1		CCS	RRINDEX	COMMAND EOR OTHER AXIS IS ZERO.
1474					25,2300	1 2302 0		TCE	+2	SETTING A TO 0.
1475	REF	72	LAST	545	25,2301	56 001 0		XCH	L	
1476	REE	8	LAST	520	25,2302	53 110 1		DXCH	TANG	
1477	REE	1			25,2303	0 2306 0		TC	RROUT	
1478	REE	1			25,2304	1 2252 1		TCF	NXTRRIAX	COME BACK IN .5 SECONDS.
1479					25,2305	22715 1	RRSPGAIN	DEC	.59062	NULL .7 ERROR IN .5 SEC.

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P1480 PROGRAM NAME_ RRDT

RROR COUNTER SCALING. RRDT LIMITS THEM

R1482 FUNCTIONAL DESCRIPTION_
 R1483 RRDT RECEIVES RR GYRO COMMANDS IN TANG, TANG +1 IN RR
 R1484 ERROR COUNTER SCALING. RRDT THEN LIMITS THEM AND
 R1485 GENERATES COMMANDS TO THE CDU TO ADJUST THE ERROR COUNTERS
 R1486 TO THE DESIRED VALUES. INITIALLY MAGSUB CHECKS THE MAGNITUDE OF
 R1487 THE COMMAND (SHAFT ON 1ST PASS) TO SEE IF IT IS GREATER THAN
 R1488 384 PULSES. IF NOT, CONTROL IS TRANSFERRED TO RRDTLIM TO
 R1489 LIMIT THE COMMAND TO +384 OR -384 PULSES. THE DIFFERENCE IS
 R1490 THEN CALCULATED BETWEEN THE DESIRED STATE AND THE PRESENT STATE OF
 R1491 THE ERROR COUNTER AS RECORDED IN LASTYCMD AND LASTXCMD.
 R1492 THE RESULT IS STORED IN OPTXCMD (1ST PASS) AND OPTYCMD (2ND
 R1493 PASS). FOLLOWING THE SECOND PASS, FOR THE TRUNNIDN COMMAND, THE
 R1494 OCDUT AND CDUS ERROR COUNTER DRIVE BITS (CHAN 14 BITS 12, 11)
 R1495 ARE SET. THIS PROGRAM THEN EXITS TO THE CALLING PROGRAM.

R1496 CALLING SEQUENCE:
 R1497 L TC RRDT (WITH RUPT INHIBITED) RRDT IS CALLED BY
 R1498 RRTCNLY, RRSONLY, AND DODES

R1499 ERASABLE INITIALIZATION REQUIRED:
 R1500 TANG, TANG +1 (DESIRED COMMANDS), LASTYCMD, LASTXCMD
 R1501 (1ST PASS = 0), RR ERROR COUNTER ENABLE SET (CHAN 12 BIT 2).

R1502 SUBROUTINES CALLED_
 R1503 MAGSUB

R1504 JDBS DR TASKS INITIATED_
 R1505 NCNE

R1506 ALARMS_ NDNE

R1507 EXIT_ L+1 (ALWAYS)

DESIRED VALUES. RUPT MUST BE INHIBITED.

1509	REF 159	LAST	543	25,2306	22 002 0	RRDT	LXCH	Q	
1510	REF 65	LAST	544	25,2307	3 4753 1		CAF	DNE	
1511	REF 5	LAST	534	25,2310	54 062 1	RRDT2	TS	ITEMP2	
1512	REF 177	LAST	543	25,2311	50 000 1		INDEX	A	
1513	REF 9	LAST	545	25,2312	3 1107 0		CA	TANG	
1514	REF 12	LAST	545	25,2313	54 061 1		TS	ITEMP1	
1515	REF 7	LAST	545	25,2314	0 4512 0		TC	MAGSUB	
1516				25,2315	77177 0	-RRLIMIT	DEC	-384	
1517	REF 1			25,2316	1 2335 1		TCF	RRDTLIM	
1518	REF 13	LAST	546	25,2317	3 0061 0	SETRCTR	CA	ITEMP1	
1519	REF 6	LAST	546	25,2320	50 062 0		INDEX	ITEMP2	
1520	REF 8	LAST	541	25,2321	56 112 0		XCH	LASTYCMD	
1521				25,2322	4 0000 0		COM		

SAVE RETURN.
LDOP TWICE.

SAVE SIGN OF COMMAND FOR LIMITING.

SEE IF WITHIN LIMITS.

LIMIT COMMAND TO MAG OF 384.

COUNT OUT DIFFERENCE BETWEEN DESIRED
STATE AND PRESENT STATE AS RECORDED IN
LASTYCMD AND LASTXCMD

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1522	REF	14	LAST	546	25,2323	6 0061 0	AD	ITEMP1	
1523	REF	9	LAST	245	25,2324	6 4754 0	AD	NEGO	PREVENT +0 IN OUTCOUNTER
1524	REF	7	LAST	546	25,2325	50 062 0	INDEX	ITEMP2	
1525	REF	1			25,2326	54 053 0	TS	CDUTCMD	
1526	REF	8	LAST	547	25,2327	10 062 1	CCS	ITEMP2	PROCESS BOTH INPUTS.
1527	REF	1			25,2330	1 2310 0	TCF	RROUT2	
1528	REF	1			25,2331	3 5020 0	CAF	PRI06	ENABLE COUNTERS.
1529					25,2332	0 0006 1	EXTEND		
1530	REF	7	LAST	297	25,2333	05 014 1	WOR	CHAN14	PUT ON CDU DRIVES S AND T
1531	REF	73	LAST	545	25,2334	0 0001 0	TC	L	RETURN.
1532	REF	15	LAST	547	25,2335	10 061 1	RROUTLIM CCS	ITEMP1	LIMIT COMMAND TO ABS VAL OF 384.
1533	REF	1			25,2336	4 2315 0	CS	-RPLIMIT	
1534					25,2337	1 2341 1	TCF	+2	
1535	REF	2	LAST	547	25,2340	3 2315 1	CA	-RPLIMIT	
1536	REF	16	LAST	547	25,2341	54 061 1	TS	ITEMP1	
1537	REF	1			25,2342	1 2320 0	TCF	SETRRCTR +1	

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P1538 ROUTINE TO ZERO THE RR CDUS AND DETERMINE THE ANTENNA MODE.

1539	REF	1		25,2343	3 2372 0	RRZERO	CAF	BIT11+1	SEE IF MONITOR REPOSITION OR NOT IN AUTO
1540	REF	59	LAST	545	25,2344 7 0110 0		MASK	RADMODES	IF SO, DONT RE-ZERO CDUS.
1541	REF	178	LAST	546	25,2345 10 000 0		CCS	A	
1542	REF	1		25,2346	1 3530 0		TCF	RADNCOOP	(IMMEDIATE TASK TO RGOODEND).
1543				25,2347	0 0004 0		INHINT		
1544	REF	26	LAST	538	25,2350 4 4737 1		CS	BIT13	SET FLAG TO SHOW ZEROING IN PROGRESS.
1545	REF	60	LAST	548	25,2351 7 0110 0		MASK	RADMODES	
1546	REF	27	LAST	548	25,2352 6 4737 0		AD	BIT13	
1547	REF	61	LAST	548	25,2353 54 110 0		TS	RADMODES	
1548	REF	66	LAST	546	25,2354 3 4753 1		CAF	ONE	
1549	REF	20	LAST	502	25,2355 0 5203 0		TC	WAITLIST	
1550	REF	21	LAST	537	E7,1454		EBANK=	LOSCOUNT	
1551	REF	1		25,2356	02370 1		2CADR	RRZ2	
1551	REF	1		25,2357	52067 1				
1552	REF	62	LAST	548	25,2360 4 0110 0		CS	RADMODES	SEE IF IN AUTO MODE.
1553	REF	35	LAST	545	25,2361 7 4752 1		MASK	BIT2	
1554	REF	179	LAST	548	25,2362 10 000 0		CCS	A	
1555	REF	1		25,2363	1 2366 1		TCF	ROADBACK	
1556	REF	21	LAST	401	25,2364 0 5567 0		TC	ALARM	AUTO DISCRETE NOT PRESENT - TRYING
1557				25,2365	00510 0		OCT	510	
1558				25,2366	0 0003 1	ROADBACK	RELINT		
1559	REF	3	LAST	341	25,2367 1 4631 0		TCF	SWRETURN	
1560	REF	2	LAST	537	25,2370 0 2071 0	RRZ2	TC	RRZEROSB	COMMON TO TURNON AND RRZERO.
1561	REF	1		25,2371	1 3546 1		TCF	ENDRADAR	
1562				25,2372	02001 1	BIT11+1	OCT	02001	

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P1563 PROGRAM NAME_ RRDESSM

R (HALF-UNIT) IN RRTARGET. REMODES IF

R1565 FUNCTIONAL DESCRIPTION_
R1566 THIS INTERPRETIVE ROUTINE WILL DESIGNATE, IF DESIRED ANGLES ARE
R1567 WITHIN THE LIMITS OF EITHER MODE, TO A LINE-OF SIGHT (LOS) VECTOR
R1568 (HALF-UNIT) KNOWN WITH RESPECT TO THE STABLE MEMBER PRESENT
R1569 ORIENTATION. INITIALLY THE IMU CDUS ARE READ AND CONTROL
R1570 TRANSFERRED TO SMNB TO TRANSFORM THE LOS VECTOR FROM STABLE
R1571 MEMBER TO NAVIGATION BASE COORDINATES (SEE STG MEMO 4699).
R1572 RRANGLES IS THEN CALLED TO CALCULATE THE RR GIMBAL ANGLES,
R1573 TRUNNION AND SHAFT, FOR BOTH THE PRESENT AND ALTERNATE MODE.
R1574 RRLIMCHK IS CALLED TO SEE IF THE ANGLES CALCULATED FOR THE
R1575 PRESENT MODE ARE WITHIN LIMITS. IF WITHIN LIMITS, THE RETURN
R1576 LOCATION IS INCREMENTED, INASMUCH AS NO VEHICLE MANEUVER IS
R1577 REQUIRED, BEFORE EXITING TO STARTDES. IF NOT WITHIN LIMITS OF THE
R1578 CURRENT MODE, TRYSW IS CALLED. FOLLOWING INVERTING OF THE RR
R1579 ANTENNA MODE FLAG (RADMODES BIT 12), RRLIMCHK IS CALLED
R1580 TO SEE IF THE ANGLES CALCULATED FOR THE ALTERNATE MODE ARE WITHIN
R1581 LIMITS. IF YES, THE RR ANTENNA MODE FLAG IS AGAIN INVERTED,
R1582 THE REMODE FLAG (RADMODES BIT 14) SET, AND THE RETURN LOCATION
R1583 INCREMENTED, TO INDICATE NO VEHICLE MANEUVER IS REQUIRED, BEFORE
R1584 EXITING TO STARTDES. IF THESE ANGLES ARE NOT WITHIN LIMITS
R1585 OF THE ALTERNATE MODE, THE RR ANTENNA MODE FLAG (RADMODES
R1586 BIT 12) IS INVERTED BEFORE RETURNING DIRECTLY TO THE CALLING PROGRAM
R1587 TO INDICATE THAT A VEHICLE MANEUVER IS REQUIRED.

R1588 CALLING SEQUENCE:
R1589 L STCALL RRTARGET (LOS HALF-UNIT VECTOR IN SM COORDINATES)
R1590 L+1 RRDESSM
R1591 L+2 BASIC (VEHICLE MANEUVER REQUIRED)
R1592 L+3 BASIC (NO VEHICLE MANEUVER REQUIRED)

R1593 ERASABLE INITIALIZATION REQUIRED:
R1594 RRTARGET, RADMODES

R1595 SUBROUTINES CALLED_
R1596 RFADCDUS, SMNB, RRANGLES, RRLIMCHK, TRYSW (ACTUALLY
R1597 PART CF), RMODINV

R1598 JOBS OR TASKS INITIATED_
R1599 NCNE

R1600 ALARMS_ NONE

R1601 EXIT_ L+2 (NEITHER SET OF ANGLES ARE WITHIN LIMITS OF RELATED MODE).
R1602 STARTDES (DESIGNATE POSSIBLE AT PRESENT VEHICLE ATTITUDE-RETURNS
R1603 TO L+3 FROM STARTDES)

CAN BE DONE IN PRESENT VEH ATTITUDE.

1605				25,2373	43020 1	RRDESSM	STQ	CLEAR
1606	REF	4	LAST	286	25,2374	01113 0		DESRET

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1607	REF	1		25,2375	00271	0		RRNBSW		
1608				25,2376	77624	1		CALL		COMPUTES SINES AND COSINES, ORDER Y Z X
1609	REF	2	LAST	499	25,2377	47443	1		CDUTRIG	
1610					25,2400	45175	0	VLOAD	CALL	LOAD VECTOR AND CALL TRANSFORMATION
1611	REF	4	LAST	529	25,2401	01102	0		RRTARGET	
1612	REF	2	LAST	499	25,2402	47575	0		*SMNB*	
1613				25,2403	77624	1		CALL		GET RR GIMBAL ANGLES IN PRESENT AND
1614	REF	1			25,2404	26133	1		RRANGLES	ALTERNATE MODE.
1615					25,2405	77776	1	EXIT		
1616				25,2406	0 0004	0		INHINT		
1617	REF	3	LAST	523	25,2407	0 4523	1	TC	RRLMCHK	
1618	REF	4	LAST	337	25,2410	01107	0	ADRES	MODEA	CONFIGURATION FOR CURRENT MODE.
1619					25,2411	0 2414	1	TC	+3	NOT IN CURRENT MODE
1620	REF	5	LAST	549	25,2412	25 113	0	OKDESSM INCR	DESRET	INCREMENT SAYS NO VEHICLE MANEUVER REQ.
1621	REF	1			25,2413	0 2432	0	TC	STARTDES	SHOW DESIGNATE REQUIRED
1622	REF	5	LAST	519	25,2414	4 0104	0	CS	FLAGWRD8	
1623	REF	4	LAST	519	25,2415	7 4744	0	MASK	SURFFBIT	CHECK IF ON LUNAR SURFACE (SURFFLAG=P22F
1624					25,2416	0 0006	1	EXTEND		
1625	REF	1			25,2417	1 2456	0	BZF	NORDSTAL	BRANCH-YES-CANNOT DESIGNATE IN MODE 2
1626	REF	1			25,2420	0 2461	0	TC	TRYSW	
1627	REF	6	LAST	550	25,2421	4 0104	0	LUNDESCH CS	FLAGWRD8	OVERFLOW RETURN FROM RRANGLES
1628	REF	5	LAST	550	25,2422	7 4744	0	MASK	SURFFBIT	CHECK IF ON LUNAR SURFACE
1629					25,2423	0 0006	1	EXTEND		
1630	REF	2	LAST	550	25,2424	1 2456	0	BZF	NORDSTAL	BRANCH-YES-RETURN TO CALLER - ALARM 527
1631	REF	38	LAST	531	25,2425	3 0074	1	CA	STATE	
1632	REF	9	LAST	516	25,2426	7 4745	1	MASK	RNDVZBIT	
1633	REF	180	LAST	548	25,2427	10 000	0	CCS	A	TEST RNDVZFLG.
1634	REF	1			25,2430	0 2471	1	TC	NODESSM	NOT ON MOON-CALL FOR ATTITUDE MANEUVER
1635	REF	84	LAST	531	25,2431	1 5155	1	TCF	ENDOFJCB	...BUT NOT IN R29.

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P1636 PROGRAM NAME_ STARTDES

STORED AS A HALF-UNIT VECTOR IN RRTARGET

R1638 FUNCTIONAL DESCRIPTION
 R1640 STARTDES IS ENTERED WHEN WE ARE READY TO BEGIN DESIGNATION.
 R1642 BIT 14 OF RADMODES IS ALREADY SET IF A REMODE IS REQUIRED.
 R1644 AT THIS TIME, THE RR ANTENNA MAY BE IN A REPOSITION
 R1646 OPERATION. IN THIS CASE, IF A REMODE IS REQUIRED IT MAY HAVE
 R1647 ALREADY BEGUN BUT IN ANY CASE THE REPOSITION WILL BE INTERRUPTED.
 R1648 OTHERWISE, THE REPOSITION WILL BE COMPLETED BEFORE 2-AXIS
 R1649 DESIGNATION BEGINS. INITIALLY DESCOUNT IS SET = 60 TO INDICATE
 R1650 THAT 30 SECONDS WILL BE ALLOWED FOR THE RR DATA GOOD INBIT
 R1651 (CHAN 33 BIT 4) IF LOCK-ON IS DESIRED (STATE BIT 5). BIT 10
 R1652 OF RADMODES IS SET TO SHOW THAT A DESIGNATE IS REQUIRED.
 R1653 THE REPOSITION FLAG (RADMODES BIT 11) IS CHECKED. IF SET,
 R1654 THE PROGRAM EXITS TO L+3 OF THE CALLING PROGRAM (SEE RRDESSM
 R1655 AND RRDESNB). THE PROGRAM WILL BEGIN DESIGNATING TO THE DESIRED
 R1656 ANGLES FOLLOWING THE REPOSITION OR REMODE IF ONE WAS
 R1657 REQUESTED. IF THE REPOSITION FLAG IS NOT SET, SETRRECR IS CALLED
 R1658 WHICH SETS THE RR ERROR COUNTER ENABLE BIT (CHAN 12 BIT 2)
 R1659 AND SETS LASTYCMD AND LASTXCMD = 0 TO INDICATE THE
 R1660 DIFFERENCE BETWEEN THE PRESENT AND DESIRED STATE OF THE ERROR
 R1661 COUNTERS. A 20 MILLISECOND WAITLIST CALL IS SET FOR BEGDES
 R1662 AFTER WHICH THE PROGRAM EXITS TO L+3 OF THE CALLING PROGRAM.

CKON IS DESIRED. BIT14 OF RADMODES IS
 OR REPOSITION OPERATION. IN THIS
 THE REPOSITION WILL BE INTERRUPTED.
 GINS.

R1663 CALLING SEQUENCE:
 R1664 FROM RRDESSM AND RRDESNB WHEN ANGLES WITHIN LIMITS.

R1665 ERASABLE INITIALIZATION REQUIRED:
 R1666 RADMODES, (SEE DODES)

R1667 SUBROUTINES CALLED_
 R1668 SETRRECR, WAITLIST

R1669 JOBS OR TASKS INITIATED_
 R1670 BECDES

R1671 ALARMS_ NCNE

R1672 EXIT_ L+3 OF CALLING PROGRAM (SEE RRDESSM)
 R1673 L+2 OF CALLING PROGRAM (SEE RRDESNB)

1674	REF	6	LAST	550	25,2432	25,113	0	STARTDES	INCR	DESRET
1675	REF	63	LAST	548	25,2433	4	0110	0	CS	RADMODES
1676	REF	31	LAST	543	25,2434	7	4742	0	MASK	BIT10
1677	REF	64	LAST	551	25,2435	26	110	0	ADS	RADMODES
1678	REF	23	LAST	541	25,2436	7	4741	0	MASK	BIT11
1679	REF	181	LAST	550	25,2437	10	000	0	CCS	A
1680	REF	1			25,2440	1	2446	1	TCF	DESRETRN

SEE IF REPOSITION IN PROGRESS.

ECTR ALREADY SET UP.

1681	REF	2	LAST	540	25,2441	0	2156	1	TC	SETRRECR
------	-----	---	------	-----	---------	---	------	---	----	----------

SET UP ERROR COUNTERS.

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1682 REF 34 LAST 518 25,2442 3 4752 0
 1683 REF 21 LAST 548 25,2443 0 5203 0
 1684 REF 22 LAST 548 25,2444 0 5273 1
 1685 REF 2 LAST 541 25,2445 52067 1
 1685

CAF TWO
 TC WAITLIST
 EBANK= LOSCOUNT
 2CADR BEGDES

1686 REF 3 LAST 526 25,2446 3 1306 0
 1687 25,2447 0 0006 1
 1688 REF 1 25,2450 1 2452 1
 1689 REF 85 LAST 550 25,2451 0 5155 0
 1690 25,2452 0 0003 1
 1691 REF 7 LAST 551 25,2453 25 1113 0
 1692 REF 8 LAST 552 25,2454 3 1113 0
 1693 REF 9 LAST 531 25,2455 1 4640 0

DESRETRN CA RADCADR
 EXTEND
 BZF DESRTRN
 TC ENDOFJOB
 DESRTRN RELINT
 INCR DESRET
 CA DESRET
 TCF BANKJUMP

FIRST PASS THRU DESIGNATE

YES SET EXIT
 NO

1694 REF 115 LAST 544 25,2456 3 4755 1
 1695 REF 4 LAST 552 25,2457 55 306 1
 1696 REF 2 LAST 552 25,2460 1 2452 1

NORDSTAL CAF ZERO
 TS RADCADR
 TCF DESRTRN

ZERO RADCADR TO WIPE OUT ANYONE
 WAITING IN RADSTALL SINCE WE ARE NOW
 RETURNING TO P20 AND MAY DO NEW RADSTALL

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P1697

SEE IF RRDESSM CAN BE ACCOMPLISHED AFTER A REMODE.

1698	REF	2	LAST	543	25,2461	0 2233 1	TRYSWS	TC	RMODINV	(NOTE RUPT INHIBIT)
1699	REF	4	LAST	550	25,2462	0 4523 1		TC	RRLIMCHK	TRY DIFFERENT MODE.
1700	REF	4	LAST	337	25,2463	01111 1		ADRES	MODEB	
1701	REF	2	LAST	550	25,2464	1 2471 0		TCF	NODESSM	VEHICLE MANEUVER REQUIRED.
1702	REF	3	LAST	553	25,2465	0 2233 1		TC	RMODINV	RESET BIT12
1703	REF	53	LAST	543	25,2466	3 4736 1		CAF	BIT14	SET FLAG FOR REMODE.
1704	REF	65	LAST	551	25,2467	26 110 0		ADS	RADMCOES	
1705	REF	1			25,2470	1 2412 0		TCF	OKDESSM	
1706	REF	4	LAST	553	25,2471	0 2233 1	NODESSM	TC	RMODINV	RE-INVERT MODE AND RETURN
1707	REF	9	LAST	552	25,2472	25'113 0		INCR	DESRET	TO CALLER +2
1708	REF	3	LAST	550	25,2473	1 2456 0		TCF	NORDSTAL	
1709					25,2474	00074 1	MAXTRYS	DEC	60	

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P1710 DESIGNATE TO SPECIFIC RR GIMBAL ANGLES (INDEPENDENT OF VEHICLE MOTION). ENTER WITH DESIRED ANGLES IN
 R1712 TANG AND TANG +1.

1713	REF	6	LAST	528	25,2475	0 4645 1	RRDES NB	TC	MAKECADR	
1714	REF	10	LAST	553	25,2476	55'113 1		TS	DESRET	
17143	REF	44	LAST	530	25,2477	0 5516 0		TC	DOWNFLAG	RESET FLAG TO PREVENT DODES FROM GOING
17146	REF	5	LAST	525	25,2500	00041 1		ADRES	LCSCMFLG	BACK TO R21
1715	REF	1			25,2501	3 2474 1		CA	MAXIRYS	SET TIME LIMIT COUNTER
1716	REF	2	LAST	520	25,2502	55'114 0		TS	DESCOUNT	FOR DESIGNATE
1717					25,2503	0 0004 0		INHINT		SEE IF CURRENT MODE OK.
1718	REF	1			25,2504	0 2540 1		TC	RRLIMNB	DO SPECIAL V41 LIMIT CHECK
1719	REF	10	LAST	546	25,2505	01107 0		ADRES	TANG	
1720	REF	1			25,2506	1 2523 0		TCF	TRYSWN	SEE IF IN OTHER MODE.
1721					25,2507	0 0003 1	OKDES NB	RELINT		
1722					25,2510	0 0006 1		EXTEND		
1723	REF	11	LAST	554	25,2511	3 1110 0		DCA	TANG	
1724	REF	9	LAST	338	25,2512	53'751 1		DXCH	TANGNB	
1725	REF	40	LAST	529	25,2513	0 6036 1		TC	INTPRET	
1726					25,2514	77624 1		CALL		GET LOS IN NB COORDS.
1727	REF	2	LAST	314	25,2515	46041 0			RRNB	
1728	REF	5	LAST	550	25,2516	01102 0		STORE	RPTARGET	
1729					25,2517	77414 0		SET	EXIT	
1730	REF	2	LAST	550	25,2520	00071 1			RRNSW	
1731					25,2521	0 0004 0		INHINT		
1732	REF	2	LAST	550	25,2522	1 2433 0		TCF	STARTDES +1	
1733	REF	5	LAST	553	25,2523	0 2233 1	TRYSWN	TC	RMODINV	SEE IF OTHER MODE WILL DO.
1734	REF	2	LAST	554	25,2524	0 2540 1		TC	RRLIMNB	DO SPECIAL V41 LIMIT CHECK
1735	REF	12	LAST	554	25,2525	01107 0		ADRES	TANG	
1736	REF	1			25,2526	1 2533 1		TCF	NODESNB	NOT POSSIBLE.
1737	REF	6	LAST	554	25,2527	0 2233 1		TC	RMODINV	
1738	REF	54	LAST	553	25,2530	3 4736 1		CAF	BIT14	CALL FOR REMODE.
1739	REF	66	LAST	553	25,2531	26 110 0		ADS	RADMODES	
1740	REF	1			25,2532	1 2507 0		TCF	OKDES NB	
1741	REF	7	LAST	554	25,2533	0 2233 1	NODESNB	TC	RMODINV	REINVERT MODE BIT.
1742	REF	22	LAST	548	25,2534	0 5567 0		TC	ALARM	BAD INPUT ANGLES.
1743					25,2535	00502 0		OCT	502	
1744	REF	7	LAST	526	25,2536	0 6011 1		TC	CLRADMOD	
17442	REF	86	LAST	552	25,2537	0 5155 0		TC	ENDOFJOB	AVOID 503 ALARM.
1745	REF	160	LAST	546	25,2540	50 002 0	RRLIMNB	INDEX	0	THIS ROUTINE IS IDENTICAL TO RRLIMCHK
1746					25,2541	3 0000 1		CAF	0	EXCEPT THAT THE MODE 1 SHAFT LOWER
1747	REF	161	LAST	554	25,2542	24 002 0		INCR	0	LIMIT IS -85 INSTEAD OF -70 DEGREES
1748					25,2543	0 0006 1		EXTEND		

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1749	REF 182	LAST 551	25,2544	5 0000 1	INDEX A	READ GIMBAL ANGLES INTO ITEMP STORAGE
1750			25,2545	3 0001 0	DCA 0	
1751	REF 17	LAST 547	25,2546	52 062 1	DXCH ITEMP1	
1752	REF 162	LAST 554	25,2547	22 002 0	LXCH Q	L(CALLER +2) TO L
1753	REF 31	LAST 543	25,2550	3 4740 0	CAF BIT12	SEE WHICH MODE RR IS IN
1754	REF 67	LAST 554	25,2551	7 0110 0	MASK RADMODES	
1755	REF 183	LAST 555	25,2552	10 000 0	CCS A	
1756	REF 2	LAST 533	25,2553	1 4550 1	TCF MODE2CHK	MODE 2 CAN USE RRLIMCHK CODING
1757	REF 18	LAST 555	25,2554	3 0061 0	CA ITEMP1	
1758	REF 8	LAST 546	25,2555	0 4512 0	TC MAGSUB	MODE 1 IS DEFINED AS
1759			25,2556	66161 1	DEC -.30555	1. ABS(T) L 55 DEGS
1760	REF 74	LAST 547	25,2557	0 0001 0	TC L	2 SHAFT LIMITS AT +59, -85 DEGS
1761	REF 9	LAST 547	25,2560	3 0062 0	CA ITEMP2	LOAD SHAFT ANGLE
1762			25,2561	0 0006 1	EXTEND	
1763	REF 1		25,2562	6 2570 1	BZMF NEGSHAFT	IF NEGATIVE SHAFT ANGLE, ADD 20.5 DEGS
1764	REF 2	LAST 534	25,2563	6 4562 1	AD 5.5DEGS	
1765	REF 9	LAST 555	25,2564	0 4512 0	SHAFTLIM TC MAGSUB	
1766			25,2565	64420 0	DEC -.35833	64.5 DEGREES
1767	REF 75	LAST 555	25,2566	0 0001 0	TC L	NOT IN LIMITS
1768	REF 2	LAST 534	25,2567	0 4560 0	TC RRLIMOK	IN LIMITS
1769	REF 1		25,2570	6 2572 0	NEGSHAFT AD 20.5DEGS	MAKE NEGATIVE SHAFT LIMIT -85 DEGREES
1770	REF 1		25,2571	1 2564 0	TCF SHAETLIM	

1771 25,2572 03512 1 20.5DEGS DEC .11389

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P1772 PRCGRAM NAME_ BEGDES

R1773 FUNCTIONAL DESCRIPTION

R1774 BEGDES CHECKS VARIOUS DESIGNATE REQUESTS AND REQUESTS THE
R1775 ACTUAL RR DESIGNATION. INITIALLY A CHECK IS MADE TO SEE IF A
R1776 REMODE (RADMODES BIT 14) IS REQUESTED OR IN PROGRESS. IF SO,
R1777 CONTRL IS TRANSFERRED TO STDESIG AFTER ROUTINE REMODE IS
R1778 EXECUTED. IF NO REMODE, STDESIG IS IMMEDIATELY CALLED WHERE
R1779 FIRST THE REPOSITION FLAG (RADMODES BIT 11) IS CHECKED. IF
R1780 PRESENT, THE DESIGNATE FLAG (RADMODES BIT 10) IS REMOVED
R1781 AFTER WHICH THE PROGRAM EXITS TO RDBADEND. IF THE REPOSITION
R1782 FLAG IS NOT PRESENT, THE CONTINUOUS DESIGNATE FLAG (RADMODES
R1783 BIT 15) IS CHECKED. IF PRESENT, ON EXECUTIVE CALL IS IMMEDIATELY
R1784 MADE FOR DODES AFTER WHICH A .5 SECOND WAIT IS INITIATED BEFORE
R1785 REPEATING AT STDESIG. IF THE RR SEARCH ROUTINE (LRS24.1) IS DESIGNATING
R1786 TO A NEW PCINT (NEWPTLG SET) THE CURRENT DESIGNATE TASK IS TERMINATED.
R1787 IF CONTINUOUS DESIGNATE IS NOT WANTED, THE DESIGNATE FLAG (RADMODES
R1788 BIT 10) IS CHECKED. IF NOT PRESENT, THE PROGRAM EXITS TO ENDRADAR TO
R1789 CHECK RR CDU FAIL BEFORE RETURNING TO THE CALLING PROGRAM. IF DESIGNATE
R1790 IS STILL REQUIRED, DESCOUNT IS CHECKED TO SEE IF THE 30 SECONDS HAS
R1791 EXPIRED BEFORE RECEIVING THE RR DATA GOOD (CHAN 33 BIT 4)
R1792 SIGNAL. IF OUT OF TIME, PROGRAM ALARM 00503 IS REQUESTED, THE
R1793 RR AUTO TRACKER ENABLE AND RR ERROR COUNTER ENABLE
R1794 (CHAN 12 BITS 14,2) BITS REMOVED, AND THE DESIGNATE FLAG
R1795 (RADMODES BIT 10) REMOVED BEFORE EXITING TO RDBADEND. IF
R1796 TIME HAS NOT EXPIRED, DESCOUNT IS DECREMENTED, THE
R1797 EXECUTIVE CALL MADE FOR DODES, AND A .5 SECOND WAIT INITIATED
R1798 BEFORE REPEATING THIS PROCEDURE AT STDESIG.

R1799 CALLING SEQUENCE:

R1800 WAITLIST CALL FROM STARTDES

R1801 TCF 3FGDES FROM DORREPOS

R1802 TC STDESIG RETURNING, FROM REMODE

R1803 ERASABLE INITIALIZATION REQUIRED:

R1804 DESCOUNT, RADMODES

R1805 SUBROUTINES CALLED_

R1806 ENDRACAR, FINDVAC

R1807 JCBS CR TASKS INITIATED_ DODES

R1808 ALARMS_ PROGRAM ALARM 00503 (30 SECONDS HAVE EXPIRED) WITH NO RR DATA

R1809 GOOD (CHAN 33 BIT 4) RECEIVED WHEN LOCK-ON (STATE BIT 5) WAS REQUESTED.

R1810 EXIT_ TASKOVER (SEARCH PATTERN DESIGNATING TO NEW POINT)

R1811 ENDRACAR (NO DESIGNATE - RADMODES BIT 10)

R1812 RDBADEND (REPOSITION OR 30 SECONDS EXPIRED)

1813 REF 68 LAST 555 25,2573 4 0110 0 8EGDES CS RADMODES

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1814	REF	55	LAST	554	25,2574	7 4736 0		MASK	BIT14	
1815	RFF	184	LAST	555	25,2575	10 000 0		CCS	A	
1816	REF	2	LAST	543	25,2576	0 2602 1		TC	STDESIG	
1817	REF	1			25,2577	0 2171 1		TC	REMODE	
1818	REF	8	LAST	545	25,2600	0 5221 0	DESLOOP	TC	FIXDELAY	2 SAMPLES PFR SECOND.
1819					25,2601	00062 0		DEC	50	
1820	REF	24	LAST	551	25,2602	3 4741 1	STDESIG	CAF	BIT11	
1821	REF	69	LAST	556	25,2603	7 0110 0		MASK	RADMODES	SEE IF GIMBAL LIMIT MONITOR HAS FOUND US
1822	RFF	185	LAST	557	25,2604	10 000 0		CCS	A	OUT OF BOUNDS. IF SO, THIS BIT SHOWS A
1823	RFF	1			25,2605	1 2623 0		TCF	8ADDES	REPOSITION TO BE IN PROGRESS.
1824	REF	70	LAST	557	25,2606	10 110 0		CCS	RADMODES	SEE IF CONTINUOUS DESIGNATE WANTED.
1825					25,2607	1 2612 1		TCF	+3	IF SO, DONT CHECK BIT 10 TO SEE IF IN
1826					25,2610	1 2612 1		TCF	+2	LIMITS BUT GO RIGHT TO FINDVAC ENTRY.
1827	RFF	1			25,2611	1 2630 1		TCF	MORFDES +1	
1828	REF	71	LAST	557	25,2612	4 0110 0		CS	RADMODES	IF NON-CONTINUOUS, SEE IF END OF
1829	REF	32	LAST	551	25,2613	7 4742 0		MASK	BIT10	PROBLEM (DATA GOOD IF LOCK-ON WANTED OR
1830	RFF	186	LAST	557	25,2614	10 000 0		CCS	A	WITHIN LIMITS IF NOT). IF SO, EXIT AFTER
1831	REF	2	LAST	548	25,2615	1 3546 1		TCF	ENDRADAR	CHECKING RR CDU FAIL.
1844	REF	3	LAST	554	25,2616	11 114 0	STDESIG1	CCS	DESCOUNT	SEE IF THE TIME LIMIT HAS EXPIRED
1845	RFF	2	LAST	557	25,2617	1 2627 1		TCF	MOREDES	
1846	RFF	1			25,2620	4 2635 1		CS	814+82	IF OUT OF TIME, REMOVE ECR ENABLE + TRKR
1847					25,2621	0 0006 1		EXTEND		
1848	REF	32	LAST	541	25,2622	03 012 1		WAND	CHAN12	
1849	RFF	33	LAST	557	25,2623	4 4742 0	8ADDES	CS	BIT10	REMOVE DESIGNATE FLAG.
1850	REF	72	LAST	557	25,2624	7 0110 0		MASK	RADMODES	
1851	REF	73	LAST	557	25,2625	54 110 0		TS	RADMODES	
1852	REF	1			25,2626	1 3562 1		TCF	RDBADEND	
1853	RFF	4	LAST	557	25,2627	55 114 0	MOREDES	TS	DESCOUNT	
1854	REF	8	LAST	530	25,2630	3 7713 0		CAF	PR1026	UPDATE GYRO TORQUE COMMANDS.
1855	REF	21	LAST	530	25,2631	0 5105 0		TC	FINDVAC	
1856	REF	23	LAST	552	E7,1454			E8ANK=	LOSCOUNT	
1857	REF	1			25,2632	02636 0		2CADR	DODES	
1857	RFF	1			25,2633	52067 1				
1858	REF	1			25,2634	1 2600 1		TCF	DESLOOP	
1859					25,2635	20002 1	814+82	OCT	20002	

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P1860 PROGRAM NAME_ DODES

R1861 FUNCTIONAL DESCRIPTION

R1862 DODES CALCULATES AND REQUESTS ISSUANCE OF RR GYRO TORQUE
R1863 COMMANDS. INITIALLY THE CURRENT RR CDU ANGLES ARE STORED AND
R1864 THE LOS HALF-UNIT VECTOR TRANSFORMED FROM STABLE MEMBER TO
R1865 NAVIGATION BASE COORDINATES VIA SMNB IF NECESSARY. THE
R1866 SHAFT AND TRUNNION COMMANDS ARE THEN CALCULATED AS FOLLOWS_
R1867 $+ \text{SHAFT} = \text{LOS} \cdot (\text{COS}(S), 0, -\text{SIN}(S)) (\text{DOT PRODUCT})$
R1868 $-\text{TRUNNION} = \text{LOS} \cdot (\text{SIN}(T) \text{SIN}(S), \text{COS}(T), \text{SIN}(T) \text{COS}(S))$
R1869 THE SIGN OF THE SHAFT COMMAND IS THEN REVERSED IF IN MODE 2
R1870 (RADMODES BIT 12) BECAUSE A RELAY IN THE RR REVERSES THE
R1871 POLARITY OF THE COMMAND. AT RRSCALUP EACH COMMAND IS
R1872 SCALED AND IF EITHER, OR BOTH, OF THE COMMANDS IS GREATER THAN
R1873 .5 DEGREES, MPAC +1 IS SET POSITIVE. IF A CONTINUOUS DESIGNATE
R1874 (RADMODES BIT 15) IS DESIRED AND THE SEARCH ROUTINE IS NOT OPERATING,
R1875 THE RR AUTO TRACKER ENABLE BIT (CHAN 12 BIT 14) IS CLEARED AND RROUT
R1876 CALLED TO PUT OUT THE COMMANDS PROVIDED NO REPOSITION (RADMODES BIT 11)
R1877 IS IN PROGRESS. IF A CONTINUOUS DESIGNATE AND THE SEARCH ROUTINE IS
R1878 OPERATING (SRCHOPT FLAG SET) THE TRACK ENABLE IS NOT CLEARED. IF NO
R1879 CONTINUOUS DESIGNATE AND BOTH COMMANDS ARE NOT LESS THAN .5 DEGREES AS
R1880 INDICATED BY MPAC +1, THE RR AUTO TRACKER ENABLE BIT (CHAN 12 BIT 14) IS
R1881 CLEARED AND RROUT CALLED TO PUT OUT THE COMMANDS PROVIDED NO REPOSITION
R1882 (RADMODES BIT 11) IS IN PROGRESS. IF BOTH COMMANDS ARE LESS THAN .5
R1883 DEGREES AS INDICATED BY MPAC+1, THE RR AUTO TRACKER ENABLE BIT
R1884 (CHAN 12 BIT 14) IS CLEARED AND RROUT CALLED TO PUT OUT THE
R1885 COMMANDS PROVIDED NO REPOSITION (RADMODES BIT 11) IS IN
R1886 PROGRESS. IF BOTH COMMANDS ARE LESS THAN .5 DEGREES, THE
R1887 LOCK-CN FLAG (STATE BIT 5) IS CHECKED. IF NOT PRESENT, THE
R1888 DESIGNATE FLAG (RADMODES BIT 10) IS CLEARED, THE RR ERROR
R1889 COUNTER ENABLE BIT (CHAN 12 BIT 2) IS CLEARED, AND ENDOFJOB
R1890 CALLED. IF LOCK-ON IS DESIRED, THE RR AUTO TRACKER (CHAN 12
R1891 BIT 14) IS ENABLED FOLLOWED BY A CHECK OF THE RECEIPT OF THE
R1892 RR DATA GOOD (CHAN 33 BIT 4) SIGNAL. IF RR DATA GOOD
R1893 PRESENT, THE DESIGNATE FLAG (RADMODES BIT 10) IS CLEARED,
R1894 THE RR ERROR COUNTER ENABLE BIT (CHAN 12 BIT 2) IS CLEARED,
R1895 AND ENDOFJOB CALLED. IF RR DATA GOOD IS NOT PRESENT, RROUT
R1896 IS CALLED TO PUT OUT THE COMMANDS PROVIDED NO REPOSITION
R1897 (RADMODES BIT 11) IS IN PROGRESS AFTER WHICH THE JOB IS TERMINATED
R1898 VIA ENDOFJOB.

R1899 CALLING SEQUENCE:
R1900 EXECUTIVE CALL EVERY .5 SECONDS FROM BEGDES.

R1901 ERASABLE INITIALIZATION REQUIRED:
R1902 RRTARGET (HALF-UNIT LOS VECTOR IN EITHER SM OR NB COORDINATES),
R1903 LOCKNSW (STATE BIT 5), RRNSW (STATE BIT 6), RADMODES

R1904 SUBROUTINES CALLED_
R1905 READCDUS, SMNB, CDULOGIC, MAGSUB, RROUT

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R1909  EXIT_  ENDCFJOB (ALWAYS)
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TC INTPRFT

RRTARGET

RRNB SW

TARGET IN NAV-BASE COORDINATES
MULTIPLY UNIT LOS BY MAGNITUDE

VSL1 PDVL

ADD ONE SECOND RELATIVE VFLOCITY TO LOS

UNIT CALL

CALL CDOT R1

* SPINDY

TANG +

```
SHAFT COMMAND = V(32D).(COS(S), 0,  
(-SIN(S)).  
SIN(S) TO 0 AND COS(S) TO 2.
```

SIN PDDL

DMP, PDDL

36D

STAGE

STURE TANG +

SHAFT COMMAND

TANG
C DILLIG

COS(T) TO 4.

PUSH DMP

SIN(T) TO 6.

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1949	25,2705	65352 0	SL1	PDDL	DEFINE VECTOR U = (SIN(T)SIN(S))
1950	25,2706	00005 1		4	(COS(T))
1951	25,2707	41325 0	PDDL	DMP	(SIN(T)COS(S))
1952	25,2710	00007 0		6	
1953	25,2711	00001 0		0	
1954	25,2712	55552 0	SL1	VDEF	
1955	25,2713	77441 0	DOT	EXIT	DOT U WITH LOS TO GET TRUNNION COMMAND.
1956	25,2714	00041 1		320	

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P1957 AT THIS POINT WE HAVE A ROTATION VECTOR IN DISH AXES LYING IN THE TS PLANE. CONVERT THIS TO A
 R1959 COMMANDED RATE AND ENABLE THE TRACKER IF WE ARE WITHIN .5 DEGREES OF THE TARGET.

1961	REF 231	LAST 529	25,2715	4 0154 0	CS	MPAC	DOT WAS NEGATIVE OF DESIRED ANGLE.
1962			25,2716	0 0006 1	EXTEND		
1963	REF 1		25,2717	7 3066 0	MP	RDESGAIN	SCALING ON INPUT ANGLE WAS 4 RADIAN.
1964	REF 17	LAST 559	25,2720	55'107 1	TS	TANG	TRUNNION COMMAND.
1965	REF 74	LAST 557	25,2721	4 0110 0	CS	RADMODES	A RELAY IN THE RR REVERSES POLARITY OF
1966	REF 32	LAST 555	25,2722	7 4740 1	MASK	BIT12	THE SHAFT COMMANDS IN MODE 2 SO THAT A
1967			25,2723	0 0006 1	EXTEND		POSITIVE TORQUE APPLIED TO THE SHAFT
1968			25,2724	1 2727 0	BZF	+3	GYRO CAUSES A POSITIVE CHANGE IN THE
1969	REF 18	LAST 561	25,2725	3 1110 0	CA	TANG +I	SHAFT ANGLE. COMPENSATE FOR THIS SWITCH
1970			25,2726	1 2730 0	TCF	+2	BY CHANGING THE POLARITY OF OUR COMMAND.
1971	REF 19	LAST 561	25,2727	4 1110 1	CS	TANG +1	
1972			25,2730	0 0006 1	EXTEND		
1973	REF 2	LAST 561	25,2731	7 3066 0	MP	RDESGAIN	SCALING ON INPUT ANGLE WAS 4 RADIAN.
1974	REF 20	LAST 561	25,2732	55'110 1	TS	TANG +1	SHAFT COMMAND.
1975	REF 42	LAST 559	25,2733	0 6036 1	TC	INTPRET	
1976			25,2734	41345 0	DLOAD	DMP	
1977			25,2735	00003 1		2	COS(S).
1978			25,2736	00005 1		4	COS(T).
1979			25,2737	65352 0	SL1	PDDL	Z COMPONENT OF URR.
1980			25,2740	65276 1	DCOMP	PDDL	Y COMPONENT = -SIN(T).
1981			25,2741	00001 0		0	SIN(S).
1982			25,2742	72405 0	DMP	SL1	
1983			25,2743	00005 1		4	COS(T).
1984			25,2744	43066 0	VDEF	BON	FORM URR IN NB AXES.
1985	REF 4	LAST 559	25,2745	00311 1		RRNBSW	BYPASS NBSM CONVERSION IN VFRB 41.
1986			25,2746	52751 0		+3	
1987			25,2747	77624 1	CALL		
1988	REF 1		25,2750	47577 1		*NBSM*	GET URR IN SM AXES.
1989			25,2751	77441 0	DOT	EXIT	
1990	REF 7	LAST 559	25,2752	01102 0		RRTARGET	GET COSINE OF ANGLE BETWEEN RR AND LOS.
1991			25,2753	0 0006 1	EXTEND		
1992	REF 1		25,2754	4 3070 1	DCS	COS1/2DG	
1993	REF 232	LAST 561	25,2755	20 155 1	DAS	MPAC	DIFFERENCE OF COSINES, SCALED B-2.
1994	REF 233	LAST 561	25,2756	10 154 0	CCS	MPAC	
1995	REF 116	LAST 552	25,2757	3 4755 1	CA	ZERO	IF COS ERROR BIGGER, ERROR IS SMALLER.
1996			25,2760	1 2762 1	TCF	+2	
1997	REF 67	LAST 548	25,2761	3 4753 1	CA	ONE	
1998	REF 234	LAST 561	25,2762	54 155 1	TS	MPAC +I	ZERO IF RR IS POINTED OK, ONE IF NOT.

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P1999

SEE IF TRACKER SHOULD BE ENABLED OR DISABLED.

2000	REF	75	LAST	561	25,2763	10 110 0	CCS	RADMODES	IF CONTINUOUS DESIGNATE WANTED, PUT OUT
2001	REF	1			25,2764	1 2767 1	TCF	SIGNLCHK	COMMANDS WITHOUT CHECKING MAGNITUDE OF
2002	REF	2	LAST	562	25,2765	1 2767 1	TCF	SIGNLCHK	ERROR SIGNALS
2003	REF	1			25,2766	1 3017 0	TCF	DORROUT	
2004	REF	235	LAST	561	25,2767	10 155 1	SIGNLCHK	CCS MPAC +1	SEE IF BOTH AXES WERE WITHIN .5 DEGS.
2005	REF	1			25,2770	1 3000 0	TCF	DGOODCHK	
2006	REF	39	LAST	550	25,2771	4 0074 0	CS	STATE	IF WITHIN LIMITS AND NO LOCK-ON WANTED,
2007	REF	1			25,2772	7 4747 0	MASK	LCKONBIT	PROBLEM IS FINISHED.
2008	REF	187	LAST	557	25,2773	10 000 0	CCS	A	
2009	REF	1			25,2774	1 3005 0	TCF	RRDESDUN	
2010	REF	56	LAST	557	25,2775	3 4736 1	CAF	BIT14	ENABLE THE TRACKER.
2011					25,2776	0 0006 1	EXTEND		
2012	REF	33	LAST	557	25,2777	05 012 1	WOR	CHAN12	
2013	REF	24	LAST	535	25,3000	3 4750 1	DGOODCHK	CAF BIT4	SEE IF DATA GOOD RECEIVED YET
2014					25,3001	0 0006 1	EXTEND		
2015	REF	9	LAST	516	25,3002	02 033 0	RAND	CHAN33	
2016	REF	188	LAST	562	25,3003	10 000 0	CCS	A	
2017	REF	2	LAST	562	25,3004	1 3017 0	TCF	DORROUT	
2018	REF	34	LAST	557	25,3005	4 4742 0	RRDESDUN	CS BIT10	WHEN PROBLEM DONE, REMOVE BIT 10 SO NEXT
2019	REF	76	LAST	562	25,3006	7 0110 0	MASK	RADMODES	WAITLIST TASK WE WILL GO TO RGOODEND.
2020					25,3007	0 0004 0	INHINT		
2021	REF	77	LAST	562	25,3010	54 110 0	TS	RADMODES	
2022	REF	45	LAST	554	25,3011	0 5516 0	TC	DOWNFLAG	RESET LOSCMFLG TO PREVENT A
2023	REF	6	LAST	554	25,3012	00041 1	ADRES	LOSCMFLG	RECOMPUTATION OF LOS AFTER DATA GOOD
2024	REF	36	LAST	548	25,3013	4 4752 1	CS	BIT2	TURN OFF ENABLE RR ERROR COUNTER
2025					25,3014	0 0006 1	EXTEND		
2026	REF	34	LAST	562	25,3015	03 012 1	WAND	CHAN12	
2027	REF	87	LAST	554	25,3016	1 5155 1	TCF	ENDOFJOB	WITH ECTR DISABLED.
2028	REF	22	LAST	510	25,3017	4 0074 0	DORROUT	CS FLAGWRD0	IF NOT IN P20/P22 BUT V41,DON'T DO
2028.2	REF	10	LAST	550	25,3020	7 4745 1	MASK	RNDVZBIT	VELOCITY CORRECTION.
2029	REF	189	LAST	562	25,3021	10 000 0	CCS	A	
2030	REF	1			25,3022	0 3041 1	IC	NOTF20	
2031	REF	43	LAST	561	25,3023	0 6036 1	TC	INTPRET	
2032					25,3024	74375 0	VLOAD	VXSC	MULTIPLY UNIT LOS BY MAGNITUDE
2033	REF	8	LAST	561	25,3025	01102 0		RRTARGET	
2034	REF	2	LAST	559	25,3026	01767 0		MLOS V	
2035					25,3027	41572 1	VSL1	PUSH	
2036					25,3030	74375 0	VLOAD	VXSC	ADD .5 SEC. OF VELOCITY
2037	REF	3	LAST	559	25,3031	01761 0		LOS VFL	TO LOS VECTOR
2038	REF	2	LAST	559	25,3032	13072 0		MCTOMS	
2039					25,3033	53362 0	VSRI	VAD	
2040					25,3034	77656 1	UNIT		
2041	REF	9	LAST	562	25,3035	15102 0	STOOL	RRTARGET	STORE VELOCITY-CORRECTED LOS (UNIT)

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2042					25,3036	00045 0			36D	
2043	REF	3	LAST	562	25,3037	01767 0		STORE	MLOSV	AND STORE MAGNITUDE
2044					25,3040	77776 1		EXIT		
2045					25,3041	0 0004 0	NOTP20	INHINT		
2046	REF	78	LAST	562	25,3042	4 0110 0		CS	RADMODES	PUT OUT COMMAND UNLESS MONITOR
2047	REF	25	LAST	557	25,3043	7 4741 0		MASK	BIT11	REPOSITION HAS TAKEN OVER.
2048	REF	190	LAST	562	25,3044	10 000 0		CCS	A	
2049	REF	2	LAST	545	25,3045	0 2306 0		TC	RROUT	
2050	REF	8	LAST	509	25,3046	3 0076 0		CA	FLAGWRD2	
205005	REF	1			25,3047	7 4740 1		MASK	LOSCMBIT	IF LOSCMFLG NOT SET, DON'T TEST
20501					25,3050	0 0006 1		EXTEND		LOS COUNTER
205015	REF	88	LAST	562	25,3051	1 5155 1		BZF	ENDOFJOB	
20502	REF	24	LAST	557	25,3052	11*454 1		CCS	LOSCOUNT	TEST LOS COUNTER TO SEE IF TIME TO GET
205025	REF	1			25,3053	0 3064 0		TC	DODESEND	A NEW LOS
20503					25,3054	0 0004 0		INHINT		
205035	REF	3	LAST	526	25,3055	0 6027 1		TC	KILLTASK	YES - KILL TASK WHICH SCHEDULES DODES
20504	REF	2	LAST	557	25,3056	52602 1		CADR	DESLOOP +2	
205045					25,3057	0 0003 1		RELINT		
205047	REF	3	LAST	391	25,3060	10 067 1		CCS	NEWJOB	
205049	REF	2	LAST	391	25,3061	0 5122 0		TC	CHANG1	
20505	REF	137	LAST	530	25,3062	0 4616 1		TC	BANKCALL	
205053	REF	1			25,3063	50752 1		CADR	R21LEM2	
205055	REF	25	LAST	563	25,3064	55*454 1	DODESEND	TS	LOSCOUNT	
20506	REF	89	LAST	563	25,3065	0 5155 0		TC	ENDOFJOB	
2051					25,3066	21122 0	RDESGAIN	DEC	.53624	TRIES TO NULL .5 ERROR IN .5 SEC.
2052					25,3067	07777 1	COS1/2DG	2DEC	.999961923 B-2	COSINE OF 0.5 DEGREES.
2052					25,3070	33005 1				
2053					25,3071	00310 0	MCTOMS	2DEC	100. B-13	
2053					25,3072	00000 1				

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P2054 RADAR READ INITIALIZATION

R2055 RADAR DATA ARE READ BY A BANKCALL FOR THE APPROPRIATE LEAD-IN BELOW.

2056	REF	1		25,3073	0 3113 1	LRALT	TC	INITREAD -1	ONE SAMPLE PER READING.
2057				25,3074	00017 1	ALLREAD	OCT	17	

2058	REF	2	LAST 564	25,3075	0 3114 0	LRVELZ	TC	INITREAD	
2059				25,3076	00016 0		OCT	16	

2060	REF	3	LAST 564	25,3077	0 3114 0	LRVELY	TC	INITREAD	
2061				25,3100	00015 0		OCT	15	

2062	REF	4	LAST 564	25,3101	0 3114 0	LRVELX	TC	INITREAD	
2063				25,3102	00014 1		OCT	14	

2064	REF	5	LAST 564	25,3103	0 3113 1	RRRDOT	TC	INITREAD -1	
2065				25,3104	00012 1		OCT	12	

2066	REF	6	LAST 564	25,3105	0 3113 1	RRRRANGE	TC	INITREAD -1	
2067				25,3106	00011 1		OCT	11	

R2068 LRVEL IS THE ENTRY TO THE LR VELOCITY READ ROUTINE WHEN 5 SAMPLES ARE
 R2069 WANTED. ENTER WITH C(A)= 0,2,4 FOR LRVELZ,LRVELY,LRVELX RESP.

2070	REF	1		25,3107	55'105 0	LRVEL	TS	TIMEHOLD	STORE VBEAM INDEX HERE MOMENTARILY
2071	REF	11	LAST 518	25,3110	3 4756 1		CAF	FIVE	SPECIFY FIVE SAMPLES
2072	REF	2	LAST 564	25,3111	51'105 1		INDEX	TIMEHOLD	
2073	REF	2	LAST 503	25,3112	1 3075 1		TCE	LRVELZ	

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2074	REF	68	LAST	561	25,3113	3 4753	1	-1	CAF	ONE	ENTRY TO TAKE ONLY 1 SAMPLE.
2075					25,3114	0 0004	0		INITREAD	INHINT	
2076	REF	3	LAST	564	25,3115	55'105	0		TS	TIMEHOLD	GET DT OF MIDPOINT OF NOMINAL SAMPLING
2077					25,3116	0 0006	1		EXTEND		INTERVAL (ASSUMES NO BAD SAMPLES WILL BE
2078	REF	25	LAST	501	25,3117	7 4751	1		MP	BIT3	ENCOUNTERED).
2079	REF	4	LAST	565	25,3120	53'106	0		DXCH	TIMEHOLD	
2080	REF	191	LAST	563	25,3121	10 000	0		CCS	A	
2081	REF	1			25,3122	55'111	0		TS	NSAMP	
2082	REF	69	LAST	565	25,3123	6 4753	1		AD	ONE	
R2083			INSERT FOLLOWING INSTRUCTION TO GET 2N TRIES FOR N SAMPLES.								
A2084									DOUBLE		
2085	REF	2	LAST	237	25,3124	55'100	0		TS	SAMPLIM	
2086	REF	1			25,3125	3 3147	0		CAF	DGBITS	READ CURRENT VALUE OF DATA GOOD BITS.
2087					25,3126	0 0006	1		EXTEND		
2088	REF	10	LAST	562	25,3127	02 033	0		RAND	CHAN33	
2089	REF	1			25,3130	55'113	1		TS	DLDATAGD	
2090	REF	1			25,3131	4 3074	0		CS	ALLREAD	
2091					25,3132	0 0006	1		EXTEND		
2092	REF	8	LAST	483	25,3133	03 013	0		WAND	CHAN13	REMOVE ALL RADAR BITS
2093	REF	163	LAST	555	25,3134	50 002	0		INDEX	0	
2094					25,3135	3 0000	1		CAF	0	
2095					25,3136	0 0006	1		EXTEND		
2096	REF	9	LAST	565	25,3137	05 013	0		WOR	CHAN13	SET NEW RADAR BITS
2097					25,3140	0 0006	1		EXTEND		
2098	REF	14	LAST	475	25,3141	3 0025	0		DCA	TIME2	
2099	REF	5	LAST	565	25,3142	21'106	0		DAS	TIMEHOLD	TIME OF NOMINAL MIDPOINT.
2100	REF	117	LAST	561	25,3143	3 4755	1		CAF	ZERO	
2101	REF	76	LAST	555	25,3144	54 001	1		TS	L	
2102	REF	3	LAST	502	25,3145	53'102	1		DXCH	SAMPLSUM	
2103	REF	2	LAST	548	25,3146	1 2366	1		TCF	ROADBACK	
2104					25,3147	00230	0	DGBITS	OCT	230	

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P2105 RADAR RUPT READER

R2106 THIS ROUTINE STARTS FROM A RADARUPT. IT READS THE DATA \$ LOTS MORE.

2107	REF	2	LAST	56	25,2000		SETLOC RADARUPT		
2108					25,3150		BANK		
2109	REF	2	LAST	56 TO	56:	3	COUNT# \$\$/RUPT		
2110					25,3150	0 0006 1	EXTEND		MUST SAVE SBANK BECAUSE OF RUPT EXITS
2111	REF	10	LAST	469	25,3151	04 007 1	ROR	SUPERBNK	VIA TASKOVER (8ADEND OR GOODENO.
2112	REF	3	LAST	269	25,3152	54 016 1	TS	BANKPUPT	
2113					25,3153	0 0006 1	EXTEND		
2114	REF	3	LAST	269	25,3154	22 012 1	QXCH	QRUPT	
2115	REF	8	LAST	515	25,3155	3 4757 0	CAF	SEVEN	
2116					25,3156	0 0006 1	EXTEND		
2117	REF	10	LAST	565	25,3157	02 013 1	RANO	CHAN13	
2118	REF	2	LAST	123	25,3160	55'335 1	TS	DNINDEX	
21181					25,3161	0 0006 1	EXTEND		IF RADAR SELECT BITS ZERO,DO NOT STORE
21182	REF	1			25,3162	1 3166 1	8ZF	TRYCOUNT	DATA FOR DOWNLIST (ERASABLE PROBLEMS)
2119	REF	1			25,3163	3 0046 0	CA	RNRAD	
2120	REF	3	LAST	566	25,3164	51'335 0	INDEX	ONINDEX	
2121	REF	5	LAST	214	25,3165	55'332 0	TS	ONRRANGE -1	
2122	REF	3	LAST	565	25,3166	11'100 0	TRYCOUNT	CCS	SAMPL1M
2123	REF	1			25,3167	1 3211 1	TCF	PLENTY	
2124	REF	1			25,3170	1 3174 1	TCF	NOMORE	
2125	REF	23	LAST	554	25,3171	0 5567 0	TC	ALARM	
2126					25,3172	00520 0	OCT	520	
2127	REF	16	LAST	275	25,3173	0 5270 1	TC	RESUME	
2128	*REF	3	LAST	295	25,3174	3 0107 1	NOMORE	CA	FLGWRD11
21282	REF	3	LAST	295	25,3175	7 4735 0	MASK	LRBY81T	IS LR8YPASS SET?
21284 *					25,3176	0 0006 1	EXTEND		
21286	*REF	1			25,3177	1 3206 1	8ZF	BADRAD	NO. R12 IS ON -- BYPASS 521 ALARM.
21288	REF	10	LAST	387	25,3200	4 0077 0	CS	FLAGWRD3	CHECK R04FLAG.
2129	REF	4	LAST	292	25,3201	7 4743 0	MASK	R04FLBIT	IF 1,R04 IS RUNNING. DO NOT ALARM-
2130					25,3202	0 0006 1	EXTEND		
2131	REF	2	LAST	566	25,3203	1 3206 1	8ZF	BADRAD	
2132	REF	24	LAST	566	25,3204	0 5567 0	TC	ALARM	P20 WANTS THE ALARM.
2133					25,3205	00521 1	OCT	521	
2134	REF	70	LAST	565	25,3206	4 4753 0	8ADRAD	CS	ONE
2135	REF	4	LAST	566	25,3207	55'100 0	TS	SAMPLIM	
2136	REF	2	LAST	557	25,3210	0 3560 1	TC	RDBADEND -2	
2137	REF	5	LAST	566	25,3211	55'100 0	PLENTY	TS	SAMPLIM
2138	REF	26	LAST	565	25,3212	3 4751 0	CAF	BIT3	
2139					25,3213	0 0006 1	EXTEND		
2140	REF	11	LAST	566	25,3214	02 013 1	RAND	CHAN13	TO FIND OUT WHICH RADAR
2141					25,3215	0 0006 1	EXTEND		

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2142	REF	1		25,3216	1 3276 0		BZF	RENRAD		
21425	REF	1		25,3217	0 3364 0		TC	R77CHECK	R77 QUITs HERE.	
2143	REE	79	LAST	563	25,3220	3 0110 1	LRPOSCHK	CA	RADMCDES	SEE IE LP IN DESIRED POSITION.
2144					25,3221	0 0006 1		EXTFND		
2145	REF	11	LAST	565	25,3222	06 033 1		RXOR	CHAN33	
2146	REF	37	LAST	475	25,3223	7 4746 1		MASK	BIT6	
2147					25,3224	0 0006 1		EXTFND		
2148	RFF	1			25,3225	1 3231 0		BZF	VELCHK	
2149	REF	25	LAST	566	25,3226	0 5567 0		TC	ALARM	
2150					25,3227	00522 1		OCT	522	
2151	REF	3	LAST	566	25,3230	0 3206 0		TC	BADPAD	
2152	RFF	1			25,3231	3 6244 0	VELCHK	CAF	BIN3	= 00003 OCT
2153					25,3232	0 0006 1		EXTEND		
2154	REF	12	LAST	566	25,3233	06 013 0		RXOR	CHAN13	RESET ACTIVITY BIT
2155	REF	2	LAST	567	25,3234	7 6244 1		MASK	BIN3	
2156					25,3235	0 0006 1		EXTEND		
2157	REF	1			25,3236	1 3272 1		BZF	LRHEIGHT	TAKE A LR RANGE READING
2158	REF	12	LAST	536	25,3237	3 4733 1		CAF	POSMAX	
2159	REF	2	LAST	566	25,3240	7 0046 1		MASK	RNRAD	
2160	REF	1			25,3241	6 2000 0		AD	LVELBIAS	
2161	REF	77	LAST	565	25,3242	54 001 1		TS	L	
2162	REF	3	LAST	567	25,3243	30 046 0		CAE	RNRAD	
2163					25,3244	6 0000 1		DOUBLE		
2164	RFF	29	LAST	538	25,3245	7 4753 0		MASK	BIT1	
2165	REF	7	LAST	273	25,3246	52 064 1		DXCH	ITEMP3	
2166	REF	26	LAST	535	25,3247	3 4744 1		CAF	BIT8	DATA GOOD ISNT CHECKED UNTIL AFTER READ-
2167	RFF	1			25,3250	0 3442 0		TC	DGCHECK	ING DATA SO SOME RADAR TESTS WILL WORK
A2168										INDEPENDENT OF DATA GOOD.
2169	REF	2	LAST	565	25,3251	11'111 0		CCS	NSAMP	
2170	REE	1			25,3252	0 3262 1		TC	NOEND	
2171	REF	71	LAST	566	25,3253	4 4753 0	GOODRAD	CS	ONE	
2172	REF	6	LAST	566	25,3254	55'100 0		TS	SAMPLIM	
2173	RFF	19	LAST	555	25,3255	4 0061 1		CS	ITEMP1	WHEN ENOUGH GOOD DATA HAS BEEN GATHERED,
2174	REF	80	LAST	567	25,3256	7 0110 0		MASK	RADMODES	RESET DATA FAIL ELAGS FOR SETTRKE.
2175	REF	81	LAST	567	25,3257	54 110 0		TS	RADMODES	
2176	REE	1			25,3260	0 3616 0		TC	RADLITFS	LAMPS MAY GO OFF IE DATA JUST GOOD.
2177	REF	2	LAST	543	25,3261	0 3553 1		TC	RGOODEND -2	
2178	RFF	3	LAST	567	25,3262	55'111 0	NOEND	TS	NSAMP	
2179	REF	7	LAST	567	25,3263	11'100 0	RESAMPLE	CCS	SAMPLIM	SEE IF ANY MORE TRIES SHOULD BE MADE.
2180					25,3264	1 3266 1		TCF	+2	
2181	REF	1			25,3265	1 3461 0		TCE	DATAFAIL	N SAMPLES NOT AVAILABLE.
2182	REF	25	LAST	562	25,3266	3 4750 1		CAF	BIT4	RESET ACTIVITY BIT.
2183					25,3267	0 0006 1		EXTEND		

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2184	REF	13	LAST	567	25,3270	05 013 0		WOR	CHAN13	RESET ACTIVITY BIT
2185	REF	17	LAST	566	25,3271	0 5270 1		TC	RESUME	
2186	REF	25	LAST	500	25,3272	3 4747 1	LRHEIGHT	CAE	BIT5	
2187	REE	20	LAST	567	25,3273	54 061 1		TS	ITEMP1	(POSITION OF DATA GOOD BIT IN CHAN 33)
2188	REE	20	LAST	344	25,3274	3 4743 0		CAE	BIT9	
2189	REF	1			25,3275	0 3320 0		TC	SCALECHK -1	
2190	REF	26	LAST	563	25,3276	3 4741 1	RENDRAD	CAF	BIT11	MAKE SURE ANTENNA HAS NOT GONE OUT OF
2191	REF	82	LAST	567	25,3277	7 0110 0		MASK	RADMODES	LIMITS.
2192	REF	192	LAST	565	25,3300	10 000 0		CCS	A	
2193	REF	4	LAST	567	25,3301	1 3206 1		TCF	BADRAD	
2194	REE	83	LAST	568	25,3302	4 0110 0		CS	RADMODEFS	BE SURE RR CDU HASNT FAILED.
2195	REF	28	LAST	487	25,3303	7 4745 1		MASK	BIT7	
2196	RFF	193	LAST	568	25,3304	10 000 0		CCS	A	
2197	RFF	5	LAST	568	25,3305	1 3206 1		TCE	BADRAD	
2198	REE	26	LAST	567	25,3306	3 4750 1		CAF	BIT4	SEE IF DATA HAS BEEN GOOD.
2199	REF	21	LAST	568	25,3307	54 061 1		TS	ITEMP1	(POSITION OF DATA GOOD BIT IN CHAN 33)
2200	REE	30	LAST	567	25,3310	3 4753 1		CAF	BIT1	SEE IF RR RDOT.
2201					25,3311	0 0006 1		EXTEND		
2202	REF	14	LAST	568	25,3312	02 013 1		RAND	CHAN13	
2203	REF	164	LAST	565	25,3313	54 002 1		TS	0	FOR LATER TESTING.
2204	REF	194	LAST	568	25,3314	10 000 0		CCS	A	
2205					25,3315	1 3317 0		TCF	+2	
2206	REF	1			25,3316	1 3331 1		TCF	RADIN	NO SCALE CHECK FOR RR RDOT.
2207	REF	27	LAST	566	25,3317	3 4751 0		CAF	BIT3	
2208	REF	78	LAST	567	25,3320	54 001 1		TS	L	
2209					25,3321	0 0006 1	SCALECHK	EXTEND		
2210	REF	12	LAST	567	25,3322	02 033 0		RAND	CHAN33	SCALE STATUS NOW
2211	REF	79	LAST	568	25,3323	56 001 0		XCH	L	
2212	REF	84	LAST	568	25,3324	7 0110 0		MASK	RADMODES	SCALE STATUS BEFORE
2213					25,3325	0 0006 1		EXTEND		
2214	REF	12	LAST	543	25,3326	06 001 0		RXOR	LCHAN	SEE IF THEY DIIIEER
2215	REF	195	LAST	568	25,3327	10 000 0		CCS	A	
2216	REF	1			25,3330	0 3350 1		TC	SCALCHNG	THFY DIFFER
2217	RFF	13	LAST	567	25,3331	3 4733 1	RADIN	CAF	PCSMAX	
2218	REF	4	LAST	567	25,3332	7 0046 1		MASK	RNRAD	
2219	RFE	5	LAST	273	25,3333	54 064 1		TS	ITEMP4	
2220	REF	5	LAST	568	25,3334	30 046 0		CAE	RNRAD	
2221					25,3335	6 0000 1		DOUBLE		
2222	RFF	31	LAST	568	25,3336	7 4753 0		MASK	BIT1	
2223	REF	8	LAST	567	25,3337	54 063 0		TS	ITEMP3	

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2224	REF	165	LAST	568	25,3340	10 002 1		CCS	Q	SEE IF RR RDOT.
2225	REF	1			25,3341	1 3402 0		TCF	SCALADJ	NO, BUT SCALE CHANGING MAY BE NEEDED.
2226					25,3342	0 0006 1		EXTEND		IF RR RANGE RATE, THROW OUT BIAS.
2227	REF	1			25,3343	4 2002 0		DCS	RDDTBIAS	
2228	REF	9	LAST	568	25,3344	20 064 1	DASAMPL	DAS	ITEMP3	
2229	REF	22	LAST	568	25,3345	3 0061 0	DGCHECK2	CA	ITEMP1	SEE THAT DATA HAS BEEN GOOD BEFORE AND
2230	REF	2	LAST	567	25,3346	0 3443 1		TC	DGCHECK +1	AFTER TAKING SAMPLE.
2231	REF	1			25,3347	0 3253 0		TC	GOODRAD	
2232	REF	85	LAST	568	25,3350	22 110 1	SCALCHNG	LXCH	RADMODES	
2233	REF	32	LAST	568	25,3351	6 4753 1		AD	BIT1	
2234					25,3352	0 0006 1		EXTEND		
2235	REF	13	LAST	568	25,3353	06 001 0		RXDR	LC4AN	
2236	REF	86	LAST	569	25,3354	54 110 0		TS	RADMODES	
2237	REF	2	LAST	565	25,3355	3 3147 0		CAF	DGBITS	UPDATE LAST VALUE OF DATA GOOD BITS.
2238					25,3356	0 0006 1		EXTEND		
2239	REF	13	LAST	568	25,3357	02 033 0		RAND	CHAN33	
2240	REF	2	LAST	565	25,3360	55 113 1		TS	DLDTAGD	
2241	REF	27	LAST	530	25,3361	0 5504 0		TC	UPFLAG	SET RNGSCFLG
2242	REF	1			25,3362	00120 1		ADRES	RNGSCFLG	FOR LRS24.1
2243	REF	6	LAST	568	25,3363	1 3206 1		TCF	BADRAD	
R22431	R77	MUST	IGNORE	DATA	FAILS	SO AS	NOT TO	DISTURB	THE	ASTRONAUT.
22432	REF	14	LAST	502	25,3364	4 0101 0	R77CHECK	CS	FLAGWRD5	
22433	REF	3	LAST	502	25,3365	7 4741 0		MASK	R77FLBIT	
22434	REF	196	LAST	568	25,3366	10 000 0		CCS	A	
22435	REF	166	LAST	569	25,3367	0 0002 0		TC	Q	NOT R77
22436	REF	1			25,3370	4 3401 0		CS	BIT5,8	UPDATE LR DATA GOOD BITS IN RADMODES
22437	REF	87	LAST	569	25,3371	7 0110 0		MASK	RADMODES	
22438	REF	80	LAST	568	25,3372	54 001 1		TS	L	
22439	REF	2	LAST	569	25,3373	3 3401 1		CA	BIT5,8	
224391					25,3374	0 0006 1		EXTEND		
224392	REF	14	LAST	569	25,3375	02 033 0		RAND	CHAN33	
224393	REF	81	LAST	569	25,3376	6 0001 0		AD	L	
224394	REF	88	LAST	569	25,3377	54 110 0		TS	RADMODES	
224395	REF	3	LAST	567	25,3400	0 3553 1		TC	RDDDFND -2	
224397					25,3401	00220 1	BIT5,8	OCT	220	

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P2244 THE FOLLOWING ROUTINE INCORPORATES RR RANGE AND LR ALT SCALE INFORMATION AND LEAVES DATA AT LO SCALE.

2246	REF	82	LAST	569	25,3402	10 001 1	SCALADJ	CCS	L	L HAS SCALE INBIT FOR THIS RADAR.
2247					25,3403	1 3405 1		TCF	+2	ON HIGH SCALE.
2248	REF	1			25,3404	1 3345 1		TCF	DGCHECK2	

2249	REF	4	LAST	566	25,3405	3 1335 0		CA	DNINDEX	
2250	REF	28	LAST	568	25,3406	7 4751 1		MASK	BIT3	
2251	REF	197	LAST	569	25,3407	10 000 0		CCS	A	
2252	REF	1			25,3410	1 3417 1		TCF	LRSC K	

2253	REF	10	LAST	569	25,3411	52 064 1		DXCH	ITEMP3	
2254					25,3412	20 001 1		DDOUBL		
2255					25,3413	20 001 1		DDOUBL		
2256					25,3414	20 001 1		DDOUBL		
2257	REF	11	LAST	570	25,3415	52 064 1		DXCH	ITEMP3	

2258	REF	2	LAST	570	25,3416	1 3345 1		TCF	DGCHECK2	
2259	REF	12	LAST	570	25,3417	10 063 0	LRSC K	CCS	ITEMP3	
2260					25,3420	1 3431 0		TCF	+11	
2261	REF	6	LAST	568	25,3421	4 0064 1		CS	ITEMP4	
2262	REF	1			25,3422	6 3441 0		AD	HISCALIM	
2263					25,3423	0 0006 1		EXTEND		
2264					25,3424	6 3431 1		BZMF	+5	

2265	REF	4	LAST	566	25,3425	4 0107 0		CS	FLGWRD11	
2266	REF	1			25,3426	7 4751 1		MASK	SCABBIT	
2267	REF	5	LAST	570	25,3427	26 107 0		ADS	ELGWRD11	
2268					25,3430	1 3434 0		TCF	+4	

2269	REF	2	LAST	570	25,3431	4 4751 1		CS	SCABBIT	
2270	REF	6	LAST	570	25,3432	7 0107 0		MASK	FLGWRD11	
2271	REF	7	LAST	570	25,3433	54 107 0		TS	FLGWRD11	

2272					25,3434	0 0006 1		EXTEND		
2273	REF	13	LAST	570	25,3435	3 0064 0		DCA	ITEMP3	
2274					25,3436	20 001 1		DDOUBL		
2275					25,3437	20 001 1		DDOUBL		
2276	REF	1			25,3440	1 3344 0		TCF	DASAMPL	

2277					25,3441	00714 0	HISCALIM DEC	460	2481.7 FT	*****
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2278	REF	23	LAST	569	25,3442	54 061 1	DGCHECK	TS	ITEMP1	UPDATE DATA GOOD BIT IN OLDDATAGD AND
2279					25,3443	0 0006 1		EXTEND		MAKE SURE IT WAS ON BEFORE AND AFTER THE
2280	REF	15	LAST	569	25,3444	02 033 0		RAND	CHAN33	SAMPLE WAS TAKEN BEFORE RETURNING. IF
2281	REF	83	LAST	570	25,3445	54 001 1		TS	L	NOT, GOFS TO RESAMPLE TO TRY AGAIN. IF
2282	REF	24	LAST	571	25,3446	4 0061 1		CS	ITEMP1	MAX NUMBER OF TRIES HAS BEEN REACHED,
2283	RFF	3	LAST	569	25,3447	7 1113 1		MASK	OLDDATAGD	THE BIT CORRESPONDING TO THE DATA GOOD
2284	REF	84	LAST	571	25,3450	6 0001 0		AD	L	WHICH FAILED TO APPEAR IS IN ITEMPL AND
2285	REF	4	LAST	571	25,3451	57'113 0		XCH	OLDDATAGD	CAN BE USED TO SET RADMODES WHICH VIA
2286	REF	25	LAST	571	25,3452	7 0061 1		MASK	ITEMPL	SETTRKF SETS THE TRACKER FAIL LAMP.
2287	REF	85	LAST	571	25,3453	6 0001 0		AD	L	
2288	REF	198	LAST	570	25,3454	10 000 0		CCS	A	SHOULD BOTH BE ZERO.
2289	REF	1			25,3455	0 3263 0		TC	RESAMPLE	
2290	REF	14	LAST	570	25,3456	52 064 1		DXCH	ITEMP3	IF DATA GOOD BEFORE AND AFTER, ADD TO
2291	REF	4	LAST	565	25,3457	21'102 1		DAS	SAMPLSUM	ACCUMULATION.
2292	REF	167	LAST	565	25,3460	0 0002 0		TC	Q	
2293	REF	26	LAST	571	25,3461	4 0061 1	DATAFAIL	CS	ITEMPL	IN THE ABOVE CASE, SET RADMODES BIT
2294	REF	89	LAST	569	25,3462	7 0110 0		MASK	RADMODES	SHOWING SOME RADAR DATA FAILED.
2295	REF	27	LAST	571	25,3463	6 0061 0		AD	ITEMPL	
2296	REF	90	LAST	571	25,3464	54 110 0		TS	RADMODES	
2297	REF	15	LAST	571	25,3465	52 064 1		DXCH	ITEMP3	IF WE HAVE BEEN UNABLE TO GATHER N
2298	REF	5	LAST	571	25,3466	53'102 1		DXCH	SAMPLSUM	SAMPLES, USE LAST ONE ONLY.
2299	REF	2	LAST	567	25,3467	0 3616 0		TC	RADLITES	
2300	REF	2	LAST	566	25,3470	1 3174 1		TCF	NOMORE	

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P2304 THIS ROUTINE CHANGES THE LR POSITION, AND CHECKS THAT IT GOT THERE.

2305	REF	2	LAST	537	25,2000		SETLOC P20S1		
2306					25,3471		BANK		
2307	REF	2	LAST	537	TO 566:	566	COUNT* \$\$/R SUB		
2308					25,3471	0 0004 0	LRPOS2	INHINT	
2309	REF	91	LAST	571	25,3472	4 0110 0	CS	RADMODES	
2310	REF	38	LAST	567	25,3473	7 4746 1	MASK	BIT6	SET BIT6 TO SHOW DESIRED LR POS IS 2
2311	REF	52	LAST	572	25,3474	26 110 0	ADS	RADMODES	
2312	REF	29	LAST	568	25,3475	3 4745 0	CAF	BIT7	
2313					25,3476	0 0006 1	EXTEND		
2314	REF	16	LAST	571	25,3477	02 033 0	RAND	CHAN33	SEE IF ALREADY THERE.
2315					25,3500	0 0006 1	EXTEND		
2316	REF	2	LAST	548	25,3501	1 3530 0	BZF	RADNOOP	
2317	REF	28	LAST	548	25,3502	3 4737 0	CAF	BIT13	
2318					25,3503	0 0006 1	EXTEND		
2319	REF	35	LAST	562	25,3504	05 012 1	WDR	CHAN12	COMMAND TO POSITION 2
2320	REF	1			25,3505	3 3545 0	CAF	6SFCS	START SCANNING FOR INBIT AFTER 7 SECS.
2321	REF	22	LAST	552	25,3506	0 5203 0	TC	WAITLIST	
2322	REF	26	LAST	563	E7,1454		EBANK=	LOSCOUNT	
2323	REF	1			25,3507	03543 0	2CADR	LRPOSCAN	
2323	REF	1			25,3510	52067 1			
2324	REF	3	LAST	565	25,3511	0 2366 0	TC	ROADBACK	
2325	REF	8	LAST	567	25,3512	55'100 0	LRPOS NXT	TS	SAMPLIM
2326	REF	9	LAST	557	25,3513	0 5221 0	TC	FIXDELAY	SCAN ONCE PER SECOND 15 TIMES MAX AFTER
2327					25,3514	00144 0	DEC	100	INITIAL DELAY OF 7 SECONDS.
2328	REF	30	LAST	572	25,3515	3 4745 0	CAF	BIT7	SEE IF LR POS2 IS ON
2329					25,3516	0 0006 1	EXTEND		
2330	REF	17	LAST	572	25,3517	02 033 0	RAND	CHAN33	
2331					25,3520	0 0006 1	EXTEND		
2332	REF	1			25,3521	1 3535 0	BZF	LASTLRDT	IF THERE, WAIT FINAL SECOND FOR BOUNCE.
2333	REF	9	LAST	572	25,3522	11'100 0	CCS	SAMPLIM	SEE IF MAX TIME UP.
2334	REF	1			25,3523	1 3512 0	TCF	LRPOS NXT	
2335	REF	29	LAST	572	25,3524	4 4737 1	CS	BIT13	IF TIME UP, DISABLE COMMAND AND ALARM.
2336					25,3525	0 0006 1	EXTEND		
2337	REF	36	LAST	572	25,3526	03 012 1	WAND	CHAN12	
2338	REF	3	LAST	566	25,3527	1 3562 1	TCF	RDBADEND	
2339	REF	72	LAST	567	25,3530	3 4753 1	RADNOOP	CAF	ONE
2340	REF	23	LAST	572	25,3531	0 5203 0	TC	WAITLIST	NO FURTHER ACTION REQUESTED.
2341	REF	27	LAST	572	E7,1454		EBANK=	LOSCOUNT	
2342	REF	4	LAST	569	25,3532	03555 1	2CADR	RGOODEND	
2342					25,3533	52067 1			

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2343	REF	4	LAST	572	25,3534	0 2366 0	TC	ROADBACK	
2344	REF	3	LAST	519	25,3535	3 5000 1	LASTLRDT CA	2SECS	WAIT TWO SECONDS AFTER RECEIPT OF INBIT
2345	REF	3	LAST	180	25,3536	0 5224 0	TC	VARDELAY	TO WAIT FOR ANTENNA BOUNCE TO DIE OUT.
2346	REF	30	LAST	572	25,3537	4 4737 1	CS	BIT13	REMOVE COMMAND
2347					25,3540	0 0006 1	EXTEND		
2348	REF	37	LAST	572	25,3541	03 012 1	WAND	CHAN12	
2349	REF	5	LAST	572	25,3542	1 3555 0	TCF	RGOODEND	
2350	REF	1			25,3543	3 4317 0	LRPOSCAN CAF	FOURTEEN	SET UP FOR 15 SAMPLES.
2351	REF	2	LAST	572	25,3544	1 3512 0	TCF	LRPOSNXT	
2352					25,3545	01130 1	6SECS DEC	600	

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P2353 SEQUENCES TO TERMINATE RR OPERATIONS.

2354	REF	31	LAST	572	25,3546	3 4745 0	ENDRADAR	CAF	BIT7	PROLOG TO CHECK RR CDU FAIL BEFORE FND.
2355	REF	93	LAST	572	25,3547	7 0110 0		MASK	RADMCDES	
2356	REF	159	LAST	571	25,3550	10 000 0		CCS	A	
2357	REF	6	LAST	573	25,3551	1 3555 0		TCF	RGDDEND	
2358	REF	4	LAST	572	25,3552	1 3562 1		TCF	RDBADEND	
2359	REF	118	LAST	565	25,3553	4 4755 0	-2	CS	ZERD	RGDDEND WHEN NOT UNDER WAITLIST CONTRDL
2360	REF	2	LAST	116	25,3554	54 734 0		TS	RUPTAGN	
2361	REF	35	LAST	552	25,3555	3 4752 0	RGDDEND	CAF	TWO	
2362	REF	36	LAST	481	25,3556	0 4635 0		TC	POST JUMP	
2363	REF	2	LAST	260	25,3557	17640 0		CADR	GOODEND	
2364	REF	119	LAST	574	25,3560	4 4755 0	-2	CS	ZERD	RDBADEND WHEN NOT UNDER WAITLIST.
2365	REF	3	LAST	574	25,3561	54 734 0		TS	RUPTAGN	
2366	REF	36	LAST	574	25,3562	3 4752 0	RDBADEND	CAF	TWO	
2367	REF	37	LAST	574	25,3563	0 4635 0		TC	POST JUMP	
2368	REF	1			25,3564	17635 1		CADR	BADEND	
2369	REF	18	LAST	521	6244		BIN3	EQUALS	THREE	

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P2370 PROGRAM NAME_ LPS20.1 VECTOR EXTRAPOLATION AND LOS COMPUTATION
R2371 MOD. NO. 2 BY J.D. COYNE SDC DATE 12-7-66

R2372 FUNCTIONAL DESCRIPTION_

R2373 1) EXTRAPOLATE THE LEM AND CSM VECTORS IN ACCORDANCE WITH THE TIME REFERED TO IN CALLER + 1.
R2375 2) COMPUTES THE LOS VECTOR TO THE CSM, CONVERTS IT TO STABLE MEMBER COORDINATES AND STORES IT IN RRTARGET.
R2377 3) COMPUTES THE MAGNITUDE OF THE LOS VECTOR AND STORES IT IN MLOSV

R2378 CALLING SEQUENCE CALL
R2379 LPS20.1

R2380 SUBROUTINES CALLED_

R2381 LEMPREC,CSMPREC

R2382 NCRMAL EXIT_ RETURN TO CALLER + 2

R2383 ERROR EXITS_ NONE

R2384 ALARMS_ NONE

R2385 OUTPUT_

R2386 LOS VECTOR (HALF UNIT) IN SM COORDINATES STORED IN RRTARGET
R2387 MAGNITUDE OF THE LOS VECTOR (METERS SCALED 8-29) STORED IN MSLOV
R2388 RRNBW CLEARED

R2389 INITIALIZED ERASEABLE

R2390 TDECL MUST CONTAIN THE TIME FOR EXTRAPOLATION
R2391 SEE ORBITAL INTEGRATION ROUTINE

R2392 DEBRIS_

R2393 MPAC DESTROYED BY THIS ROUTINE

2394		23,2275	BANK 23
2395	REF 4 LAST 526	24,2000	SETLOC P20S
2396		24,3151	BANK

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2397	REF	1				COUNT*	\$/LPS20		
2398				24,3151	43020	1	LPS20.1	STQ	BOFF
23985	REF	3	LAST	512	24,3152	01757	0		LS21X
2399	REF	7	LAST	562	24,3153	01343	1		LOSCMFLG
23993	REF	1			24,3154	51160	1		LMINT
23994					24,3155	77614	1	BON	
23995	REF	6	LAST	512	24,3156	04307	1		SURFFLAG
23996	REF	1			24,3157	51170	0		CSMINT
23997					24,3160	77624	1	LMINT	CALL
2400	REF	3	LAST	499	24,3161	27100	0		LEMCCNIC
2401					24,3162	77775	1		VLOAD
2402	REF	5	LAST	499	24,3163	00001	0		RATT
2403	REF	3	LAST	510	24,3164	26356	0		LMPOS
2404	REF	1			24,3165	00007	0		VATT
2405	REF	2	LAST	510	24,3166	16364	1		STODL
2406	REF	5	LAST	505	24,3167	00015	0		LMVEL
2407	REF	15	LAST	529	24,3170	34041	0	CSMINT	TAT
2408	REF	2	LAST	352	24,3171	27066	1		STCALL
2409					24,3172	52375	1		LMVEL
2410	REF	2	LAST	576	24,3173	00007	0		TDEC1
2411	REF	3	LAST	576	24,3174	02364	1		CSMCCNIC
2412					24,3175	76521	0		VLOAD
2413	REF	8	LAST	499	24,3176	01734	0		VSU
24132					24,3177	77776	1		VATT
24134					24,3200	0 0004	0		LMVEL
24136	REF	4	LAST	563	24,3201	0 6027	1		VSL1
24138	REF	3	LAST	563	24,3202	52602	1		REFSMAT
24139	REF	44	LAST	562	24,3203	0 6036	1		
2414	REF	4	LAST	562	24,3204	25761	0		EXIT
2415	REF	6	LAST	576	24,3205	00001	0		INHINT
2416					24,3206	43051	1		TC
2417	REF	4	LAST	576	24,3207	02356	0		KILL TASK
24173	REF	3	LAST	507	24,3210	00350	1		DESLOCOP +2
24176	REF	1			24,3211	51217	1		STORING INTO ERASEABLES DODES USFS
24177					24,3212	77604	0		INTPRET
24178	REF	1			24,3213	57725	0		TC
2418					24,3214	41061	0		STOVL
24183					24,3215	20212	1		LOSVEL
24186	REF	1			24,3216	50123	1		RATT
24189					24,3217	77656	1		BOFF
2419					24,3220	76521	0		LMPOS
2420	REF	9	LAST	576	24,3221	01734	0		RNDVZFLG
2421	REF	10	LAST	562	24,3222	15102	0		NOTSHIFT
2422					24,3223	00045	0		BOVB
2425	REF	4	LAST	563	24,3224	01767	0		TCDANZIG
2426					24,3225	77614	1		BOVB
2427	REF	5	LAST	561	24,3226	00231	1		9D
2428	REF	4	LAST	576	24,3227	01757	0		526ALARM
								NOTSHIFT	UNIT
								MXV	VSL1
									REFSMAT
								STODL	RRTARGET
									36D
								STORE	MLOS
								CLRGO	
									RRNBSW
									LS21X

LOSCMFLG = 0 MEANS NOT CALLED BY R21
 SO CALL LEMCONIC TO GET LM STATE
 IF IN R21 AND ON LUNAR SURFACE
 DON'T CALL LEMCONIC

EXTRAPOLATE LEM

SAVE LM POSITION B-29

SAVE LM VELOCITY B-7

EXTRAPOLATE CSM
 COMPUTE RELATIVE VELOCITY V(CSM) - V(LM)

KILL THE TASK WHICH CALLS DODES SINCE
 STORING INTO ERASEABLES DODES USFS

CONVERT TO STABLE MEMBER

SAVE MAGNITUDE OF LOS VECTOR FOR
 VELOCITY CORRECTION IN DESIGNATE

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P2429 PROGRAM NAME_ LPS20.2 400 NM RANGE CHECK
 R2430 MOD. NO. 2 BY J.D. COYNE SDC DATE 12-7-66

R2431 FUNCTIONAL DESCRIPTION_

R2432 COMPARES THE MAGNITUDE OF THE LCS VECTOR TO 400 NM

R2433 CALLING SEQUENCE CALL
 R2434 LPS20.2

R2435 SUBROUTINES CALLED_ NONE

R2436 NORMAL EXIT _ RETURN TO CALLER +1, MPAC EQ 0 (RANGE 400NM OR LESS.)

R2437 ERROR EXITS _ RETURN TO CALLER +1, MPAC EQ 1 (RANGE GREATER THAN 400NM)

R2438 ALARMS_ NONE

R2439 OUTPUT_ NONE

R2440 INITIALIZED ERASEABLE_

R2441 PDL 36D MUST CONTAIN THE MAGNITUDE OF THE VECTOR
 R2442 DEBRIS

R2443 MPAC DESTROYED BY THIS ROUTINE

2444 REF 3 LAST 572 25,2000 SETLOC P20S1
 2445 25,3565 BANK
 24452 REF 1 COUNT* \$\$/LPS20

2446			25,3565	45345 1	LPS20.2	DLOAD	DSU	
2447	REF	5	LAST 576	25,3566	01767 0		MLOSV	MAGNITUDE OF LOS
2448	REF	1		25,3567	13600 0		FHNM	OVER 400NM _
2449				25,3570	77644 1	BPL		
2450	REF	1		25,3571	53574 1		TCFAR	
2451				25,3572	43535 0	SLOAD	RVQ	
2452	REF	1		25,3573	06424 0		ZERO/SP	
2453				25,3574	43535 0	TOFAR	RVQ	
2454	REF	1		25,3575	13577 0		ONE/SP	
2455				25,3576	00001 0	ONE/SP	DEC	1

GAP: ASSEMBLE REVISION 069 OF AGC PROGRAM LUMINARY BY NASA 2021112-011

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2456	25,3577	26467 0	FHNM	2DEC	740800 B-20	400 NAUTICAL MILES IN METERS B-20
2456	25,3600	00000 1				

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P2457 PROGRAM NAME: LRS22.1 (DATA READ SUBROUTINE 1)
R2458 MOD. NO.: I BY: P. VOLANTE SDC DATE: 11-15-66

R2459 FUNCTIONAL DESCRIPTION

R2460 1) READS RENDEZVOUS RADAR RANGE AND RANGE-RATE, TRUNION AND SHAFT ANGLES, THREE CDU VALUES AND TIME. CONVERTS THIS
R2462 DATA AND LEAVES IT FOR THE MEASUREMENT INCORPORATION ROUTINE (LSR22.3). CHECKS FOR THE RR DATA GOOD DISCRETE, FOR
R2464 RR REPOSITION AND RR CDU FAIL

R2465 2) COMPARES RADAR LOS WITH LOS COMPUTED FROM STATE VECTORS TO SEE IF THEY ARE WITHIN THREE DEGREES

R2467 CALLING SEQUENCE: BANKCALL FOR LRS22.1

R2468 SUBROUTINES CALLED:

R2469 RRRDOT LPS20.1
R2470 RRRANGE BANKCALL
R2471 RADSTALL CDULOGIC
R2472 RRNB SMNB
R2473 NORMAL EXIT: RETURN TO CALLER+1 WITH MPAC SET TO +0

R2474 ERRDR EXITS: RETURN TO CALLER+1 WITH ERROR CODE STORED IN MPAC AS FOLLOWS:

R2476 00001-ERROR EXIT 1-RR DATA NO GOOD (NO RR DATA GOOD DISCRETE OR RR CDU FAIL OR RR REPOSITION)
R2478 00002-ERROR EXIT 2-RR LOS NOT WITHIN THREE DEGREES OF LOS COMPUTED FROM STATE VECTORS

R2480 ALARMS: 521-COULD NOT READ RADAR DATA (RR DATA GOOD DISCRETE NOT PRESENT BEFORE AND AFTER READING THE RADAR)
R2482 (THIS ALARM IS ISSUED BY THE RADAREAD SUBROUTINE WHICH IS ENTERED FROM A RADARUPT)

R2484 OUTPUT: RRLOSVEC- THE RR LINE-OF-SIGHT VECTOR (USED BY LRS22.2)-A HALF-UNIT VECTOR
R2486 RM- THE RR RANGE READING (TO THE GSM) DP, IN METERS SCALED B-29 (USED BY LRS22.2 AND LRS22.3)

R2488 ALL OF THE FOLLOWING OUTPUTS ARE USED BY LRS22.3:

R2489 RDOTM- THE RR RANGE-RATE READING, DP, IN METERS PER CENTISECOND, SCALED B-7
R2491 RRTRUN-RR TRUNION ANGLE, DP, IN REVOLUTIONS, SCALED B0
R2492 RRSHAFT-RR SHAFT ANGLE, DP, IN REVOLUTIONS, SCALED B0
R2493 AIG, AMG, AOG- THE CDU ANGLES, THREE SP WORDS
R2494 MKTIME- THE TIME OF THE RR READING, DP, IN CENTISECONDS

R2495 ERASABLE INITIALIZATION REQUIRED:

R2496 RNRAD, THE RADAR READ COUNTER FROM WHICH IS OBTAINED:

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R2497 1)RR RANGE SCALED 9.38 FT. PER BIT ON THE LOW SCALE AND 75.04 FT. PER BIT ON THE HIGH SCALE
 R2499 2)RR RANGE RATE, SCALED .6278 FT./SEC. PER BIT

R2500 THE CDU ANGLES FROM CDUX,CDUY,CDUZ AND TIME1 AND TIME2

R2501 DEBRIS: LRS22.1X,A,L,Q,PUSHLIST

25012					32,2376				BANK	32		
25014	REF	2	LAST	56	32,2000				SETLOC	LRS22		
25016					32,2376				BANK			
2502	REF	2	LAST	56 TO	56:	4	4*		COUNT*	\$/LRS22		
2503	REF	7	LAST	554	32,2376	0 4645	1	LRS22.1	TC	MAKECADR		
2504	REF	3	LAST	516	32,2377	55'735	0		TS	LRS22.1X		
2505	REF	46	LAST	562	32,2400	0 5516	0		TC	DOWNFLAG		
2506	REF	2	LAST	569	32,2401	00120	1		ADRES	RNGSCFLG		
2507					32,2402	0 0004	0		INHINT			
2508	REF	29	LAST	570	32,2403	3 4751	0		CAF	BIT3		
2509					32,2404	0 0006	1		EXTEND			
2510	REF	18	LAST	572	32,2405	02 033	0		RAND	CHAN33	GET RR RANGE SCALE	
2511	RFF	86	LAST	571	32,2406	54 001	1		TS	L	FROM CHANNEL 33 BIT 3	
2512	REF	30	LAST	580	32,2407	4 4751	1		CS	BIT3	AND SET IN RADMODES BIT3	
2513	RFF	94	LAST	574	32,2410	7 0110	0		MASK	RADMODES		
2514	REF	87	LAST	580	32,2411	6 0001	0		AD	L		
2515	REF	95	LAST	580	32,2412	54 110	0		TS	RADMODES		
2516					32,2413	0 0003	1		RELINT			
2517	REF	138	LAST	563	32,2414	0 4616	1	READRDOT	TC	BANKCALL		
2518	REF	3	LAST	519	32,2415	53103	0		CADR	RPRDOT	READ RANGE-RATE (ONE SAMPLE)	
2519	REF	139	LAST	580	32,2416	0 4616	1		TC	BANKCALL		
2520	REF	8	LAST	521	32,2417	17667	0		CADR	RADSTALL	WAIT FOR DATA READ COMPLETION	
2521	REF	1			32,2420	1 2540	0		TCF	EREXIT1	COULD NOT READ RADAR-ERROR EXIT 1	
2522					32,2421	0 0004	0		INHINT		NO INTERRUPTS WHILE READING TIME AND CDU	
2523	REF	6	LAST	565	32,2422	53'106	0		DXCH	TIMEHOLD	SET MARK TIME EQUAL TO THE MID-POINT	
25235	REF	5	LAST	216	32,2423	53'753	0		DXCH	MKTIME	TIME OF THE RANGE-RATE READING	
2524	REF	6	LAST	571	32,2424	53'102	1		DXCH	SAMPLSUM	SAVE RANGE-RATE READING	
2525	REF	3	LAST	161	32,2425	53'745	1		DXCH	RDOTMSAV		
2526					32,2426	0 0006	1		EXTEND			
2527	REF	2	LAST	269	32,2427	3 0034	0		DCA	CDUY	SAVE 1CDU ANGLES	
2528	REF	3	LAST	216	32,2430	53'456	0		DXCH	AIG		
2529	REF	10	LAST	400	32,2431	3 0032	0		CA	CDUX		
2530	REF	3	LAST	216	32,2432	55'457	1		TS	ADG		
2531					32,2433	0 0006	1		EXTEND			
2532	REF	15	LAST	565	32,2434	3 0025	0		DCA	TIME2	SAVE TIME	
2533	REF	236	LAST	562	32,2435	52 155	1		DXCH	MPAC	SAVE TIME OF CDY READINGS IN MPAC	
2534					32,2436	0 0006	1		EXTEND			
2535	REF	9	LAST	559	32,2437	3 0036	1		DCA	CDUT	SAVE TRUNION AND SHAFT ANGLES FOR RRNB	
2536	RFF	21	LAST	561	32,2440	53'110	1		DXCH	TANG		

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2537				32,2441	0 0003 1	RELINT		
2538	REF	140	LAST	580	32,2442 0 4616 1	TC	BANKCALL	
2539	REF	2	LAST	503	32,2443 53105 0	CADR	RRRANGE	READ RR RANGE (ONE SAMPLE)
2540	REF	141	LAST	581	32,2444 0 4616 1	TC	BANKCALL	
2541	REF	9	LAST	580	32,2445 17667 0	CADR	RAOSTALL	WAIT FOR READ COMPLETE
2542	REF	1			32,2446 0 2534 1	TC	CHEXERR	CHECK FOR ERRORS DURING READ
2543	REF	45	LAST	576	32,2447 0 6036 1	TC	INTPRET	
2544					32,2450 14025 0	STODL	200	SAVE TIME OF CDU READINGS IN 200
2545	REF	4	LAST	580	32,2451 03745 1		RDOTMSAV	CONVERT ROOT UNITS AND SCALING
2546					32,2452 57261 0	SL	DMPR	START WITH READING SCALED B-28, -.6278
2547					32,2453 20217 1		140	FT./SECONO PER BIT
2548	REF	1			32,2454 24012 1		RDOTCONV	END WITH METERS/CENTISECONO, B-7
2550	RFF	2	LAST	161	32,2455 17747 0	STODL	RODTM	STORE FOR USE BY LSR22.3
2551	REF	22	LAST	580	32,2456 01110 0		TANG	
2552	RFF	10	LAST	554	32,2457 03751 1	STORE	TANGNB	
2553					32,2460 47135 0	SLOAD	RTB	
2554	REF	23	LAST	581	32,2461 01110 0		TANG	GET TRUNION ANGLE
2555	REF	11	LAST	559	32,2462 21465 0		CDULOGIC	CONVERT TO DP ONES COMP. IN REVOLUTIONS
2556	REF	2	LAST	161	32,2463 03732 1	STORE	RRTPUN	AND SAVE FOR TMI ROUTINE (LSR22.3)
2557					32,2464 47135 0	SLOAD	RTB	
2558	REF	24	LAST	581	32,2465 01111 1		TANG +1	DITTO FOR SHAFT ANGLE
2559	REF	12	LAST	581	32,2466 21465 0		CDULOGIC	
2560	REF	2	LAST	161	32,2467 17734 1	STODL	RRSHAFT	
2561	REF	7	LAST	580	32,2470 01102 0		SAMPLSUM	
2562					32,2471 66405 0	DMP	SLZR	CONVERT UNITS AND SCALING OF RANGE
2563	REF	1			32,2472 24014 1		RANGCONV	PER BIT, END WITH METERS, SCALED -29
2565	REF	3	LAST	216	32,2473 37755 1	STCALL	RM	
2566	REF	3	LAST	554	32,2474 46041 0		RPNB	COMPUTE RADAR LOS USING RRNB
2567	REF	3	LAST	161	32,2475 17737 1	STODL	RRBORSIT	AND SAVE
2568					32,2476 00025 0		200	
2569	REF	16	LAST	576	32,2477 34041 0	STCALL	TDEC1	GET STATE VECTOR LOS AT TIME OF CDU READ
2570	REF	4	LAST	529	32,2500 51151 0		LPS20.1	
2571					32,2501 77776 1	EXIT		
2572	REF	4	LAST	580	32,2502 3 1455 1	CA	AIG	STORE IMU CDU ANGLES AT MARKTIME
2573	REF	10	LAST	491	32,2503 54 766 1	TS	COUSPOT	IN COUSPOT FOR TRG*SMNB
2574	REF	1			32,2504 3 1456 1	CA	AMG	
2575	REF	11	LAST	581	32,2505 54 770 0	TS	COUSPOT +2	
2576	REF	4	LAST	580	32,2506 3 1457 0	CA	ACG	
2577	REF	12	LAST	581	32,2507 54 772 1	TS	COUSPOT +4	
2578	REF	46	LAST	581	32,2510 0 6036 1	TC	INTPRET	
2579					32,2511 45175 0	VLOAD	CALL	LOAD VECTOR AND CALL TRANSFORMATION
2580	REF	11	LAST	576	32,2512 01102 0		RRTARGET	
2581	REF	1			32,2513 47555 1		TRG*SMNB	ROTATE LOS AT MARKTIME FROM SM TO NB.
2582					32,2514 77641 1	DOT		DOT WITH RADAR LOS TO GET ANGLE
2583	REF	4	LAST	581	32,2515 03737 1		RRBORSIT	
2584					32,2516 65552 0	SLI	ACOS	BETWEEN THEM
2585	REF	22	LAST	461	32,2517 01046 1	STORE	DSPTM1	STORE FOR POSSIBLE DISPLAY
2586					32,2520 50025 0	DSU	BMN	IS IT LESS THAN 3 DEGREES
2587	REF	1			32,2521 24544 1		THREDEEG	
2588	REF	1			32,2522 64527 0		NORMEXIT	YES-NORMAL EXIT

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2589				32,2523	77776	1		EXIT		ERROR EXIT 2
2590	REF	37	LAST	562	32,2524	3 4752	0	CAF	BIT2	SET ERROR CODE
2591	REF	237	LAST	580	32,2525	54 154	0	TS	MPAC	
2592	REF	1			32,2526	1 2532	0	TCF	OUT22.1	
2593					32,2527	77776	1	NORMEXIT	EXIT	NORMAL EXIT-SET MPAC EQUAL ZERO
2594	REF	120	LAST	574	32,2530	3 4755	1	CAF	ZERO	
2595	REF	238	LAST	582	32,2531	54 154	0	TS	MPAC	
2596	REF	4	LAST	580	32,2532	31 735	1	OUT22.1	CAE	EXIT FROM LRS22.1
2597	REF	10	LAST	552	32,2533	0 4640	1	TC	BANK JUMP	
2598	REF	15	LAST	569	32,2534	30 101	1	CHEXERR	CAE	FLAGWRD5
2599	REF	1			32,2535	7 4742	0	MASK	RNGSCBIT	
2600	REF	200	LAST	574	32,2536	10 000	0	CCS	A	CHECK IF RANGE SCALE CHANGED
2601	REF	1			32,2537	1 2414	0	TCF	READRDOT	YES-TAKE ANOTHER READING
2602	REF	33	LAST	569	32,2540	3 4753	1	EREXIT1	CA	SET ERROR CODE
2603	REF	239	LAST	582	32,2541	54 154	0	TS	MPAC	
2604	REF	2	LAST	582	32,2542	0 2532	1	TC	OUT22.1	
2607					32,2543	00210	1	THREEDEG	ZDEC	THREE DEGREES, SCALED REVS, 80
2607					32,2544	21042	1			
2608	REF	12	LAST	581	1101			RRLOSVEC	EQUALS	RRTARGET

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P2609 PROGRAM NAME - LRS22.2 (DATA READ SUBROUTINE 2)

R2610 MOD. NO. : 1 BY: P VOLANTE SDC DATE 4-11-67

R2611 FUNCTIONAL DESCRIPTION-

R2612 2) CHECKS IF THE RR LOS (I.E. THE RADAR BORESIGHT VECTOR) IS WITHIN 30 DEGREES OF THE LM +Z AXIS

R2614 CALLING SEQUENCE- BANKCALL FOR LRS22.2

R2615 SUBROUTINES CALLED: G+N,AUTO SETMAXDB

R2616 NORMAL EXIT - RETURN TO CALLER WITH MPAC SET TO +0 (VIA SWRETURN)

R2617 ERROR EXIT - RETURN TO CALLER WITH MPAC SET TO 00001 -RADAR LOS NOT WITHIN 30 DEGREES OF LM +Z AXIS

R2619 ALARMS - NONE IN THE AUTO MODE

R2621 ERASABLE INITIALIZATION REQUIRED -

R2622 RRLOSVEC - THE RR LINE-OF-SIGHT VECTOR-A HALF UNIT VECTOR COMPUTED BY LRS22.1

R2624 RM - RR RANGE, METERS B-29, FROM LRS22.1

R2625 BIT 14 CHANNEL 31 -INDICATES AUTOPILOT IS IN AUTO MODE

R2626 DEBRIS - A,L,Q MPAC -PUSHLIST AND -PUSHLOC ARE NOT CHANGED BY THIS ROUTINE

2628 REF 5 LAST 575 24,2000 SETLOC P20S

2629 24,3230 BANK

2630 REF 8 LAST 580 24,3230 0 4645 1 LRS22.2 TC MAKFCADR

2631 REF 5 LAST 582 24,3231 55*735 0 TS LRS22.1X

2632 REF 47 LAST 581 24,3232 0 6036 1 TC INTPRET

A2633

2634 REF 5 LAST 581 24,3233 65545 0 30DEGCHK DLOAD ACOS

2635 REF 5 LAST 581 24,3234 03743 1 RRBORSIT +4

A2636

A2637

2638 24,3235 50025 0 DSU BMN

2639 REF 1 24,3236 11252 1 30DEG

2640 REF 1 24,3237 51244 1 OKEXIT

2641 24,3240 77776 1 EXIT

2642 REF 34 LAST 582 24,3241 3 4753 1 CAF BIT1

2643 REF 240 LAST 582 24,3242 54 154 0 TS MPAC

2644 REF 1 24,3243 1 3247 1 TCF OUT22.2

2645 24,3244 77776 1 OKEXIT EXIT

CHECK IF RR LOS IS WITHIN 30 DEG OF
THE SPACECRAFT +Z AXIS
BY TAKING ARCCOS OF Z-COMP. OF THE RR
LOS VECTOR,A HALF UNIT VECTOR
IN NAV BASE AXES)

NORMAL EXIT-WITHIN 30 DEG.
ERROR EXIT-NOT WITHIN 30 DEG.
SET ERROR CODE IN MPAC

NORMAL EXIT-SET MPAC = ZERO

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2646	REF 121	LAST 582	24,3245	3 4755 1	CAF	ZERO
2647	REF 241	LAST 583	24,3246	54 154 0	TS	MPAC
2648	REF 6	LAST 583	24,3247	31'735 1	CAE	LRS22.1X
2649	REF 11	LAST 582	24,3250	0 4640 1	TC	BANK JUMP

2650		24,3251	02525 1	30DEG	2DEC	.083333333	THIRTY DEGREES, SCALED REVS,80
2650		24,3252	12525 0				

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R2651 PROGRAM NAME - LSR22.3
R2653 MOD. NO 3
R2655 MOD. BY - DANFORTH
R2657
R2658 FUNCTIONAL DESCRIPTION

DATE - 29 MAY 1967
LOG SECTION - P20-25
ASSEMBLY LEMP20S REV 10

R2659 THIS ROUTINE COMPUTES THE B-VECTORS AND DELTA Q FOR EACH OF THE QUANTITIES MEASURED BY THE RENDEZVOUS
R2661 RADAR. (RANGE, RANGE RATE, SHAFT AND TRUNNION ANGLES). THE ROUTINE CALLS THE INCORP1 AND INCORP2 ROUTINES
R2663 WHICH COMPUTE THE DEVIATIONS AND CORRECT THE STATE VECTOR.

R2664 CALLING SEQUENCE

R2665 THIS ROUTINE IS PART OF P20 RENDEZVOUS NAVIGATION FOR THE LM COMPUTER ONLY. THE ROUTINE IS ENTERED FROM
R2667 R22LEM ONLY AND RETURNS DIRECTLY TO R22LEM FOLLOWING SUCCESSFUL INCORPORATION OF MEASURED DATA. IF THE
R2669 COMPUTED STATE VECTOR DEVIATIONS EXCEED THE MAXIMUM PERMITTED, THE ROUTINE RETURNS TO R22LEM TO DISPLAY
R2671 THE DEVIATIONS. IF THE ASTRONAUT ACCEPTS THE DATA R22LEM RETURNS TO LSR22.3 TO INCORPORATE THE
R2673 DEVIATIONS INTO THE STATE VECTOR. IF THE ASTRONAUT REJECTS THE DEVIATIONS, NO MORE MEASUREMENTS ARE
R2675 PROCESSED FOR THIS MARK, I.E., R22LEM GETS THE NEXT MARK.

R2676
R2677 SUBROUTINES CALLED
R2678 WLIMIT LGCUPDTE INTEGRV INCORP1 ARCTAN
R2679 GETULC RARARANG INCORP2 NBSM INSTALL

R2680
R2681 OUTPUT

R2682 CORRECTED LM OR CSM STATE VECTOR (PERMANENT)
R2683 NUMBER OF MARKS INCORPORATED IN MARKCTR
R2684 MAGNITUDE OF POSITION DEVIATION (FOR DISPLAY) IN R22DISP METERS B-29
R2685 MAGNITUDE OF VELOCITY DEVIATION (FOR DISPLAY) IN R22DISP +2 M/CSEC B-7
R2686 UPDATED W-MATRIX
R2687

R2688 ERASABLE INITIALIZATION REQUIRED

R2689 LM AND CSM STATE VECTORS

R2690 W-MATRIX

R2691 MARK TIME IN MKTIME

R2692 RADAR RANGE IN RM METERS B-29

R2693 RANGE RATE IN RDOTM METERS/CSES B-7

R2694 SHAFT ANGLE IN RRSHAFT REVS. 80

R2695 TRUNNION ANGLE IN RRTRUN REVS. 80

R2696 GIMBAL ANGLES INNER IN AIG

R2697 MIDDLE IN AMG

R2698 OUTER IN AOG

R2699 REFSMMAT

R2700 RENDWFLG

R2701 NCANGFLG

R2702 VEHUPFLG

R2703 DEBRIS

R2704 PUSHLIST--ALL

R2705 MX, MY, MZ (VECTORS)

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R2706 ULC,RXZ,SINTheta,LGRET,RDRET,BVECTOR,W.IND,X78T

2707				13,2207			BANK	13	
2708	REF	1		26,2000			SETLOC	P20S3	
2709				26,2370			BANK		
2710	REF	28	LAST	572	E7,1454		EBANK=	LCSCCUNT	
2711	REF	1					COUNT*	\$4/L SR22	
2712					26,2370	77624 1	CALL		
2713	REF	7	LAST	518	26,2371	11165 0		GRP2PC	
2714					26,2372	43014 0	BON	SET	
2715	REF	7	LAST	576	26,2373	04307 1		SURFFLAG	ARE WE ON LUNAR SURFACE
2716	REF	1			26,2374	55143 1		LSR22.4	YES
2717	REF	1			26,2375	02466 1		DMENFLG	
2718					26,2376	45014 0	BOFF	CALL	
2719	REF	6	LAST	512	26,2377	00747 0		VEHUPFLG	
2720	REF	1			26,2400	54432 0		DOLEM	
2721	REF	11	LAST	512	26,2401	27412 0		INTSTALL	
2722					26,2402	45014 0	CLEAR	CALL	LM PRECISION INTEGRATION
2723	REF	10	LAST	512	26,2403	01674 0		VINTFLAG	
2724	REF	4	LAST	512	26,2404	26644 0		SETIFLGS	
2725					26,2405	77624 1	CALL		
2726	REF	1			26,2406	55205 0		INTGRCAL	
2727					26,2407	77624 1	CALL		
2728	REF	8	LAST	586	26,2410	11165 0		GRP2PC	
2729					26,2411	77624 1	CALL		
2730	REF	12	LAST	586	26,2412	27412 0		INTSTALL	
2731					26,2413	43014 0	CLEAR	BOFF	
2732	REF	7	LAST	512	26,2414	01676 1		DIMOFLLG	
2733	REF	5	LAST	512	26,2415	02756 1		RENDWFLG	
2734	REF	1			26,2416	54422 1		NOTWCSM	
2735					26,2417	43014 0	SET	SET	CSM WITH W-MATRIX INTEGRATION
2736	REF	8	LAST	586	26,2420	01476 0		DIMOFLLG	
2737	REF	5	LAST	512	26,2421	01475 0		D6DR9FLG	
2738					26,2422	43014 0	NOTWCSM	SET	
2739	REF	11	LAST	586	26,2423	01474 1		VINTFLAG	
2740	REF	3	LAST	506	26,2424	01673 1		INTYPFLG	
2741					26,2425	45014 0	SET	CALL	
2742	REF	1			26,2426	01472 1		STATEFLG	
2743	REF	2	LAST	586	26,2427	55205 0		INTGRCAL	
2744					26,2430	77650 1	GOTO		
2745	REF	1			26,2431	54462 0		MARKTEST	
2746					26,2432	77624 1	DOLEM	CALL	
2747	REF	13	LAST	586	26,2433	27412 0		INTSTALL	
2748					26,2434	45014 0	SET	CALL	
2749	REF	12	LAST	586	26,2435	01474 1		VINTFLAG	
2750	REF	5	LAST	586	26,2436	26644 0		SETIFLGS	
2751					26,2437	77624 1	CALL		
2752	REF	3	LAST	586	26,2440	55205 0		INTGRCAL	

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2753				26,2441	77624 1	CALL		
2754	REF	9	LAST	586	26,2442	11165 0		GPP2PC
2755				26,2443	77624 1	CALL		
2756	REF	14	LAST	586	26,2444	27412 0		INTSTALL
2757				26,2445	43014 0	CLEAR		BOFF
2758	REF	9	LAST	586	26,2446	01676 1		DIMOFFLAG
2759	REF	6	LAST	586	26,2447	02756 1		RENDWFLG
2760	REF	1			26,2450	54454 0		NOTWLEM
2761				26,2451	43014 0	SET		SET
2762	REF	10	LAST	587	26,2452	01476 0		DIMOFFLAG
2763	REF	6	LAST	586	26,2453	01475 0		D6CR9FLG
2764				26,2454	43014 0	NOTWLEM CLEAR		CLEAR
2765	REF	4	LAST	586	26,2455	01673 1		INTYPFLG
2766	REF	13	LAST	586	26,2456	01674 0		VINTFLAG
2767				26,2457	45014 0	SET		CALL
2768	REF	2	LAST	586	26,2460	01472 1		STATEFLG
2769	REF	4	LAST	586	26,2461	55205 0		INTGRCAL
2770				26,2462	45014 0	MARKTEST BON		CALL
2771	REF	7	LAST	587	26,2463	02716 0		RENDWFLG
2772	REF	1			26,2464	54474 1		RANGEBO
2773	REF	1			26,2465	55214 0		WLINIT
2774				26,2466	77776 1	EXIT		YES-REINITIALIZE
2775	REF	122	LAST	584	26,2467	3 4755 1	CA	ZERO
2776	REF	5	LAST	530	26,2470	551743 1	TS	R65CNTIP
2777	REF	142	LAST	581	26,2471	0 4616 1	TC	8ANKCALL
2778	REF	3	LAST	519	26,2472	46105 1	CADR	R65LEM
2779	REF	48	LAST	583	26,2473	0 6036 1	TC	INTPRET
2780				26,2474	43174 1	RANGE80 AXT,2	BON	CLEAR X2.
2781				26,2475	00000 1		0	
2782	REF	2	LAST	36	26,2476	04304 1		LMOONFLG
2783	REF	1			26,2477	54502 1		SFTX2
2784				26,2500	77714 0	INCR,2		
2785				26,2501	00002 0		2	
2786				26,2502	45134 0	SETX2	SXA,2	CALL
2787	REF	2	LAST	160	26,2503	03716 1		SCALSHFT
2788	REF	10	LAST	587	26,2504	11165 0		GRP2PC
27882				26,2505	54335 0		SLOAD	SR
27884	REF	1			26,2506	01775 0		RVARMIN
27886				26,2507	20635 0			28D
27887				26,2510	77634 0	RT8		
27888	REF	1			26,2511	21537 0		TPMODE
27889				26,2512	00025 0	STORE	20D	AND SAVE IN 20D
2789				26,2513	77624 1	CALL		BEGIN COMPUTING THE 8-VECTORS, DELTAQ
2790	REF	1			26,2514	55276 1		8-VECTORS FOR RANGE
2791				26,2515	57414 1	BON	VCOMP	BO, COMP. IF LM BEING CORRECTED
2792	REF	7	LAST	586	26,2516	00707 1		VEHUPFLG
2793				26,2517	54520 1		+1	
2794	REF	2	LAST	160	26,2520	27523 0	STOVL	8VECTOR
2795	REF	2	LAST	36	26,2521	06424 0		ZEROVFCS
2796	REF	3	LAST	587	26,2522	03531 0	STORE	BVECTOR +6

B1

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2797	REF	4	LAST	587	26,2523	17537 0	STODL	BVECTOR +12D	B2
2798					26,2524	00045 0		36D	
2799					26,2525	44257 1	SRR*	BDSU	
2800					26,2526	56174 0		2,2	SHIFT FROM EARTH/MOON SPHERE TO 8-29
2801	REF	4	LAST	581	26,2527	03755 0		PM	RM - (MAGNITUDE RCSM-RLM)
2802					26,2530	77657 0	SLR*		
2803					26,2531	56574 1		2,2	SHIFT TO EARTH/MOON SPHERE
2804	REF	2	LAST	160	26,2532	17545 0	STODL	DELTAQ	EARTH B-29. MOON B-27
2805					26,2533	00045 0		36D	RLC B-29/B-27
2806					26,2534	63501 0	NORM	DSO	NORMALIZE AND SQUARE
2807	REF	3	LAST	400	26,2535	00047 1		X1	
2808					26,2536	53605 1	DMP	SP*	
2809	REF	1			26,2537	01771 1		RANGFVAR	MULTIPLY BY RANGEVAR(B12) THEN
2810					26,2540	20577 0		0 -2,1	UNNORMALIZE
2811					26,2541	53657 0	SR*	SR*	
2812					26,2542	20601 1		0,1	
2813					26,2543	57176 0		0,2	
2814					26,2544	47057 0	SR*	RTB	
2815					26,2545	57176 0		0,2	
2816	REF	2	LAST	587	26,2546	21537 0		TPMODE	
2817	REF	2	LAST	141	26,2547	02707 0	STORE	VARIANCE	B-40
2818					26,2550	76276 0	DCOMP	TAD	
2819					26,2551	00025 0		20D	B-40
2820					26,2552	72240 1	BMN	TLOAD	
2821	REF	1			26,2553	54556 0		QOK	
2822					26,2554	00025 0		20D	B-40
2823	REF	3	LAST	588	26,2555	02707 0	STORE	VARIANCE	
2824					26,2556	77624 1	CALL		
2825	REF	1			26,2557	55344 1		LGCUPDTF	
2826					26,2560	77624 1	CALL		
2827	REF	11	LAST	587	26,2561	11165 0		GPP2PC	
2828					26,2562	77624 1	CALL		B-VECTOR, DELTAQ FOR RANGE RATE
2829	REF	2	LAST	587	26,2563	55276 1		GETULC	
2830					26,2564	53725 1	PDOL	SR*	GET RLC SCALED B-29/8-27
2831					26,2565	00045 0		36D	AND SHIFT TO B-23
2832					26,2566	57202 0		0 -4,2	
2833					26,2567	24045 0	STOVL	36D	THEN STORE BACK IN 36D
2834					26,2570	57414 1	BON	VDCMP	B1, COMP. IF LM BEING CORRECTED
2835	REF	8	LAST	587	26,2571	00707 1		VEHUPFLG	
2836					26,2572	54573 1		+1	
2837					26,2573	77761 1	VXSC		
2838					26,2574	00045 0		36D	B1 = RLC (B-24/8-22)
2839	REF	5	LAST	588	26,2575	27531 0	STOVL	BVECTOR +6	
2840	REF	1			26,2576	01653 0		NUVLEM	
2841					26,2577	53257 1	VSP*	VAD	
2842					26,2600	57170 0		6,2	SHIFT FOR EARTH/MOON SPHERE
2843	REF	2	LAST	510	26,2601	01667 1		VCVLEM	EARTH B-7. MOON B-5
2844					26,2602	53715 1	PDVL	VSP*	VL TO PD6
2845	REF	1			26,2603	01601 1		NUVCSM	

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2846			26,2604	57170 0		6,2	SHIFT EOR EARTH/MOON SPHERF
2847			26,2605	52255 1	VAD	VSU	
2848	REF	1	26,2606	01615 1		VCVCSM	
2849			26,2607	50315 0	PDVL	DOT	VC - VL = VLC TO PD6
2850			26,2610	00001 0		0	
2851			26,2611	00007 0		6	
2852			26,2612	53606 1	PUSH	SRR*	RDOT B-8/8-6 TO PD12
2853			26,2613	56174 0		2,2	SHIET FROM EARTH/MOON SPHERE TO 8-8
2854			26,2614	57316 1	DSQ	DMPR	RDOT**2 8-16 X RATEVAR B12
2855	REF	1	26,2615	01773 0		RATFVAR	
2856	REF	4	26,2616	02707 0	STORE	VARIANCE	
28612			26,2617	54335 0	SLOAD	SR	
28614	REE	1	26,2620	01776 0		VVARMIN	GET SINGLE PRECISION VVARMIN (8+12)
28616			26,2621	20621 0		16D	SHIET TO DP (8 -4)
28618			26,2622	00031 0	STORE	24D	AND SAVE IN 24D
2862			26,2623	50025 0	DSU	BMN	IS MIN. VARIANCE > COMPUTED VARIANCE
2863	REF	5	26,2624	02707 0		VARIANCE	
2864	REF	1	26,2625	54631 1		VOK	BRANCH - NO
2865			26,2626	77745 1	DLOAD		YFS - USE MINIMUM VARIANCE
2866			26,2627	00031 0		24D	
2873	REF	6	26,2630	02707 0	STORE	VARIANCE	
2874			26,2631	60545 0	DLOAD	SR2	RDOT(PD12) FROM 8-8/8-6
2875			26,2632	53725 1	PDDL	SLR*	TO 8-10/8-8
2876	REF	3	26,2633	03747 0		RDOTM	SHIFT TO EARTH/MOON SPHERE
2877			26,2634	56577 1		0 -1,2	8-7 TO 8-10/8-8
2878			26,2635	77625 0	DSU		
2879			26,2636	77675 0	DMPR		
2880			26,2637	00045 0		36D	
2881	REF	3	26,2640	27545 0	STOVL	DELTAQ	B-33
2882			26,2641	00001 0		0	NOW GET 80
2883			26,2642	47235 0	VXV	VXV	(ULC X VLC) X ULC
2884			26,2643	57414 1	8ON	VCOMP	80, COMP. IF LM BEING CORRECTED
2885	REF	9	26,2644	00707 1		VEHUPELG	
2886			26,2645	54646 1		+1	
2887			26,2646	77657 0	VSR*		
2888			26,2647	57200 1		0 -2,2	SCALED B-5
2889	REE	6	26,2650	27523 0	STOVL	BVECTOR	
2890	REF	3	26,2651	06424 0		ZFROVECS	
2891			26,2652	00025 0	STORE	20D	ZERO OUT 20 TO 25 IN PUSHLIST
2892	REF	7	26,2653	27537 0	STOVL	BVECTOR +12D	
2893	REF	8	26,2654	03523 0		BVECTOR	
2894			26,2655	60246 1	ABVAL	NORM	LOAD 80, GET MAGNITUDE AND NORMALIZE
2895			26,2656	00025 0		20D	SHIET COUNT IN 20D
2896			26,2657	51575 1	VLOAD	ABVAL	
2897	REE	9	26,2660	03531 0		BVECTOR +6D	LOAD 81, GET MAGNITUDE AND NORMALIZE
2898			26,2661	71301 0	NORM	DLOAD	
2899			26,2662	00027 1		22D	SHIET COUNT IN 22D
2900			26,2663	00027 1		22D	FIND WHICH SHIFT IS SMALLER
2901			26,2664	50025 0	DSU	BMN	BRANCH- 80 HAS SMALLER SHIFT COUNT
2902			26,2665	00025 0		20D	

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2903	REF	1		26,2666	54672	0		VCK1		
2904				26,2667	52150	1	LXA,1	GOTO		
2905				26,2670	00026	0		22D	LOAD X2 WITH THE SMALLER SHIFT COUNT	
2906	REF	1		26,2671	54674	0		VCK2		
2907				26,2672	77750	0	VOK1	LXA,1		
2908				26,2673	00024	1		20D		
2909				26,2674	53775	1	VOK2	VLOAO	THEN ADJUST B0,B1,DELTAQ AND VARIANCE	
2910	REF	10	LAST	589	26,2675	03523	0		BVECTOR	WITH THIS SHIFT COUNT
2911				26,2676	20201	0		0,1		
2912	REF	11	LAST	590	26,2677	27523	0	STOVL	BVECTOR	
2913	REF	12	LAST	590	26,2700	03531	0		BVECTOR +6	
2914				26,2701	77657	0		VSL*		
2915				26,2702	20201	0		0,1		
2916	REF	13	LAST	590	26,2703	17531	0	STOOL	BVECTOR +6	
2917	REF	4	LAST	589	26,2704	03545	0		DELTAQ	
2918				26,2705	77657	0		SL*		
2919				26,2706	20201	0		0,1		
2920	REF	5	LAST	590	26,2707	03545	0	STORE	DELTAQ	
2921				26,2710	53745	1	DLOAD	SL*	GET RLC AND ADJUST FOR SCALE SHIFT	
2922				26,2711	00045	0		360		
2923				26,2712	20200	1		0 -1,1		
2924				26,2713	41316	0	OSQ	DMP	MULTIPLY RLC**2 BY VARIANCE	
2925	REF	7	LAST	589	26,2714	02707	0		VARIANCE	
2926				26,2715	47012	1	SL4	RTB	SHIFT TO CONFORM TO BVECTORS AND DELTAQ	
29263	REF	3	LAST	588	26,2716	21537	0		TPMOOE	
29266	REF	8	LAST	590	26,2717	36707	1	STCALL	VARIANCE	AND STORE TP VARIANCE
2927	REF	2	LAST	588	26,2720	55344	1		LGCUPDTE	
2928				26,2721	77624	1		CALL		
2929	REF	12	LAST	588	26,2722	11165	0		GRP2PC	
2930				26,2723	77414	0	BON	EXIT	ARE ANGLES TO BE DONE	
2931	REF	8	LAST	586	26,2724	04307	1		SURFFLAG	
2932	REF	1		26,2725	55141	0		RENOEND	NO	
2933	REF	5	LAST	581	26,2726	3 3275	1	EBANK=	AIG	
2934	REF	1		26,2727	54 006	0	MXMYMZ	CAF	AIGRANK	
2935	REF	15	LAST	530	26,2730	3 1455	1	TS	3BANK	
2936	REF	6	LAST	590	26,2731	54 766	1	CA	AIG	YES, COMPUTE MX, MY, MZ
2937	REF	13	LAST	581	26,2732	3 1456	1	TS	CDUSPOT	
2938	REF	2	LAST	581	26,2733	54 770	0	CA	AMG	
2939	REF	14	LAST	590	26,2734	3 1457	0	TS	COUSPOT +2	
2940	REF	5	LAST	581	26,2735	54 772	1	CA	AOG	
2941	REF	15	LAST	590	26,2736	0 6036	1	TS	CDUSPOT +4	GIMBL ANGLES NOW IN CDUSPOT FOR TRG*NBSM
2942	REF	49	LAST	587	26,2737	45175	0	TC	INTPRET	
2943				26,2740	06422	0		VLOAO	CALL	
2944	REF	5	LAST	352	26,2741	47570	0		UNITX	
2945	REF	4	LAST	268	26,2742	76505	0		TRG*NBSM	
2946				26,2743	01734	0		VXM	VSL1	
2947	REF	10	LAST	576	26,2744	27675	0		REFSMAT	
2948	REF	5	LAST	160	26,2745	06420	1	STOVL	*X	
2949	REF	3	LAST	315					UNITY	

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2950				26,2746	77624 1	CALL		
2951	REF	2	LAST	561	26,2747	47577 1		
2952					26,2750	76505 0	VXM	*N8SM*
2953	REF	11	LAST	590	26,2751	01734 0		VSL1
2954	REF	2	LAST	160	26,2752	27703 0	STOVL	REFSMAT
2955	REF	5	LAST	353	26,2753	06416 1		MY
2956					26,2754	77624 1	CALL	UNITZ
2957	REF	3	LAST	591	26,2755	47577 1		*N8SM*
2958					26,2756	76505 0	VXM	VSL1
2959	REF	12	LAST	591	26,2757	01734 0		REFSMAT
2960	REF	2	LAST	160	26,2760	37711 1	STCALL	MZ
2961	REF	1			26,2761	55324 1		RADARANG
2962					26,2762	77624 1	CALL	
2963	REF	13	LAST	590	26,2763	11165 0		GRP2PC
2964					26,2764	50375 0	VLOAD	DOT
2965	REF	2	LAST	160	26,2765	03722 0		JLC
2966	REF	6	LAST	590	26,2766	03675 0		MX
2967					26,2767	77752 1	SL1	
2968	REF	6	LAST	491	26,2770	24023 0	STOVL	SINTH
2969	REF	3	LAST	591	26,2771	03722 0		ULC
2970					26,2772	72441 0	DOT	SL1
2971	REF	3	LAST	591	26,2773	03711 0		MZ
2972	REF	6	LAST	491	26,2774	34021 0	STCALL	COSTH
2973	REF	3	LAST	491	26,2775	26510 1		ARCTAN
2974					26,2776	41221 0	8DSU	DMP
2975	REF	3	LAST	581	26,2777	03734 1		RSSHAF
2976	REF	1			26,3000	15404 0		2PI/8
2977					26,3001	41472 0	SL3R	PUSH
2978					26,3002	52545 1	DLOAD	SL3
2979	REF	2	LAST	211	26,3003	01701 0		X789
2980					26,3004	44257 1	SRR*	8DSU
2981					26,3005	56176 1		0,2
2982					26,3006	53605 1	DMP	SRR*
2983	REF	2	LAST	160	26,3007	03720 1		RXZ
2984					26,3010	21601 0		0,1
2985	REF	6	LAST	590	26,3011	27545 0	STOVL	DELTAQ
2986	REF	4	LAST	591	26,3012	03722 0		ULC
2987					26,3013	76435 1	VXV	VSL1
2988	REF	3	LAST	591	26,3014	03703 0		MY
2989					26,3015	77656 1	UNIT	
2990					26,3016	57414 1	BOFF	VCOMP
2991	REF	10	LAST	589	26,3017	00747 0		VEHUPFLG
2992					26,3020	55021 1		+1
2993	REF	14	LAST	590	26,3021	27523 0	STOVL	BVECTOR
2994	REF	4	LAST	589	26,3022	06424 0		ZEROVECS
2995	REF	15	LAST	591	26,3023	03531 0	STORE	BVECTOR +6
2996	REF	16	LAST	591	26,3024	17537 0	STODL	BVECTOP +120
2997	REF	3	LAST	591	26,3025	03720 1		PXZ
2998					26,3026	53657 0	SR*	SRR*
2999					26,3027	20577 0		0 -2,1

COMPUTE DELTAQ,8 VECTORS FOR SHAFT ANG.

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SHIFT FROM -5/-3 TO 80

SHIFT TO EARTH/MOON SPHERE
EARTH B-29, MOON B-27

80, COMP. IF CSM BEING CORRECTED

SHIFT FROM EARTH/MOON SPHERE TO B-25

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3000				26,3030	56176 1		0,2
3001	REF	17	LAST	591	26,3031	03537 0	STORE BVECTOR +12D
3002					26,3032	77735 0	SLOAD
3003	REF	1			26,3033	02011 0	SHAFTVAR
3004					26,3034	41215 1	DAD DMP
3005	REF	1			26,3035	15401 0	IMUVAR RAD**2 B12
3006	REF	4	LAST	591	26,3036	03720 1	RXZ
3007					26,3037	41257 1	SRR* DMP
3008					26,3040	21601 0	0,1 SHIFT TO EARTH/MOON SPHERE
3009	REF	5	LAST	592	26,3041	03720 1	RXZ
3010					26,3042	53657 0	SR* SR*
3011					26,3043	20577 0	0 -2,1
3012					26,3044	57176 0	0,2
3013					26,3045	47057 0	SR* RTB
3014					26,3046	57176 0	0,2
3015	REF	4	LAST	590	26,3047	21537 0	TPMODE STORE VARIANCE TRIPLE PRECISION
3016	REF	9	LAST	590	26,3050	36707 1	B-40
3017	REF	3	LAST	590	26,3051	55344 1	STCALL VARIANCE LGCUPDTE
3018					26,3052	77624 1	CALL
3019	REF	14	LAST	591	26,3053	11165 0	GRP2PC
3020					26,3054	77624 1	TRUNBQ CALL
3021	REF	2	LAST	591	26,3055	55324 1	RADARANG
3022					26,3056	77624 1	CALL
3023	REF	15	LAST	592	26,3057	11165 0	GRP2PC
3024					26,3060	47375 0	VLOAD VXV
3025	REF	5	LAST	591	26,3061	03722 0	ULC
3026	REF	4	LAST	591	26,3062	03703 0	MY
3027					26,3063	47372 1	VSL1 VXV
3028	REF	6	LAST	592	26,3064	03722 0	ULC
3029					26,3065	77772 0	VSL1 (ULC X MY) X ULC
3030					26,3066	57414 1	BOFF VCOMP 80, COMP. IF CSM BEING CORRECTED
3031	REF	11	LAST	591	26,3067	00747 0	VEHUPFLG
3032					26,3070	55071 1	+1
3033	REF	18	LAST	592	26,3071	27523 0	STOVL BVECTOR
3034	REF	5	LAST	591	26,3072	06424 0	ZEROVECS
3035	REF	19	LAST	592	26,3073	03531 0	STORE BVECTOR +6
3036	REF	20	LAST	592	26,3074	17537 0	STODL BVECTOR +12D
3037	REF	6	LAST	592	26,3075	03720 1	RXZ
3038					26,3076	53657 0	SR* SR*
3039					26,3077	20577 0	0 -2,1
3040					26,3100	56176 1	0,2
3041	REF	21	LAST	592	26,3101	03541 1	STORE BVECTOR +14D
3042					26,3102	77735 0	SLOAD
3043	REF	1			26,3103	02012 0	TRUNVAR
3044					26,3104	41215 1	DAD DMP
3045	REF	2	LAST	592	26,3105	15401 0	IMUVAR
3046	REF	7	LAST	592	26,3106	03720 1	RXZ
3047					26,3107	41257 1	SRR* DMP
3048					26,3110	21601 0	0,1 SHIFT TO EARTH/MOON SPHERE

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3049	REE	8	LAST	592	26,3111	03720	1		RXZ	
3050					26,3112	53657	0	SR*	SP*	
3051					26,3113	20577	0		0 -2,1	
3052					26,3114	57176	0		0,2	
3053					26,3115	47057	0	SR*	RTB	
3054					26,3116	57176	0		0,2	
3055	REF	5	LAST	592	26,3117	21537	0		TPMODE	STORE VARIANCE TRIPLE PRECISION
3056	REF	10	LAST	592	26,3120	16707	0	STODL	VARIANCE	
3057	REF	2	LAST	161	26,3121	03730	0		SIN THETA	
3058					26,3122	44336	1	ASIN	BDSU	SIN THETA IN PD6
3059	REE	3	LAST	581	26,3123	03732	1		RTRUN	
3060					26,3124	56405	0	DMP	SL3P	
3061	REE	2	LAST	591	26,3125	15404	0		2PI/8	
3062					26,3126	52525	1	PDDL	SL3	
3063	REF	3	LAST	591	26,3127	01703	1		X789 +2	
3064					26,3130	44257	1	SRR*	BDSU	SHIFT FROM -5/-3 TO B0
3065					26,3131	56176	1		0,2	
3066					26,3132	53605	1	DMP	SRR*	
3067	REF	9	LAST	593	26,3133	03720	1		RXZ	
3068					26,3134	21601	0		0,1	
3069	REE	7	LAST	591	26,3135	37545	1	STCALL	DELTAQ	EARTH B-29. MOON B-27
3070	REE	4	LAST	592	26,3136	55344	1		LGCUPDTE	
3071					26,3137	77624	1	CALL		
3072	REF	16	LAST	592	26,3140	11165	0		GRP2PC	
3073					26,3141	77650	1	RENDEND	GOTO	
3074	REE	1			26,3142	50614	1		R22LFM93	
R3075	FUNCTIONAL DESCRIPTION									

R3076 LSR22.4 IS THE ENTRY TO PERFORM LUNAR SURFACE NAVIGATION FOR THE LM
 R3077 COMPUTER ONLY. THIS ROUTINE COMPUTES THE B-VECTORS AND DELTA Q FOR RANGE
 R3078 AND RANGE RATE MEASURED BY THE RENDEZVOUS RADAR

R3079 SUBROUTINES CALLED
 R3080 INSTALL LGCUPDTE INCORP1 RP-TO-R
 R3081 INTEGRV GETULC INCORP2

R3082 OUTPLT
 R3083 CORRECTED CSM STATE VECTOR (PERMANENT)
 R3084 NUMBER OF MARKS INCORPORATED IN MARKCTR
 R3085 MAGNITUDE OF POSITION DEVIATION (FOR DISPLAY) IN R22DISP METERS B-29
 R3086 MAGNITUDE OF VELOCITY DEVIATION (FOR DISPLAY) IN R22DISP +2 M/CSEC B-7
 R3087 UPDATED W-MATRIX

R3088 ERASABLE INITIALIZATION REQUIRED
 R3089 LM AND CSM STATE VECTORS
 R3090 W-MATRIX
 R3091 MARK TIME IN MKTIME
 R3092 RADAR RANGE IN RM METERS B-29
 R3093 RANGE RATE IN RDOTM METERS/CSEC B-7
 R3094 VEHUPFLG

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3095          26,3143  77624 1  LSR22.4  CALL
3096  REF  15  LAST  587  26,3144  27412 0          INTSTALL
3097          26,3145  43014 0          SET      CLEAR
3098  REF  3   LAST  587  26,3146  01472 1          STATEFLG
3099  REF  14  LAST  587  26,3147  01674 0          VINTFLAG
3100          26,3150  77624 1          CALL
3101  REF  5   LAST  587  26,3151  55205 0          INTGRCAL
3102          26,3152  77624 1          CALL
3103  REF  17  LAST  593  26,3153  11165 0          GRP2PC
3104          26,3154  45014 0          CLEAR   CALL
3105  REF  2   LAST  586  26,3155  02666 0          DMENFLG      SET MATRIX SIZE TO 6X6 FOR INCORP
3106  REF  16  LAST  594  26,3156  27412 0          INTSTALL
3107          26,3157  46145 0          DLOAD  BHIZ      IS THIS FIRST TIME THROUGH
3108  REF  3   LAST  518  26,3160  03461 1          MARKCTR
3109  REF  1   LAST  518  26,3161  55174 0          INITWMX6    YES. INITIALIZE 6X6 W-MATRIX
3110          26,3162  43014 0          CLEAR   SET
3111  REF  7   LAST  587  26,3163  01675 1          D6OR9FLG
3112  REF  11  LAST  587  26,3164  01476 0          DIMOFLAG
3113          26,3165  43014 0          SET      CLEAR
3114  REF  15  LAST  594  26,3166  01474 1          VINTFLAG
3115  REF  5   LAST  587  26,3167  01673 1          INTYPLG
3116          26,3170  77624 1          CALL
3117  REF  6   LAST  594  26,3171  55205 0          INTGRCAL
3118          26,3172  77650 1          GOTO
3119  REF  2   LAST  587  26,3173  54474 1          RANGE80

3120          26,3174  77624 1  INITWMX6 CALL
3121  REF  2   LAST  587  26,3175  55214 0          WINIT      INITIALIZE W-MATRIX
3122          26,3176  45014 0          SET      CALL
3123  REF  16  LAST  594  26,3177  01474 1          VINTFLAG
3124  REF  6   LAST  586  26,3200  26644 0          SETIFLGS
3125          26,3201  77624 1          CALL
3126  REF  7   LAST  594  26,3202  55205 0          INTGRCAL
3127          26,3203  77650 1          GOTO
3128  REF  3   LAST  594  26,3204  54474 1          RANGE80

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R3129 THIS ROUTINE CLEARS RFINAL (DP) AND CALLS INTEGRV

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3130          26,3205  71220 1  INTGRCAL STQ  DLOAD
3131  REF  1   LAST  580  26,3206  03673 0          IGRET
3132  REF  6   LAST  580  26,3207  03753 0          MKTIME
3133  REF  17  LAST  581  26,3210  34041 0          STCALL  IDECI
3134  REF  8   LAST  512  26,3211  27134 1          INTFGRV
3135          26,3212  77650 1          GOTO
3136  REF  2   LAST  594  26,3213  03673 0          IGRET

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R3137 THIS ROUTINE INITIALIZES THE W-MATRIX BY ZEROING ALL W THEN SETTING
R3138 DIAGONAL ELEMENTS TO INITIAL STORED VALUES.

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3139  REF  4   LAST  142  E5,1400          EBANK= W

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3140				26,3214	77776 1	WLIMIT	EXIT		
3141	REF	1		26,3215	3 3274 0		CAF	WBANK	
3142	REF	16	LAST 590	26,3216	54 006 0		TS	BBANK	
3143	REF	1		26,3217	3 3402 1		CAF	WSIZE	
3144	REF	2	LAST 123	26,3220	55'257 1		TS	W.IND	
3145	REF	123	LAST 587	26,3221	3 4755 1		CAF	ZERO	
3146	REF	3	LAST 595	26,3222	51'257 0		INDEX	W.IND	
3147	REF	5	LAST 594	26,3223	55'400 0		TS	W	
3148	REF	4	LAST 595	26,3224	11'257 1		CCS	W.IND	
3149				26,3225	0 3220 1		TC	-5	
3150	REF	2	LAST 590	26,3226	3 3275 1		CAF	AIBANK	RESTORE EBANK 7
3151	REF	17	LAST 595	26,3227	54 006 0		TS	BBANK	
3152	REF	50	LAST 590	26,3230	0 6036 1		TC	INTPRET	
3153				26,3231	67214 1		BON	SLOAD	IF ON LUNAR SURFACE, INITIALIZE WITH
3154	REF	9	LAST 590	26,3232	04307 1			SURFFLAG	WSURFPOS AND WSURFVEL INSTEAD OF
3155	REF	1		26,3233	55237 1			WLSRFPOS	WRENDPOS AND WRENDVEL
3156	REF	2	LAST 133	26,3234	02001 1			WRENDPOS	
3157				26,3235	77650 1		GOTO		
3158	REF	1		26,3236	55241 0			WPOSTORE	
3159				26,3237	77735 0	WLSRFPOS	SLOAD		
3160	REF	1		26,3240	02007 1			WSURFPOS	
3161				26,3241	77661 0	WPOSTORE	SR		SHIFT TO B-19 SCALE
3162				26,3242	20606 0			5	
3163	REF	6	LAST 595	26,3243	02401 0		STORE	W	
3164	REF	7	LAST 595	26,3244	02411 1		STORE	W +8D	
3165	REF	8	LAST 595	26,3245	02421 1		STORF	W +16D	
3166				26,3246	67214 1		BON	SLOAD	
3167	REF	10	LAST 595	26,3247	04307 1			SURFFLAG	
3168	REF	1		26,3250	55254 1			WLSRFVEL	
3169	REF	1		26,3251	02002 1			WRENDVEL	
3170				26,3252	77650 1		GOTO		
3171	REF	1		26,3253	55256 0			WVELSTOR	
3172				26,3254	77735 0	WLSRFVEL	SLOAD		
3173	REF	1		26,3255	02010 1			WSURFVEL	
3174	REF	9	LAST 595	26,3256	02511 0	WVELSTOR	STORE	W +72D	
3175	REF	10	LAST 595	26,3257	02521 0		STORE	W +80D	
3176	REF	11	LAST 595	26,3260	02531 1		STORE	W +88D	
3177				26,3261	77735 0		SLOAD		
3178	REF	1		26,3262	02003 0			WSHAFT	
3179	REF	12	LAST 595	26,3263	02621 0		STORE	W +144D	
3180				26,3264	77735 0		SLOAD		
3181	REF	1		26,3265	02004 1			WTRUN	
3182	REF	13	LAST 595	26,3266	02631 1		STORE	W +152D	
3183				26,3267	66214 0		SET	SSP	SET RENDWFLG - W-MATRIX VALID
3184	REF	8	LAST 587	26,3270	02476 0			RENDWFLG	
3185	REF	4	LAST 594	26,3271	03461 1			MARKCTR	SET MARK COUNTER EQUAL ZERO
3186				26,3272	00000 1			0	
3187				26,3273	77616 0		RVQ		
3188	REF	14	LAST 595	E5,1400			EBANK=	W	

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3189	REF	3	LAST	594	26,3274	54065 0	WBANK	8BCON	WLIMIT
3190	REF	7	LAST	590	E7,1455			EBANK=	AIG
3191	REF	2	LAST	518	26,3275	54067 1	AIBANK	BBCON	LSR22.3

R3192 GETULC

R3193 THIS SUBROUTINE COMPUTES THE RELATIVE POSITION VECTOR BETWEEN THE CSM
 R3194 AND THE LM, LEAVING THE UNIT VECTOR IN THE PUSHLIST AND MPAC AND THE
 R3195 MAGNITUDE IN 36D.

3196					26,3276	77201 1	GETULC	SETPD	VLOAD	
3197					26,3277	00001 0			0	
3198	REF	1			26,3300	01645 1			DELTALEM	
3199					26,3301	77754 1		LXA,2		
3200	REF	3	LAST	587	26,3302	03716 1			SCALSHFT	LOAD X2 WITH SCALE SHIFT
3201					26,3303	53257 1		VSR*	VAD	
3202					26,3304	57165 1			9D,2	SHIFT FOR EARTH/MOON SPHERE
3203	REF	2	LAST	510	26,3305	01661 1			RCVLEM	
3204					26,3306	53715 1		PDVL	VSR*	
3205	REF	1			26,3307	01573 1			DELTACSM	
3206					26,3310	57165 1			9D,2	SHIFT FOR EARTH/MOON SPHERE
3207					26,3311	52255 1		VAD	VSU	
3208	REF	1			26,3312	01607 1			RCVCSM	
3209					26,3313	41434 1		RTB	PUSH	USE NORMUNIT TO PRESERVE ACCURACY
3210	REF	1			26,3314	21676 0			NORMUNX1	
3211	REF	7	LAST	592	26,3315	17722 0		STODL	ULC	
3212					26,3316	00045 0			36D	
3213					26,3317	77657 0		SL*		ADJUST MAGNITUDE FROM NORMUNIT
3214					26,3320	20201 0			0,1	
3215					26,3321	24045 0		STOVL	36D	ULC IN PDO AND MPAC,RLC IN 36D
3216	REF	8	LAST	596	26,3322	03722 0			ULC	
3217					26,3323	77616 0		RVQ		

R3219 RADARANG

R3220 THIS SUBROUTINE COMPUTES SIN THETA = -ULC DOT MY
 R3221 RXZ = (SQRT (1-SIN THETA**2))RLC
 R3222 OUTPUT
 R3223 ULC IN ULC, PDO
 R3224 RLC IN PD36D
 R3225 SIN THETA IN SIN THETA AND PD6
 R3226 RXZ NORM IN RXZ (N IN X1)

3227					26,3324	45020 1	RADARANG	STQ	CALL	
3228	REF	2	LAST	160	26,3325	03673 0			RDRET	
3229	REF	3	LAST	588	26,3326	55276 1			GFTULC	
3230					26,3327	50276 1		VCOMP	DOT	
3231	REF	5	LAST	592	26,3330	03703 0			MY	
3232					26,3331	41572 1		SLIR	PUSH	SIN THETA TO PD6
3233	REF	3	LAST	593	26,3332	03730 0		STORE	SIN THETA	
3234					26,3333	44316 0		DSQ	8DSU	
3235	REF	3	LAST	365	26,3334	06414 0			DP1/4TH	1 - (SIN THETA)**2

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3236				26,3335	41366 1	SQRT	DMP	
3237				26,3336	00045 0		36D	
3238				26,3337	60352 0	SL1	NORM	
3239	REF	4	LAST	588	26,3340		X1	SET SHIFT COUNTER IN X1
3240	REF	10	LAST	593	26,3341		PXZ	
3241					26,3342	GOTO		EXIT
3242	REF	3	LAST	596	26,3343		RDRFT	
3243					26,3344	LGCUPDTE STQ	CALL	
3244	REF	3	LAST	160	26,3345		LGRET	
3245	REF	1			26,3346		INCORP1	
3246					26,3347	VLOAD	ABVAL	
3247	REF	3	LAST	141	26,3350		DELTAX +6	
3248					26,3351	LXA,2	SPR*	
3249	REF	4	LAST	596	26,3352		SCAL SHFT	0-MOON. 2-EARTH
3250					26,3353		2,2	SET VEL DISPLAY TO B-7
3251	REF	3	LAST	329	26,3354	STOVL	R22DISP +2	
3252	REF	4	LAST	597	26,3355		DELTAX	
3253					26,3356	ABVAL	SRP*	
3254					26,3357		2,2	SET POS DISPLAY TO B-29
3255	RFF	4	LAST	597	26,3360	STORE	R22DISP	
3256					26,3361	SLOAD	SR	
3257	REF	1			26,3362		RMAX	
3258					26,3363		10D	
3259					26,3364	DSU	BMN	
3260	REF	5	LAST	597	26,3365		R22DISP	
3261	RFF	1			26,3366		R22LFM96	GO DISPLAY
3262					26,3367	SLOAD	DSU	
3263	REF	1			26,3370		VMAX	
3264	REF	6	LAST	597	26,3371		R22DISP +2	VMAX MINUS VEL. DEVIATION
3265					26,3372	BMN		
3266	REF	2	LAST	597	26,3373		R22LFM96	GO DISPLAY
3267					26,3374	ASTOK	CALL	
3268	REF	1			26,3375		INCORP2	
3269					26,3376	GOTO		
3270	REF	4	LAST	597	26,3377		LGRET	
3271					26,3400	IMUVAR	E-6 B12	RAD**2
3271					26,3401			
3273					26,3402	WSIZE	DEC	161
3274					26,3403	2PI/B	2DEC	3.141592653 B-2
3274					26,3404			
3275	REF	29	LAST	586	E7,1454	EBANK=	LOSCOUNT	

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P3276 PROGRAM NAME LRS24.1 RR SEARCH ROUTINE
 R3277 MCO NC 0 BY P VOLANTE SDC DATE 1-15-67

R3278 FUNCTIONAL DESCRIPTION

R3279 ORIVES THE RENDEZVOUS RADAR IN A HEXAGONAL SEARCH PATTERN ABOUT THE LOS TO THE CSM (COMPUTED FROM THE CSM AND LM
 R3281 STATE VECTORS) CHECKING FOR THE DATA GOOD DISCRETE AND MONITORING THE ANGLE BETWEEN THE RADAR BORESIGHT AND THE
 R3283 LM +Z AXIS. IF THIS ANGLE EXCEEDS 30 DEGREES THE PREFERRED TRACKING ATTITUDE ROUTINE IS CALLED TO PERFORM AN
 R3285 ATTITUDE MANEUVER.

R3286 CALLING SEQUENCE - BANKCALL FOR LRS24.1

R3287 SUBROUTINES CALLED

R3288 LEMCNIC R61LEM
 R3289 CSMCNIC RROESSM
 R3290 JOBOELAY FLAGDOWN
 R3291 WAITLIST FLAGUP
 R3292 RRNB BANKCALL

R3293 EXIT - TO ENDOFJOB WHEN THE SEARCH FLAG (SRCHOPT) IS NOT SET

R3294 OUTPUT

R3295 CATAGOOD (SP)-FOR DISPLAY IN R1- 00000 INDICATES NO LOCKON
 R3296 11111 INDICATES LOCKON ACHIEVED
 R3297 OMEGAD (SP)-FOR DISPLAY IN R2- ANGLE BETWEEN RR BORESIGHT VECTOR AND THE SPACECRAFT +Z AXIS

R3299 ERASABLE INITIALIZATION REQUIRED
 R3300 SEARCH FLAG MUST BE SET
 R3301 LM AND CSM STATE VECTORS AND REFSMMAT MATRIX
 R3302 DEBRIS

R3303 FLMSRCH UXVECT
 R3304 VXRLM UYVECT
 R3305 LOSCESRD NSRCHPNT
 R3306 CATAGOOD OMEGAD
 R3307 MPAC PUSHLIST

3308	REF	1							COUNT* \$\$/LRS24
3309	REF	124	LAST	595	26,3405	3 4755	1	LRS24.1	CAF ZFRO
3310	REF	2	LAST	159	26,3406	55.734	1		TS NSRCHPNT
3311	REF	57	LAST	562	26,3407	3 4736	1	CHKSrch	CAF BIT14
3312					26,3410	0 0006	1		EXTEND

SET SEARCH PATTERN POINT COUNTER TO ZERO
 ISSUE AUTO TRACK ENABLE TO RADAR

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3313	REF	38	LAST	573	26,3411	05 012 1	WOR	CHAN12		
3314	REF	1			26,3412	3 4736 1	CAF	SRCH08IT	CHECK IF SEARCH STILL REQUESTED	
3315	REF	9	LAST	563	26,3413	7 0076 1	MASK	FLAGWRD2	(SRCHOPT FLAG SET)	
3316					26,3414	0 0006 1	EXTEND			
3317	REF	90	LAST	563	26,3415	1 5155 1	BZF	ENDOFJOB	NO-TERMINATE JOB	
3322	REF	1			26,3416	3 3655 1	CAF	6SECONDS	SCHEDULE TASK TO DRIVE RADAR TO NEXT PT.	
3323					26,3417	0 0004 0	INHINT			
3324	REF	24	LAST	572	26,3420	0 5203 0	TC	WAITLIST	IN 6 SECONDS	
3325	REF	30	LAST	597	F7,1454		E8ANK=	LDSCCUNT		
3326	REF	3	LAST	526	26,3421	03605 1	2CADR	CALLDGCH		
3326					26,3422	54067 1				
3327					26,3423	0 0003 1	RELINT			
3328	REF	96	LAST	580	26,3424	4 0110 0	CS	RADMODES	IS REMODE IN PROGRESS	
3329	REF	58	LAST	598	26,3425	7 4736 0	MASK	8IT14	(8IT 14 RADMODES = 1)	
3330					26,3426	0 0006 1	EXTEND			
3331	REF	91	LAST	599	26,3427	1 5155 1	BZF	ENDOFJOB	YES- WAIT SIX SECONDS	
3332	REF	51	LAST	595	26,3430	0 6036 1	TC	INTPRET		
3333					26,3431	77634 0	RT8			
3334	REF	11	LAST	529	26,3432	21462 1		LOADTIME		
3335	REF	18	LAST	594	26,3433	34041 0	LRS24.11	STCALL	TDEC1	
3336	REF	4	LAST	576	26,3434	27100 0		LEMCONIC	EXTRAPOLATE LM STATE VECTOR	
3337					26,3435	77775 1	VLOAD			
3338	REF	7	LAST	576	26,3436	00001 0		RATT		
3339	REF	3	LAST	160	26,3437	27674 1	STOVL	RLMSRCH	SAVE LEM POSITION	
3340	REF	3	LAST	576	26,3440	00007 0		VATT		
3341	REF	1			26,3441	17736 0	STODL	SAVLEMV	SAVE LEM VELOCITY	
3342	REF	6	LAST	576	26,3442	00015 0		TAT		
3343	REF	19	LAST	599	26,3443	34041 0	STCALL	TDEC1	EXTRAPOLATE CSM STATE VECTOR	
3344	REF	3	LAST	576	26,3444	27066 1		CSMCONIC	EXTRAPOLATE CSM STATE VECTOR	
3345					26,3445	52375 1	VLOAD	VSU	LOS VECTOR = R(CSM)-R(LM)	
3346	REF	8	LAST	599	26,3446	00001 0		RATT		
3347	REF	4	LAST	599	26,3447	03674 1		RLMSRCH		
3348					26,3450	77656 1	UNIT			
3349	REF	2	LAST	159	26,3451	27710 1	STOVL	LDSDSRD	STORE DESIRED LOS	
3350	REF	4	LAST	599	26,3452	00007 0		VATT	COMPUTE UNIT(V(CM) CROSS R(CM))	
3351					26,3453	47256 0	UNIT	VXV		
3352	REF	9	LAST	599	26,3454	00001 0		RATT		
3353					26,3455	77656 1	UNIT			
3354	REF	2	LAST	159	26,3456	03702 1	STORE	VXRCM		
3355					26,3457	52375 1	VLOAD	VSU		
3356	REF	5	LAST	599	26,3460	00007 0		VATT		
3357	REF	2	LAST	599	26,3461	03736 0		SAVLEMV		
3358					26,3462	76521 0	MXV	VSL1	CONVERT FROM REFERENCE TO STABLE MEMBER	
3359	REF	13	LAST	591	26,3463	01734 0		REFSMAT		
3360	REF	3	LAST	599	26,3464	03736 0	STORE	SAVLMV	VLC = V(CSM) - V(LM)	
3361					26,3465	53135 0	SLOAD	BZF	CHECK IF N=0	
3362	REF	3	LAST	598	26,3466	03735 0		NSRCHPNT		

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3363	REF	1		26,3467	55600	1		DESGLOS	YES-DESIGNATE ALONG LOS
3364				26,3470	53025	0	DSU	BZE	IS N=1
3365	REF	1		26,3471	15653	0		ONFOCT	YES-CALCULATE X AND Y AXES OF
3366	REF	1		26,3472	55565	1		CALCXY	SEARCH PATTERN COORDINATE SYSTEM
3367				26,3473	77775	1	VLOAD		NO-ROTATE X-Y AXES TO NEXT SEARCH POINT
3368	REF	2	LAST	159	26,3474	03716	1	UXVECT	
3369	REF	1			26,3475	24015	0	STOVL	UXVECTPR
3370	REF	2	LAST	159	26,3476	03724	0	UYVECT	SAVE ORIGINAL X AND Y VECTORS
3371	REF	1			26,3477	00023	0	STORE	UXPRIME = ORIGINAL UX
3372					26,3500	77761	1	VXSC	UYPRIME = ORIGINAL UY
3373	REF	1			26,3501	15647	0		SIN60DEG
3374	REF	3	LAST	600	26,3502	27716	1	STOVL	UXVECT
3375	REF	2	LAST	600	26,3503	00015	0		UXVFCTPR
3376					26,3504	53361	0	VXSC	VAD
3377	REF	1			26,3505	06422	0		COS60DEG
3378	REF	4	LAST	600	26,3506	03716	1		UXVFCT
3379					26,3507	77656	1	UNIT	
3380	REF	5	LAST	600	26,3510	27716	1	STOVL	UXVECT
3381	REF	3	LAST	600	26,3511	00015	0		UXVFCTPR
3382					26,3512	77761	1	VXSC	UY=(-SIN60)UXPR +(COS 60)UYPR
3383	REF	2	LAST	600	26,3513	15647	0		SIN60DEG
3384	REF	3	LAST	600	26,3514	27724	0	STOVL	UYVECT
3385	REF	2	LAST	600	26,3515	00023	0		UYVECTPR
3386					26,3516	52361	1	VXSC	VSU
3387	REF	2	LAST	600	26,3517	06422	0		COS60DEG
3388	REF	4	LAST	600	26,3520	03724	0		UYVFCT
3389					26,3521	77656	1	UNIT	
3390	REF	5	LAST	600	26,3522	03724	0	STORE	UYVECT
3391					26,3523	53361	0	OFFCALC	VAD
3392	REF	1			26,3524	15651	1		OFFSTFAC
3393	REF	3	LAST	599	26,3525	03710	1		LOSDESRO
3394					26,3526	64256	1	UNIT	MXV
3395	REF	14	LAST	599	26,3527	01734	0		REFSMAT
3396					26,3530	77772	0	VSLI	CONVERT TO STABLE MEMBER COORDINATES
3397	REF	13	LAST	582	26,3531	25102	0	CONTDSE	STOVL
3398	REF	4	LAST	599	26,3532	03736	0		RRTARGET
3399	REF	5	LAST	576	26,3533	01761	0	STORE	SAVLEMV
3400					26,3534	77776	1	EXIT	LCSVEL
3401					26,3535	0 0004	0	INHINT	
3402	REF	5	LAST	576	26,3536	0 6027	1	TC	KILL TASK
3403	REF	4	LAST	576	26,3537	52602	1	CADR	DESLCOP +2
A3404									POINT IN THE PATTERN
3409	REF	33	LAST	543	26,3540	4 4735	0	CONTDSE2	CS
3410	REF	97	LAST	599	26,3541	7 0110	0		BIT15
3411	REF	34	LAST	600	26,3542	6 4735	1	MASK	RADMODES
3412	REF	98	LAST	600	26,3543	54 110	0	AD	BIT15
3414	REF	52	LAST	599	26,3544	0 6036	1	TS	RADMODES
								TC	INTPRFT
3415					26,3545	77624	1	CALL	
3416	REF	2	LAST	521	26,3546	52373	1		RDESSM
									DESIGNATE RADAR TO RRTARGET VECTOR

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3417 26,3547 77776 1
 3418 REF 1 26,3550 0 3637 0
 3419 REF 2 LAST 601 26,3551 0 3637 0

EXIT
 TC L1MALARM
 TC L1MALARM

LOS NOT IN MODE 2 COVERAGE (P22)
 VEHICLE MANEUVER REQUIRED (P20)

A3420

COMPUTE OMEGA, ANGLE BETWEEN RR LOS AND
 SPACECRAFT +Z AXIS

A3421

3422 26,3552 0 0006 1 OMEGALC EXTEND
 3424 REF 10 LAST 580 26,3553 3 0036 1 DCA CDUT
 3425 REF 11 LAST 581 26,3554 53'751 1 DXCH TANGNB
 3427 REF 53 LAST 600 26,3555 0 6036 1 TC INTPRET
 3428 26,3556 77624 1 CALL
 3429 REF 4 LAST 581 26,3557 46041 0 RRNB
 3430 26,3560 65545 0 DLOAD ACOS
 3431 26,3561 00045 0 36D
 3432 REF 3 LAST 159 26,3562 03733 0 STORE OMEGDISP
 3433 26,3563 77776 1 EXIT
 3434 REF 92 LAST 599 26,3564 0 5155 0 TC ENDOFJOB

OMEGA IS ARCCOSINE OF Z-COMPONENT OF
 VECTOR COMPUTED BY RRNB (LEFT AT 32D)
 STORE FOR DISPLAY IN R2

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P3435 CALCULATE X AND Y VECTORS FOR SEARCH PATTERN COORDINATE SYSTEM

3436					26,3565	47375 0	CALCXY	VLOAD	VXV		
3437	REF	3	LAST	599	26,3566	03702 1			VXPCM		
3438	REF	4	LAST	600	26,3567	03710 1			LOSDSRD		
3439					26,3570	77656 1		UNIT			
3440	REF	6	LAST	600	26,3571	27716 1		STOVL	UXVECT	UX = (VLM X RLM) X LOS	
3441	REF	5	LAST	602	26,3572	03710 1			LOSDSRD		
3442					26,3573	53435 0		VXV	UNIT		
3443	REF	7	LAST	602	26,3574	03716 1			UXVECT		
3444	REF	6	LAST	600	26,3575	03724 0		STORE	UYVECT	UY = LOS X UX	
3445					26,3576	77650 1		GOTO			
3446	REF	1			26,3577	55523 0			OFFCALC		
3447					26,3600	64375 1	DESGLOS	VLOAD	MXV	WHEN N= 0, DESIGNATE ALONG LOS	
3448	REF	6	LAST	602	26,3601	03710 1			LOSDSRD		
3449	REF	15	LAST	600	26,3602	01734 0			REFSMAT	CONVERT LOS FROM REFERENCE TO SM COORDS	
3450					26,3603	52172 1		VSL1	GOTO		
3451	REF	1			26,3604	55531 0			CONTDESG		
3452	REF	23	LAST	562	26,3605	30 074 1	CALLDGCH	CAE	FLAGWRDO	IS RENDEZVOUS FLAG SET	
3453	REF	11	LAST	562	26,3606	7 4745 1		MASK	RNDVZBIT		
3454					26,3607	0 0006 1		EXTEND			
3455	REF	24	LAST	541	26,3610	1 5261 0		BZF	TASKOVER	NO-EXIT R24	
3456	REF	2	LAST	502	26,3611	3 7712 1		CAF	PRIQ25	YES -SCHEDULE JOB TO DRIVE RADAR TO NEXT	
3457	REF	22	LAST	557	26,3612	0 5105 0		TC	FINDVAC	POINT IN SEARCH PATTERN	
3458	REF	5	LAST	599	E7,1673			EBANK=	RLMSRCH		
3459	REF	1			26,3613	03616 0		2CADR	DATGDPCHK		
3459	REF	1			26,3614	54067 1					
3460	REF	25	LAST	602	26,3615	0 5261 1		TC	TASKOVER		
3461	REF	27	LAST	568	26,3616	3 4750 1	DATGDCHK	CAF	BIT4		
3462					26,3617	0 0006 1		EXTEND		CHECK IF DATA GOOD DISCRETE PRESENT	
3463	REF	19	LAST	580	26,3620	02 033 0		RAND	CHAN33		
3464					26,3621	0 0006 1		EXTEND			
3465	REF	1			26,3622	1 3631 1		BZF	STORE15	YES- GO TO STORE 11111 FOR DISPLAY IN R1	
3466	REF	14	LAST	446	26,3623	4 6241 1		CS	SIX		
3467	REF	4	LAST	599	26,3624	6 1734 0		AD	NSRCHPNT	IS N GREATER THAN 6	
3468					26,3625	0 0006 1		EXTEND			
3469	REF	2	LAST	526	26,3626	1 3405 1		BZF	LRS24.1	YES - RESET N = 0 AND START AROUND AGAIN	
3470	REF	5	LAST	602	26,3627	25'734 0		INCR	NSRCHPNT	NO-SET N = N+1 AN GO TO	
3471	REF	1			26,3630	1 3407 0		TCF	CHKSRCH	NEXT POINT IN PATTERN	
3472	REF	1			26,3631	3 3645 0	STORE15	CAF	ALL15	STORE 11111 FOR DISPLAY IN R1	
3473	REF	5	LAST	525	26,3632	55'731 1		TS	DATAGOOD		

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3474				26,3633	0 0004 0	INHINT		
3475	REF	6	LAST	600	26,3634	0 6027 1	TC	KILLTASK
3476	REF	5	LAST	600	26,3635	52602 1	CADR	DESLOOP +2
3477	REF	93	LAST	601	26,3636	0 5155 0	TC	ENDOFJOB
3478	REF	26	LAST	567	26,3637	0 5567 0	LIMALARM	TC
3479					26,3640	00527 1	OCT	527
3480					26,3641	0 0004 0	INHINT	
3481	REF	7	LAST	603	26,3642	0 6027 1	TC	KILLTASK
3482	REF	4	LAST	599	26,3643	55605 1	CADR	CALDGCH
3483	REF	94	LAST	603	26,3644	0 5155 0	TC	ENDOFJOB

DELETE DESIGNATE TASK FROM
WAITLIST USING KILLTASK

ISSUE ALARM 527-LOS NOT IN MODE2
COVERAGE IN P22 OR VEHICLE MANEUVER
REQUIRED IN P20
KILL WAITLIST CALL FOR NEXT
POINT IN SEARCH PATTERN

3484				26,3645	25547 0	ALLIS	DEC	11111	
3485				26,3646	33555 1	SIN60DEG	2DEC	.86603	
3486	REF	7	LAST	375	23,2421				
3487					0014	COS60DEG =	DPHALF		(2DEC .50)
3488					0022	UXVECTPR	EQUALS	12D	PREVIOUS
3489					0014	UYVECTPR	EQUALS	18D	
3490					26,3650	01642 0	RLMUNIT	EQUALS	12D
3490					26,3651	11045 0	OFFSTEAC	2DEC	0.05678
3491					26,3652	00001 0			
3492					26,3653	00000 1	ONEOCT	OCT	00001
3492					26,3654	00454 1	3SECONDS	2DEC	300
A3493									**** NOTE-THESE TWO CONSTANTS MUST ****
A3494									**** BE IN THIS ORDER BECAUSE ****
3495					26,3655	01130 1	6SECONDS	DEC	600
3496					26,3656	00062 0	DEC50	DEC	50

**** ONEOCT NEEDS A LOWER ORDER ****
**** WORD OF ZEROES ****

R3498 TEST PROGRAM FOR LSR22.3 --- TO BE REMOVED
R3499 *****

3500				27,2156		BANK	27
3501	REF	8	LAST	596	E7,1455	EBANK=	AIG
3502	REF	1				COUNT*	\$/RTEST
3503	REF	125	LAST	598	27,2156	3 4755 1	TEST22.3
3504	REF	3	LAST	329	27,2157	55'122 0	CAF
3505	REF	54	LAST	601	27,2160	0 6036 1	TS
3506					27,2161	70744 1	LONG
3507	REF	4	LAST	603	27,2162	01122 1	LOOP22.3
3508	REF	1			27,2163	62370 1	TC
3509	REF	9	LAST	603	27,2164	03456 0	INTPRET
3510					27,2165	77743 1	LXC,2
3511	REF	2	LAST	603	27,2166	62367 1	DLOAD*
3512	REF	3	LAST	590	27,2167	03457 1	LONG
3513					27,2170	77743 1	JOBOVER +1,2
							STORE
							AIG
							DLOAD*
							JOBOVER +2,2
							STORE
							AMG
							DLOAD*

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3514	REF	3	LAST	603	27,2171	62365 0			JOB OVER +4,2
3515	REE	7	LAST	594	27,2172	03753 0		STORE	MKTIME
3516					27,2173	77743 1		DLOAD*	
3517	REE	4	LAST	604	27,2174	62363 0			JOB OVER +6,2
3518	RFE	5	LAST	588	27,2175	03755 0		STORE	RM
3519					27,2176	77743 1		DLOAD*	
3520	REE	5	LAST	604	27,2177	62361 1			JOB OVER +80,2
3521	REE	4	LAST	589	27,2200	03747 0		STORE	RDOTM
3522					27,2201	77743 1		DLOAD*	
3523	REE	6	LAST	604	27,2202	62357 1			JOB OVER +100,2
3524	REE	4	LAST	591	27,2203	03734 1		STORE	RRSHAET
3525					27,2204	77743 1		DLOAD*	
3526	REE	7	LAST	604	27,2205	62355 0			JOB OVER +120,2
3527	REE	4	LAST	593	27,2206	03732 1		STORE	RRTRUN
3528					27,2207	77624 1		CALL	
3529	REE	3	LAST	596	27,2210	54370 1			LSR22.3
3530					27,2211	77776 1	22.3ENT	EXIT	
3531	REF	5	LAST	603	27,2212	3 1122 1		CA	LONG
3532	REF	1			27,2213	6 2222 1		AD	DEC13T
3533	REF	6	LAST	604	27,2214	55'122 0		TS	LJNG
3534	REE	7	LAST	604	27,2215	11'123 1		CCS	LONG +1
3535					27,2216	0 2220 0		TC	+2
3536	REF	201	LAST	582	27,2217	3 0000 1	STOP22.3	CA	A
3537	REF	8	LAST	604	27,2220	55'123 1		TS	LONG +1
3538	REE	1			27,2221	0 2160 1		TC	LOOP22.3
3539					27,2222	00015 0	DEC13T	DEC	I3
3540	REE	3	LAST	602	26,3405		JOB OVER	EQUALS	LSR24.1 **** TEMPORARY DEEINITIION *****
R3541	END OF TEST PROGRAM								
R3542	*****								
3543	REE	3	LAST	499	23,2423		ZERO/SP	EQUALS	H16ZEROS
3544					4616			BLOCK	32
3545	REE	3	LAST	239	6000			SETLOC	EFTAG5
3546					6022			BANK	
3547	REF	1						COUNT*	\$\$/P20
3548					6022	0 0006 1	GOTOV56	EXTEND	P20 TERMINATES BY GOTOV56 INSTEAD OF
3549	REF	1			6023	3 6026 0		DCA	VB56CADR
3550	REE	4	LAST	470	6024	1 5165 1		TCF	SUPDXCHZ
3551	REE	5	LAST	498	E7,1467			EBANK=	WHOCARES
3552	REE	2	LAST	277	6025	03034 0	VB56CADR	2CADR	TRMTRACK
3552					6026	66107 1			

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P3553 PRDGRAM NAME: R29 (RENDEZVDUS RADAR DESIGNATE DURING POWERED FLIGHT)
R3554 MCD NC. 2 BY H. BLAIR-SMITH JULY 2, 1968.

R3555 FUNCTIONAL DESCRIPTION:

R3556 DESIGNATES THE RENDEZVDUS RADAR TOWARD THE COMPUTED LOS TO THE CSM, WITH THE CHIEF OBJECTIVE OF OBTAINING RANGE
R3558 AND RANGE RATE DATA AT 2-SECOND INTERVALS FOR TRANSMISSION TO THE GROUND. WHEN THE RP IS WITHIN .5 DEGREE OF
R3560 THE COMPUTED LOS, TRACKING IS ENABLED, AND DESIGNATION CONTINUES UNTIL THE DATA-GOOD DISCRETE IS RECEIVED. AT
R3562 THAT POINT, DESIGNATION CEASES AND A RADAR-READING ROUTINE TAKES OVER, PREPARING A CONSISTENT SET OF DATA FOR
R3564 DOWN TELEMETRY. THE SET INCLUDES RANGE, RANGE RATE, MARK TIME, TWO RR CDU ANGLES, THREE IMUCDU ANGLES, AND AN
R3566 INDICATOR WHICH IS 1 WHEN THE SET IS CONSISTENT AND 0 OTHERWISE. THE INDICATOR IS IN TRKMKCNT.

R3578 CALLING SEQUENCE: BEGUN EVERY 2 SECONDS AS AN INTEGRAL PART OF SERVICER

R3579 SUBROUTINES CALLED:

R3580 REMDDE RRONLY
R3581 UNIT MPACVBUF
R3582 QUICTRIG AX*SR*F
R3583 SPSIN SPCDS
R3584 SETRRECR RRDU
R3585 RRRDDT RRRANGE

R3586 EXIT: TO NOR29NOW, IN SERVICER.

R3587 OUTPUT: (ALL FOR DDWNLINK)

R3588	RM	RDDTM	{RAW}
R3589	AIG	AMG	
R3590	ACG	TRKMKCNT	TRKMKCNT = 00001 IF SET IS CONSISTENT,
R3591	TANGNB	TANGNB +1	OTHERWISE TRKMKCNT = 00000.
R3592	MKTIME		

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P3593 ERASABLE INITIALIZATION REQUIRED:

R3594 NCR29FLG READRFLG (TO 1 AND 0 BY FRESH START) (RESET NOR29FLG TO LET SERVICER RUN R29)
R3596 PIPTIME RADMODES (BIT 10) (BIT SET TO 0 BY FRESH START)
R3597 R(CSM) V(CSM)
R3598 R V (PIPTIME THRU V BY AVE G IN SERVICER)

R3599 DEBRIS:

R3600 RADMODES (BIT 10)
R3601 LOSSM LCSVDI/4 (= RRTARGET & LOSVEL)
R3602 SAVECDUT OLDESFLG (SAVECDUT = MLOSV)
R3603 LOSCMFLG READRFLG

R3604 ALARMS: NCNE.

R3605 COMPONENT JOBS AND TASKS:

R3606 INITIALIZING, IF RR IS FOUND TO BE IN MODE 1: JOB R29REMOJ AND TASK REMODE; ALWAYS: TASK PREPOS29.
R3608 DESIGNATING: TASK BEGDES29 & JOB R29DDDES.
R3609 RADAR READING: TASK R29READ AND JOB R29RDJOB. ALL JOBS ARE NOVAC TYPE.

3610			33,2045	BANK 33
3611	REF	1	33,2000	SETLOC R29/SERV
3612			33,2045	BANK

3613	REF	1		COUNT* \$\$/R29
------	-----	---	--	-----------------

3614	REF	2	LAST 401 5014	NR29&RDR EQUALS EBANK5
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P3615 SERVICER COMES TO R29 FROM "R29?" IF NOR29FLG, READRFLG, RRREMOOE, RRCOUZRO, RRREPOS, AND DISPLAY-INERTIAL-DATA
 R3617 ARE ALL RESET, AND THE RR IS IN LGC MODE (OFTEN CONFUSINGLY CALLED AUTO MODE).

3619	REF	99	LAST	600	33,2045	4 0110 0	R29	CS	RAOMCOES	
3620	REF	35	LAST	562	33,2046	7 4742 0		MASK	BIT10	
3621					33,2047	0 0006 1		EXTEND		
3622	REF	1			33,2050	1 2123 1		BZF	R29.LDS	BRANCH IF OESIGNATION IS ALREADY ON.
3623					33,2051	0 0004 0		INHINT		
3624	REF	100	LAST	607	33,2052	26 110 0		AOS	RAOMCOES	SHOW THAT OESIGNATION IS NOW ON.
3625	REF	59	LAST	599	33,2053	4 4736 0		CS	BIT14	
3626					33,2054	0 0006 1		EXTEND		
3627	REF	39	LAST	599	33,2055	03 012 1		WANO	CHAN12	REMOVE RR TRACK ENABLE DISCRETE.
3628	REF	2	LAST	563	33,2056	4 4740 1		CS	LOSCMBIT	
3629	REF	10	LAST	599	33,2057	7 0076 1		MASK	FLAGWPO2	
3630	REF	11	LAST	607	33,2060	54 076 1		TS	FLAGWRD2	CLEAR LOSCMFLG TO SHOW OES. LOOP IS OFF.
3631	REF	1			33,2061	4 4753 0		CS	OLDESBIT	
3632	REF	40	LAST	562	33,2062	7 0074 0		MASK	STATE	
3633	REF	41	LAST	607	33,2063	54 074 0		TS	STATE	SHOW THAT OES. LOOP IS NOT REQUESTED.
3634	REF	143	LAST	587	33,2064	0 4616 1		TC	BANKCALL	
3635	REF	3	LAST	551	33,2065	52156 1		CAOR	SETRRECR	ENABLE RR ERROR COUNTERS.
3636	REF	33	LAST	561	33,2066	3 4740 0		CA	BIT12	
3637	REF	101	LAST	607	33,2067	7 0110 0		MASK	RADMODES	
3638	REF	202	LAST	604	33,2070	10 000 0		CCS	A	TEST RR MODE BIT.
3639	REF	1			33,2071	1 2104 1		TCF	SETPRPOS	MODE 2.
3640	REF	2	LAST	341	33,2072	3 5031 0		CA	PRIO21	MODE 1; MUST REMOOE.
3641	REF	11	LAST	518	33,2073	0 5072 1		TC	NOVAC	
3642	REF	31	LAST	599	E7,1454			EBANK=	LOSCOUNT	
3643	REF	1			33,2074	02113 0		2CAOR	R29REMOJ	NEEOS OWN JOB TO RADSTALL IN.
3643	REF	1			33,2075	66067 0				
3644	REF	36	LAST	607	33,2076	4 4742 0		CS	BIT10	
3645	REF	102	LAST	607	33,2077	7 0110 0		MASK	RAOMCOES	CLEAR OESIGNATE FLAG IN RADMOOES
3646	REF	103	LAST	607	33,2100	54 110 0		TS	RAOMCOES	BEFORE CALLING REMODE
3647	REF	60	LAST	607	33,2101	3 4736 1		CA	BIT14	
3648	REF	104	LAST	607	33,2102	26 110 0		ADS	RADMODES	SHOW THAT REMOOING IS ON.
3649	REF	1			33,2103	1 2623 0		TCF	NOR29NOW	CONTINUE SERVICER FUNCTIONS.
3650	REF	73	LAST	572	33,2104	3 4753 1	SETPRPOS	CA	ONE	
3651	REF	25	LAST	599	33,2105	0 5203 0		TC	WAITLIST	
3652	REF	32	LAST	607	E7,1454			EBANK=	LOSCOUNT	
3653	REF	1			33,2106	03601 0		2CADR	PREPCS29	TASK TO SET TRUNNION ANGLE TO -180 DEG.
3653	REF	1			33,2107	52067 1				
3654	REF	27	LAST	568	33,2110	3 4741 1		CA	BIT11	
3655	REF	105	LAST	607	33,2111	26 110 0		ADS	RAOMCOES	SHOW THAT REPOSITIONING IS ON.
3656	REF	2	LAST	607	33,2112	1 2623 0		TCF	NOR29NOW	

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P3657 FORCE RENDEZVOUS RADAR INTO MODE 2.

3658	REF	74	LAST	607	33,2113	3 4753 1	R29REMOJ	CA	ONE	
3659	REF	26	LAST	607	33,2114	0 5203 0		TC	WAITLIST	
3660	REF	33	LAST	607	E7,1454			EBANK=	LOSCOUNT	
3661	REF	2	LAST	557	33,2115	02171 1		2CADR	REMODE	REMODE MUST RUN AS A TASK.
3661					33,2116	52067 1				
3662	REF	144	LAST	607	33,2117	0 4616 1		TC	BANKCALL	WAIT FOR END OF REMODING.
3663	REF	10	LAST	581	33,2120	17667 0		CADR	RADSTALL	
3664	REF	95	LAST	603	33,2121	1 5155 1		TCF	ENDOFJOB	BAD EXIT CAN'T HAPPEN.
3665	REF	96	LAST	608	33,2122	1 5155 1		TCF	ENDOFJOB	

R3666 TASK TO PREPOSITION THE RR TRUNNION ANGLE TO -180 DEG.

3667	REF	1			25,2000			SETLOC	R29S1	
3668					25,3601			BANK		
3669	REF	2	LAST	380	25,3601	3 4735 1	PREPOS29	CA	NEGMAX	-180 DEG.
3670	REF	5	LAST	543	25,3602	0 2241 1		TC	RRONLY	DRIVE TRUNNION CDU.
3671	*REF	1			25,3603	4 4741 0		CS	REPOSBIT	SHOW THAT REPOSITIONING IS OFF.
3672	*REF	106	LAST	607	25,3604	7 0110 0		MASK	RADMODES	
36725	*REF	107	LAST	608	25,3605	54 110 0		TS	RADMODES	
3673	REF	26	LAST	602	25,3606	1 5261 0		TCF	TASKVER	

R3674 COMPUTE LINE-OF-SIGHT AND LOS VELOCITY, AND PASS THEM TO THE R29DODES LOOP.

3676	REF	1			33,2045			SETLOC	R29	
3677					33,2123			BANK		
3678					33,2123	0 0006 1	R29.LOS	EXTEND		
3679	REF	4	LAST	349	33,2124	4 1235 0		DCS	PIPTIME	
3680	REF	242	LAST	584	33,2125	52 155 1		DXCH	MPAC	
3681					33,2126	0 0006 1		EXTEND		
3682	REF	16	LAST	580	33,2127	3 0025 0		DCA	TIME2	
3683	REF	243	LAST	608	33,2130	20 155 1		DAS	MPAC	(MPAC) = T-PIPTIME, SCALED B-28.
3684	REF	4	LAST	349	33,2131	54 163 1		TS	MODE	SET MODE TO DOUBLE PRECISION.
3685	REF	244	LAST	608	33,2132	3 0155 0		CA	MPAC +1	
3686					33,2133	0 0006 1		EXTEND		
3687	REF	34	LAST	607	33,2134	7 4740 1		MP	BIT12	
3688	REF	245	LAST	608	33,2135	52 155 1		DXCH	MPAC	T-PIPTIME NOW SCALED B-17.
3689	REF	55	LAST	603	33,2136	0 6036 1		TC	INTPRET	

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P3690 LOSCMFLG=0 MEANS THAT THE DESIGNATION IS READY FOR NEW DATA. SETTING LOSCMFLG MAKES IT GO AWAY SO SETUP290 CAN
 R3692 START IT UP WHEN THE DATA IS IN PLACE.

3693				33,2137	52315 1	PDVL	VSU	PUSH DOWN T-PIPTIME.
3694	REF	1		33,2140	01726 0		V(CSM)	
3695	REF	2	LAST	33,2141	03525 0		V	LOSVEL = V(CSM) - V.
3696				33,2142	74325 0	PDDL	VXSC	SWAP LOSVEL FOR T-PIPTIME, MULTIPLY THEM
3697				33,2143	52255 1	VAD	VSU	AND ADD THE RESULT TO R(CSM) - R TO GET
3698	REF	1		33,2144	01720 0		R(CSM)	AN UP-TO-DATE LOS VECTOR IN SM AXES.
3699	REF	4	LAST	33,2145	03517 1		R	
3700				33,2146	77414 0	BOFSET	EXIT	(BOFSET DOES ITS THING INHINTED.)
3701	REF	8	LAST	33,2147	01043 1		LOSCMFLG	IF DESIGNATE LOOP IS OFF, CHANGE LOSCM-
3702	REF	1		33,2150	66152 1		SETUP29D	FLG TO ON AND GO TO SET UP NEW DATA.
3703	REF	3	LAST	33,2151	1 2623 0	TCF	NOR29NOW	IF OES. LOOP IS ON, LET IT USE OLD DATA.
3704	REF	1		33,2152	25102 0	SETUP29D	STOVL	LINE-OF-SIGHT VECTOR, STABLE MEMBER AXES
3705				33,2153	00001 0		0	
3706				33,2154	77761 1		VXSC	
3707	REF	1		33,2155	26177 1		.5SECB17	
3708	REF	1		33,2156	01761 0	STORE	LOSVD1/4	1/2 SECOND'S WORTH OF LOS VELOCITY.
3709				33,2157	77414 0	CLEAR	EXIT	
3710	REF	9	LAST	33,2160	01263 1		LOSCMFLG	LET R29DLOOP USE NEW DATA.
3711	REF	42	LAST	33,2161	4 0074 0	CS	STATE	
3712	REF	2	LAST	33,2162	7 4753 0	MASK	OLDESBIT	
3713				33,2163	0 0006 1	EXTEND		
3714	REF	4	LAST	33,2164	1 2623 0	BZF	NOR29NOW	BRANCH IF R29 DES. LOOP IS REQUESTED.
3715				33,2165	0 0004 0	INHINT		
3716	REF	43	LAST	33,2166	26 074 0	ADS	STATE	OTHERWISE REQUEST IT NOW.
3717	REF	1		33,2167	11'056 1	CCS	PIPCTR	SEE IF TASK SHOULD BE OFFSET ONE SECOND.
3718	REF	1		33,2170	4 4776 1	CS	SUPER110	-96D +100D = 4.
3719	REF	4	LAST	33,2171	6 4777 1	AD	1SEC	0 +100D = 100D.
3720	REF	27	LAST	33,2172	0 5203 0	TC	WAITLIST	
3721	REF	34	LAST	E7,1454		EBANK=	LOSCCOUNT	
3722	REF	1		33,2173	03253 0	2CADR	BEGDES29	START BEGDES29 TASK ASAP.
3722	REF	1		33,2174	50067 0			
3723	*REF	5	LAST	33,2175	1 2623 0	TCF	NOR29NOW	RELINT AND CONTINUE SERVICER FUNCTIONS.
3724				33,2176	00006 1	.5SECB17	2DEC	50 B-17
3724				33,2177	10000 0			

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P3725 R29 DESIGNATE JOB AND TASK MACHINERY. TASK RECURS EVERY .5 SEC UNTIL DESIGNATE IS CALLED OFF; IT MAY WAIT FOR A
 R3727 CENTISECOND OR TWO IF IT COMES UP WHILE SETUP29D IS SUPPLYING NEW DATA.

3728				24,3253				BANK	24		
3729	REF	6	LAST	583	24,2000			SETLOC	P20S		
3730					24,3253			BANK			
3731	REF	1						COUNT*	\$/R29		
3732	REF	3	LAST	607	24,3253	3 5031	0	BEGDES29	CAF	PRI021	
3733	REF	12	LAST	607	24,3254	0 5072	1		TC	NOVAC	
3734	REF	2	LAST	609	E3,1760				EBANK=	LJSVDT/4	
3735	REF	1			24,3255	02545	1		2CADR	R29D0DES	START R29D0DES JOB TWICE A SECOND.
3735	REF	1			24,3256	64063	0				
3736	REF	2	LAST	526	24,3257	3 4774	1	R29DLOOP	CAF	.5SEC	
3737	REF	4	LAST	573	24,3260	0 5224	0		TC	VARDELAY	
3738	REF	108	LAST	608	24,3261	4 0110	0		CS	RADM0DES	
3739	REF	37	LAST	607	24,3262	7 4742	0		MASK	BIT10	
3740	REF	203	LAST	607	24,3263	10 000	0		CCS	A	
3741	REF	27	LAST	608	24,3264	1 5261	0		TCF	TASKOVER	QUIT IF DESIGNATION IS CALLED OFF.
3742	REF	12	LAST	607	24,3265	4 0076	1		CS	FLAGWRD2	
3743	REF	3	LAST	607	24,3266	7 4740	1		MASK	LOSCMBIT	
3744					24,3267	0 0006	1		EXTEND		
3745					24,3270	1 3273	0		BZF	+3	BRANCH IF SETUP29D'S SUPPLYING NEW DATA.
3746	REF	13	LAST	610	24,3271	26 076	1		ADS	FLAGWRD2	SET LOSCMFLG: SHOW THAT DES. LOOP IS ON.
3747	REF	2	LAST	609	24,3272	1 3253	1		TCF	BEGDES29	
3748	REF	75	LAST	608	24,3273	3 4753	1		CA	ONE	
3749	REF	1			24,3274	1 3260	1		TCF	R29DLOOP +1	WAIT A CENTISECOND FOR NEW DATA.

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P3750 R29DODES: RR DESIGNATION LOOP FOR R29

R3751 THIS ROUTINE DOES MUCH THE SAME THING AS DODES, BUT A GREAT DEAL FASTER. IT TAKES THE NON-UNITIZED LOS VECTOR,
 R3753 IN STABLE MEMBER COORDINATES (LOSSM) AND A DELTA-LOS IN SM AXES (LOSVD/4) WHICH IS 1/2 SEC TIMES LOS VELOCITY,
 R3755 AND DEVELOPS THE SHAFT AND TRUNNION COMMANDS USING SINGLE PRECISION AS MUCH AS POSSIBLE, AND INTERPRETIVE NOT AT
 R3757 ALL. THE UNIT(LOSSM + LOSVEL * 1 SEC) IS COMPUTED IN DP AND TRANSFORMED TO NAV BASE COORDINATES IN DOUBLE PRE-
 R3759CISION (USING SP SINES AND COSINES OF CDU ANGLES), AND THE REST IS DONE IN SP.

R3761 THE FUNCTIONAL DIFFERENCE IS THAT R29DODES ALWAYS CLEARS LOSCMFLG WHEN IT ENDS, AND IT STARTS UP THE R29READ
 R3763 TASK WHEN LOCK-ON IS ACHIEVED.

3764				32,2545				BANK	32			
3765	REF	2	LAST	55	32,2000			SETLOC	F2DPS*32			
3766					32,2545			BANK				
3767	REF	1						COUNT*	\$/R29			
3768	REF	3	LAST	610	E3,1760			EBANK=	LOSVD/4			
3769	REF	76	LAST	610	32,2545	3 4753	1	R29DODES	CA	ONE		
3770	REF	25	LAST	581	32,2546	55'107	1		TS	TANG		INDICATE 1ST PASS THRU VECTOR LOOP.
3771	REF	12	LAST	564	32,2547	3 4756	1		CA	FIVE		
3772	REF	204	LAST	610	32,2550	10 000	0	R29DV8EG	CCS	A		COUNT DOWN BY TWOS IN VECTOR LOOP.
3773	REF	168	LAST	571	32,2551	54 002	1		TS	Q		
3774	REF	26	LAST	611	32,2552	11'107	1		CCS	TANG		
3775	REF	1			32,2553	1 2561	0		TCE	R29DPAS1		DO THIS ON 1ST PASS THRU LOOP.
3776					32,2554	0 0006	1		EXTEND			(A "PASS" HERE MEANS 3 TIMES AROUND).
3777	REF	169	LAST	611	32,2555	5 0002	0		INDEX	Q		
3778	REF	4	LAST	611	32,2556	3 1761	0		DCA	LOSVD/4		
3779	REF	170	LAST	611	32,2557	50 002	0		INDEX	Q		
3780	REF	2	LAST	609	32,2560	21'102	1		DAS	LOSSM		ADVANCE LOS VECTOR 1/2 SECOND.
3781					32,2561	0 0006	1	R29DPAS1	EXTEND			
3782	REF	171	LAST	611	32,2562	5 0002	0		INDEX	Q		
3783	REF	3	LAST	611	32,2563	3 1102	0		DCA	LOSSM		
3784	REF	172	LAST	611	32,2564	50 002	0		INDEX	Q		MOVE CURRENT LOS (1ST PASS) OR LOS PRO-
3785	REF	246	LAST	608	32,2565	52 156	1		DXCH	MPAC +1		JECTED 1/2 SEC AHEAD (2ND PASS).
3786	REF	27	LAST	611	32,2566	11'107	1		CCS	TANG		
3787	REF	1			32,2567	1 2575	0		TCF	R29DVEND		BUG OUT HERE IN 1ST PASS.
3788					32,2570	0 0006	1		EXTEND			
3789	REF	173	LAST	611	32,2571	5 0002	0		INDEX	Q		
3790	REF	5	LAST	611	32,2572	3 1761	0		DCA	LOSVD/4		
3791	REF	174	LAST	611	32,2573	50 002	0		INDEX	Q		
3792	REF	247	LAST	611	32,2574	20 156	1		DAS	MPAC +1		PROJECT LOS 1 SECOND AHEAD (2ND PASS).
3793	REF	175	LAST	611	32,2575	10 002	1	R29DVEND	CCS	Q		
3794	REF	1			32,2576	1 2550	1		TCF	R29DV8EG		BRANCH TO CONTINUE VECTOR LOOP.

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P3795 UNITIZE AND TRANSFORM TO NAV BASE AXES THE PRESENT LOS (1ST PASS) OR THE 1-SEC PROJECTED LOS (2ND PASS).

3797	REF	248	LAST	611	32,2577	52 156 1	DXCH	MPAC +1	
3798	REF	249	LAST	612	32,2600	52 155 1	DXCH	MPAC	
3799	REF	1			32,2601	3 2770 0	CA	R29FXLOC	= ADRES INTB15+ -34D
3800	REF	18	LAST	369	32,2602	54 120 0	TS	FIXLOC	
3801	REF	1			32,2603	0 4713 0	TC	USPRCADR	WITH FIXLOC ARMED FOR LENGTH AND LENGTH
3802	REF	1			32,2604	01023 1	CADR	UNIT	SQUARED, BORROW UNITIZING ROUTINE.
3803	REF	1			32,2605	0 7531 1	TC	MPACVBUF	MOVE UNIT(LOS) TO AX*SR*T ARG AREA.
3804	REF	28	LAST	611	32,2606	11*107 1	CCS	TANG	
3805					32,2607	1 2611 1	TCF	+2	
3806	REF	1			32,2610	1 2625 0	TCF	GOTANGLS	GET CDU ANGLES ONLY AFTER 1ST PASS.
3807					32,2611	0 0004 0	INHINT		ENSURE CONSISTENT CDU READINGS.
3808					32,2612	0 0006 1	EXTEND		
3809	REF	11	LAST	601	32,2613	3 0036 1	DCA	CDUT	
3810	REF	1			32,2614	53*767 1	DXCH	SAVECDUT	TRUNNION AND SHAFT ANGLES.
3811	REF	3	LAST	580	32,2615	3 0033 1	CA	CDUY	
3812	REF	16	LAST	590	32,2616	54 766 1	TS	CDUSPOT	
3813	REF	6	LAST	370	32,2617	3 0034 0	CA	CDUZ	
3814	REF	17	LAST	612	32,2620	54 770 0	TS	CDUSPOT +2	
3815	REF	11	LAST	580	32,2621	3 0032 0	CA	CDUX	
3816	REF	18	LAST	612	32,2622	54 772 1	TS	CDUSPOT +4	CDU ANGLES IN FUNNY ORDER FOR AX*SR*T.
3817	REF	145	LAST	608	32,2623	0 4616 1	TC	BANKCALL	
3818	REF	1			32,2624	47521 1	CADR	QUICTRIG	GET SINES AND COSINES OF CDU ANGLES.
3819	REF	19	LAST	574	32,2625	4 6244 1	GOTANGLS CS	THREE	
3820	REF	146	LAST	612	32,2626	0 4616 1	TC	BANKCALL	
3821	REF	1			32,2627	47601 0	CADR	AX*SR*T	TRANSFORM UNIT LOS TO NB AXES (ULOSNB).
3822	REF	29	LAST	612	32,2630	11*107 1	CCS	TANG	
3823					32,2631	1 2633 1	TCF	+2	
3824	REF	1			32,2632	1 2676 0	TCF	R29DPAS2	GO TO RR COMMAND COMP. AFTER 2ND PASS.

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P3825 COMPUTE COSINE OF THE ANGLE BETWEEN THE PRESENT LOS AND THE RR BORESIGHT VECTOR, AND SET THE SELFTRACK ENABLE IF
 R3827 THE CCSINE IS APPROXIMATELY COS(1.5 DEG) OR GREATER (I.E. SMALLER ANGLE).

3828	REF	30	LAST	612	32,2633	55'107 1	TS	TANG	INDICATE 2ND PASS THRU VECTOR LOOP.
3829	REF	2	LAST	612	32,2634	3 1766 1	CA	SAVECDUT	
3830	REF	3	LAST	204	32,2635	0 5032 0	TC	SPCOS	
3831	REF	2	LAST	267	32,2636	54 166 1	TS	PUSHLOC	PUSHLOC = COS T.
3832	REF	3	LAST	613	32,2637	4 1766 0	CS	SAVECDUT	
3833	REF	3	LAST	203	32,2640	0 5033 1	TC	SPSIN	
3834	REF	5	LAST	608	32,2641	54 163 1	TS	MODE	MODE = -SIN T.
3835					32,2642	0 0006 1	EXTEND		
3836	REF	26	LAST	348	32,2643	7 0124 1	MP	VBUF +2	FORM - SIN T ULOSNB.
3837	REF	250	LAST	612	32,2644	52 155 1	DXCH	MPAC	
3838	REF	4	LAST	613	32,2645	3 1767 0	CA	SAVECDUT +1	
3839	REF	4	LAST	613	32,2646	0 5033 1	TC	SPSIN	
3840	REF	5	LAST	613	32,2647	55'766 0	TS	SAVECDUT	SAVECDUT NOW = SIN S.
3841					32,2650	0 0006 1	EXTEND		
3842	REF	3	LAST	613	32,2651	7 0166 1	MP	PUSHLOC	
3843					32,2652	0 0006 1	EXTEND		
3844	REF	27	LAST	613	32,2653	7 0122 1	MP	VBUF	FORM SIN S COS T ULOSNBX.
3845	REF	251	LAST	613	32,2654	20 155 1	DAS	MPAC	
3846	REF	6	LAST	613	32,2655	3 1767 0	CA	SAVECDUT +1	
3847	REF	4	LAST	613	32,2656	0 5032 0	TC	SPCOS	
3848	REF	7	LAST	613	32,2657	55'767 1	TS	SAVECDUT +1	SAVECDUT +1 NOW = COS S .
3849					32,2660	0 0006 1	EXTEND		
3850	REF	4	LAST	613	32,2661	7 0166 1	MP	PUSHLOC	
3851					32,2662	0 0006 1	EXTEND		
3852	REF	28	LAST	613	32,2663	7 0126 0	MP	VBUF +4	FORM COS S COS T ULOSNBZ.
3853	REF	252	LAST	613	32,2664	20 155 1	DAS	MPAC	COS(ERROR) = ULOSNB . (SIN S COS T,
3854					32,2665	0 0006 1	EXTEND		- SIN T, COS S COS T).
3855	REF	253	LAST	613	32,2666	3 0155 0	DCA	MPAC	
3856	REF	254	LAST	613	32,2667	20 155 1	DAS	MPAC	(ULOSNB IN VBUF WAS A HALF-UNIT VECTOR).
3857	REF	205	LAST	611	32,2670	10 000 0	CCS	A	TEST FOR + OVERFLOW, NONE, OR MINUS.
3858	REF	61	LAST	607	32,2671	3 4736 1	CA	BIT14	
3859					32,2672	12 673 0	NOOP		
3860					32,2673	0 0006 1	EXTEND		
3861	REF	40	LAST	607	32,2674	05 012 1	WOR	CHAN12	IF PLUS OVERFLOW, SET SELFTRACK ENABLE.
3862	REF	2	LAST	611	32,2675	1 2547 1	TCF	R29DVBEG -1	MAKE 2ND PASS THRU VECTOR LOOP.

TESTCOS

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P3863 COMPUTE SHAFT AND TRUNNION COMMANDS TO NULL HALF THE ERROR IN HALF A SECOND.

3865	REF	8	LAST	613	32,2676	3 1767 0	R29DPAS2	CA	SAVECOUT +1	
3866					32,2677	0 0006 1		EXTEND		
3867	REF	29	LAST	613	32,2700	7 0122 1		MP	VBUF	FORM COS S ULOSNB'X.
3868	REF	31	LAST	613	32,2701	53'110 1		DXCH	TANG	
3869	REF	9	LAST	614	32,2702	4 1766 0		CS	SAVECOUT	
3870					32,2703	0 0006 1		EXTEND		
3871	REF	30	LAST	614	32,2704	7 0126 0		MP	VBUF +4	FORM - SIN S ULOSNB'Z.
3872	REF	32	LAST	614	32,2705	21'110 1		OAS	TANG	RAW SHAFT CMD = ULOSNB' . (COS S, 0,
3873	REF	6	LAST	613	32,2706	4 0163 1		CS	MODE	- SIN S)
3874					32,2707	0 0006 1		EXTEND		
3875	REF	10	LAST	614	32,2710	7 1766 0		MP	SAVECOUT	
3876					32,2711	0 0006 1		EXTEND		
3877	REF	31	LAST	614	32,2712	7 0122 1		MP	VBUF	FORM SIN T SIN S ULOSNB'X.
3878	REF	255	LAST	613	32,2713	52 155 1		DXCH	MPAC	
3879	REF	5	LAST	613	32,2714	3 0166 0		CA	PUSHLOC	
3880					32,2715	0 0006 1		EXTEND		
3881	REF	32	LAST	614	32,2716	7 0124 1		MP	VBUF +2	FORM COS T ULOSNB'Y.
3882	REF	256	LAST	614	32,2717	20 155 1		DAS	MPAC	
3883	REF	7	LAST	614	32,2720	4 0163 1		CS	MODE	
3884					32,2721	0 0006 1		EXTEND		
3885	REF	11	LAST	614	32,2722	7 1767 1		MP	SAVECOUT +1	
3886					32,2723	0 0006 1		EXTEND		
3887	REF	33	LAST	614	32,2724	7 0126 0		MP	VBUF +4	FORM SIN T COS S ULOSNB'Z.
3888	REF	257	LAST	614	32,2725	20 155 1		DAS	MPAC	RAW TRUNNION CMD = ULOSNB' .
3889	REF	258	LAST	614	32,2726	3 0154 1		CA	MPAC	(SIN S SIN T, COS T, SIN S COS T).
3890					32,2727	0 0006 1		EXTEND		
3891	REF	1			32,2730	7 2771 0		MP	RR29GAIN	
3892	REF	33	LAST	614	32,2731	57'107 0		XCH	TANG	STORE REFINED T CMD, GET RAW S CMD.
3893					32,2732	0 0006 1		EXTEND		
3894	REF	2	LAST	614	32,2733	7 2771 0		MP	RR29GAIN	
3895	REF	34	LAST	614	32,2734	55'110 1		TS	TANG +1	STORE REFINED S CMD.

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P3896 WHETHER OR NOT TRACKING WAS ENABLED THIS TIME, CHECK ON RR DATA-GOOD. IF PRESENT, STOP DESIGNATING AND START
 R3898 READING DATA FROM THE RENDEZVOUS RADAR.

3899	REF	28	LAST	602	32,2735	3 4750 1	DGOOD?	CAF	BIT4	
3900					32,2736	0 0006 1		EXTEND		
3901	REF	20	LAST	602	32,2737	02 033 0		RAND	CHAN33	GET RR DATA-GOOD BIT.
3902					32,2740	0 0004 0		INHINT		(MAINLY FOR RROUT).
3903					32,2741	0 0006 1		EXTEND		
3904	REF	1			32,2742	1 2746 1		BZF	R29LOKON	BRANCH IF DATA-GOOD IS PRESENT.
3905	REF	147	LAST	612	32,2743	0 4616 1		TC	BANKCALL	
3906	REF	3	LAST	563	32,2744	52306 0		CADR	RRCUT	DATA-GOOD IS ABSENT, SO SEND COMMANDS.
3907	REF	1			32,2745	1 2764 1		TCF	END29DOD	
3908	REF	38	LAST	610	32,2746	4 4742 0	R29LOKON	CS	BIT10	
3909	REF	109	LAST	610	32,2747	7 0110 0		MASK	RADMODES	
3910	REF	110	LAST	615	32,2750	54 110 0		TS	RADMODES	SHOW THAT DESIGNATION IS OVER.
3911	REF	38	LAST	582	32,2751	4 4752 1		CS	BIT2	
3912					32,2752	0 0006 1		EXTEND		
3913	REF	41	LAST	613	32,2753	03 012 1		WAND	CHAN12	DISABLE RR ERROR COUNTERS.
3914	REF	2	LAST	234	32,2754	3 4743 0		CA	READRBIT	
3915	REF	11	LAST	566	32,2755	26 077 0		ADS	FLAGWRD3	SHOW THAT READING HAS BEEN REQUESTED.
3916	REF	2	LAST	609	32,2756	11 056 1		CCS	PIPCTR	SEE IF TASK SHOULD BE OFFSET 1 SEC.
3917	REF	2	LAST	609	32,2757	4 4776 1		CS	SUPER110	- 960 + 1000 = 4.
3918	REF	5	LAST	609	32,2760	6 4777 1		AD	1SEC	0 + 1000 = 1000.
3919	REF	28	LAST	609	32,2761	0 5203 0		TC	WAITLIST	
3920	REF	35	LAST	609	E7,1454			FRANK=	LOSCCUNT	
3921	REF	1			32,2762	03275 1		2CADR	R29READ	START READING TASK AND JOB.
3921	REF	1			32,2763	50067 0				
3922	REF	4	LAST	610	32,2764	4 4740 1	END29DOD	CS	LOSCMBIT	
3923	REF	14	LAST	610	32,2765	7 0076 1		MASK	FLAGWRD2	
3924	REF	15	LAST	615	32,2766	54 076 1		TS	FLAGWRD2	ALWAYS CLEAR LOSCMFLG.
3925	REF	97	LAST	608	32,2767	1 5155 1		TCF	ENDOFJOB	
3926	REF	4	LAST	112	32,2770	00052 0	R29FXLOC	ADRES	INTB15+ -34D	
3927					32,2771	56655 1	RR29GAIN	DEC	- .53624	
3928	REF	6	LAST	600	E3,1760		LOSVDI/4	EQUALS	LOSVEL	
3929	REF	14	LAST	600	1101		LOSSM	EQUALS	RRTARGET	
3930	REF	6	LAST	577	E3,1766		SAVECDUT	EQUALS	MLOS V	

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P3931 RR READING IS SET UP BY R29D0DES WHEN IT DETECTS RR LOCK-ON.

3932					24,3275				BANK	24		
3933	REF	7	LAST	610	24,2000				SETLOC	P20S		
3934					24,3275				BANK			
3935	REF	2	LAST	610 TO	611:	18	18*		COUNT*	\$/P29		
3936	REF	36	LAST	615	E7,1454				EBANK=	LCSCCUNT		
3937	REF	9	LAST	557	24,3275	3	7713	0	R29READ	CAF	PRIQ26	CALLED BY WAITLIST.
3938	REF	13	LAST	610	24,3276	0	5072	1		TC	NOVAC	
3939	REF	37	LAST	616	E7,1454				FBANK=	LOSCCUNT		
3940	REF	1			24,3277		03310	0	2CADR	R29RDJOB		START JOB TO READ AND DOWNLINK FOR R29.
3940	REF	1			24,3300		50067	0				
3941	REF	4	LAST	573	24,3301	3	5000	1	CA	2SECS		
3942	REF	5	LAST	610	24,3302	0	5224	0	TC	VARDELAY		
3943	REF	12	LAST	615	24,3303	3	0077	1	CA	FLAGWRD3		2 SECONDS LATER, SEE IF READING IS STILL
3944	REF	3	LAST	615	24,3304	7	4743	1	MASK	READRBIT		ALLOWED (NO TRACKER FAIL ETC.)
3945	REF	206	LAST	613	24,3305	10	000	0	CCS	A		
3946	REF	2	LAST	615	24,3306	1	3275	0	TCF	R29READ		IT'S OK; CALL IT AGAIN.
3947	REF	28	LAST	610	24,3307	1	5261	0	TCF	TASKOVER		IT AIN'T; WAIT FOR REDESIGNATE.
3948	REF	13	LAST	616	24,3310	3	0077	1	R29RDJOB	CA	FLAGWRD3	CALLED VIA NOVAC.
3949	REF	3	LAST	295	24,3311	7	4741	0	MASK	NR29FBIT		
3950	REF	207	LAST	616	24,3312	10	000	0	CCS	A		TEST "NOR29FLG".
3951	REF	1			24,3313	1	3372	0	TCF	ENDRRD29		R29 IS NOW OVER, STOP AT ONCE.
3952	REF	111	LAST	615	24,3314	3	0110	1	CA	RADMODES		
3953	REF	39	LAST	615	24,3315	7	4752	1	MASK	BIT2		
3954	REF	208	LAST	616	24,3316	10	000	0	CCS	A		TEST RR-NOT-IN-AUTO-MODE BIT.
3955	REF	2	LAST	616	24,3317	1	3372	0	TCF	ENDRRD29		ASTRO TOOK RR OUT OF AUTO MODE.
3956	REF	148	LAST	615	24,3320	0	4616	1	TC	BANKCALL		
3957	REF	4	LAST	580	24,3321		53103	0	CADR	RRRDOT		INITIATE READING OF RANGE RATE.
3958	REF	149	LAST	616	24,3322	0	4616	1	TC	BANKCALL		
3959	REF	11	LAST	608	24,3323		17667	0	CADR	RADSTALL		GO TO SLEEP UNTIL IT'S READY.
3960	REF	3	LAST	616	24,3324	1	3372	0	TCF	ENDRRD29		BAD READ; REDESIGNATE.

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P3961 R29 RADAR READING CONTINUED.

3962	RFF	7	LAST	580	24,3325	53'106 0		DXCH	TIMEHOLD	
3963	REF	259	LAST	614	24,3326	52 155 1		DXCH	MPAC	TIME OF RR READING, FOR DOWNLINK.
3964					24,3327	0 0004 0		INHINT		BE SURE OF 5 CONSISTENT CDU ANGLES.
3965					24,3330	0 0006 1		EXTEND		
3966	REF	12	LAST	612	24,3331	3 0036 1		DCA	CDUT	
3967	REF	260	LAST	617	24,3332	52 157 0		DXCH	MPAC +2	RRCDU ANGLES AT RR READ, FOR DOWNLINK.
3968					24,3333	0 0006 1		EXTEND		
3969	REF	4	LAST	612	24,3334	3 0034 0		DCA	CDUY	
3970	REF	261	LAST	617	24,3335	52 161 0		DXCH	MPAC +4	MPAC'S 7 WORDS ARE BUFFER FOR COPYCYCLE.
3971	REF	12	LAST	612	24,3336	3 0032 0		CA	CDUX	
3972	REF	262	LAST	617	24,3337	54 162 0		TS	MPAC +6	IMUCDU ANGLES AT RR READ, FOR DOWNLINK.
<hr/>										
3973	REF	150	LAST	616	24,3340	0 4616 1	R29RANGE	TC	BANKCALL	
3974	REF	3	LAST	581	24,3341	53105 0		CADR	RRPANGE	INITIATE READING OF RR RANGE.
3975	REF	151	LAST	617	24,3342	0 4616 1		TC	BANKCALL	
3976	REF	12	LAST	616	24,3343	17667 0		CADR	RADSTALL	GO TO SLEEP UNTIL IT'S READY.
3977	REF	1			24,3344	1 3363 0		TCF	R29RRR?	BAD READ OR SCALE CHANGE ... WHICH?
<hr/>										
3978					24,3345	0 0004 0		INHINT		
3979	REF	6	LAST	566	24,3346	53'334 0		DXCH	DNRRANGE	COPYCYCLE TO LAY OUT NEW R29 DOWNLINK.
3980	REF	6	LAST	604	24,3347	53'755 0		DXCH	RM	
3981	RFF	263	LAST	617	24,3350	52 155 1		DXCH	MPAC	
3982	REF	8	LAST	604	24,3351	53'753 0		DXCH	MKTIME	
3983	REF	264	LAST	617	24,3352	52 157 0		DXCH	MPAC +2	
3984	RFF	12	LAST	601	24,3353	53'751 1		DXCH	TANGNB	
3985	REF	265	LAST	617	24,3354	52 161 0		DXCH	MPAC +4	
3986	REF	10	LAST	603	24,3355	53'456 0		DXCH	AIG	
3987	REF	266	LAST	617	24,3356	3 0162 1		CA	MPAC +6	
3988	REF	6	LAST	590	24,3357	55'457 1		TS	ACG	
3989	REF	77	LAST	611	24,3360	3 4753 1		CA	ONE	
3990	REF	4	LAST	329	24,3361	55'460 0		TS	TRMKMCNT	SHOW THAT DOWNLINK DATA IS CONSISTENT.
3991	REF	98	LAST	615	24,3362	1 5155 1		TCF	ENDOFJOB	
<hr/>										
3992	REF	16	LAST	582	24,3363	4 0101 0	R29RRR?	CS	FLAGWRD5	
3993	REF	39	LAST	615	24,3364	7 4742 0		MASK	RIT10	
3994	REF	209	LAST	616	24,3365	10 000 0		CCS	A	WAS IT A SCALE CHANGE (REAL OR PHONY)?
3995	REF	4	LAST	616	24,3366	1 3372 0		TCF	ENDRRD29	NO, A BAD READ; REDESIGNATE.
3996	REF	47	LAST	580	24,3367	0 5516 0		TC	DOWNFLAG	
3997	REF	3	LAST	580	24,3370	00120 1		ADRES	RNGSCFLG	
3998	REF	1			24,3371	1 3340 1		TCF	R29RANGE	YES; CLEAR FLAG AND READ AGAIN.
<hr/>										
3999	RFF	126	LAST	603	24,3372	3 4755 1	ENDRRD29	CA	ZERO	TROUBLE MADE US COME HERE TO LEAVE THE
4000	REF	5	LAST	617	24,3373	55'460 0		TS	TRMKMCNT	RR-READING MODE. DISCREDIT DOWTEL.
4001	REF	48	LAST	617	24,3374	0 5516 0		TC	DOWNFLAG	
4002	REF	1			24,3375	00063 1		ADRES	READRFLG	
4003	REF	62	LAST	613	24,3376	4 4736 0		CS	BIT14	
4004					24,3377	0 0006 1		EXTEND		

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4005	REF	42	LAST	615	24,3400	03 012 1
4006	REF	99	LAST	617	24,3401	1 5155 1

WAND	CHAN12
TCF	ENDOFJOB

REMOVE TRACK-ENABLE DISCRETE.

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P4007 W-MATRIX MCNITOR

4008 31,2011 BANK 31
 4009 REF 1 31,2000 SETLOC VB67
 4010 31,2011 BANK
 4011 REF 1 COUNT* \$\$/EXTVP

40115 REF 3 LAST 332 E4,1604 EBANK= WWPOS

4012 REF 56 LAST 608 31,2011 0 6036 1 V67CALL TC INTPRET
 4013 31,2012 77624 1 CALL
 4014 REF 1 31,2013 62114 1 V67WW

4015 31,2014 77776 1 EXIT
 40151 31,2015 0 0006 1 EXTEND
 40152 REF 4 LAST 619 31,2016 3 1605 0 DCA WWPOS

SAVE THE PRESENT N99 VALUES FOR
 COMPARISON AFTER THE DISPLAY

40153 RFF 2 LAST 332 31,2017 53'611 1 DXCH WWVFL +2
 40154 31,2020 0 0006 1 EXTEND

40155 REF 3 LAST 619 31,2021 3 1607 1 DCA WWVEL
 40156 REF 4 LAST 619 31,2022 53'613 0 DXCH WWVFL +4

4016 REF 1 31,2023 3 2171 1 V06N99DS CAF V06N99
 4017 REF 152 LAST 617 31,2024 0 4616 1 TC BANKCALL

4018 REF 4 LAST 310 31,2025 20231 0 CADR GOXDSPFR
 4019 REF 33 LAST 500 31,2026 1 5472 1 TCF ENDEXT

4020 31,2027 1 2034 0 TCF +5
 4021 REF 1 31,2030 1 2023 0 TCF V06N99DS

4022 REF 31 LAST 580 31,2031 3 4751 0 CAF BIT3
 4023 REF 9 LAST 501 31,2032 0 5464 1 TC BLANKET

4024 RFF 100 LAST 618 31,2033 0 5155 0 TC FNDOFJOB
 40245 31,2034 22 007 0 +5 ZL

4025 REF 20 LAST 612 31,2035 3 6244 0 CA THREE
 40251 REF 176 LAST 611 31,2036 54 002 1 N99LOOP TS 0

40252 REF 177 LAST 619 31,2037 50 002 0 INDEX 0
 40253 REF 5 LAST 619 31,2040 4 1604 0 CS WWPOS

402535 REF 178 LAST 619 31,2041 50 002 0 INDEX 0
 40254 REF 6 LAST 619 31,2042 6 1610 1 AD WWPOS +4

402545 REF 88 LAST 580 31,2043 26 001 1 ADS L
 40255 REF 179 LAST 619 31,2044 10 002 1 CCS 0

THE SUM OF ALL DIFFERENCES MUST BE ZERO.

402555 REF 1 31,2045 1 2036 1 TCF N99LOOP
 40256 RFF 210 LAST 617 31,2046 22 000 1 LXCH A

40257 31,2047 0 0006 1 EXTEND
 40258 REF 1 31,2050 1 2053 1 BZF V06N9933

4026 REF 28 LAST 569 31,2051 0 5504 0 TC UPFLAG
 4027 REF 1 31,2052 00160 0 ADRES V67FLAG

4028 REF 57 LAST 619 31,2053 0 6036 1 V06N9933 TC INIPRET
 4029 31,2054 77414 0 BON EXIT

4030 REF 2 LAST 619 31,2055 03707 1 V67FLAG
 4031 31,2056 62060 0 +2

4032 RFF 34 LAST 619 31,2057 1 5472 1 TCF ENDEXT
 4033 31,2060 41345 0 DLOAD DMP

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4034	REF	7	LAST	619	31,2061	02205	1		WWPOS
4035	REF	1			31,2062	22170	1		1/SQRT3
4036					31,2063	72412	0	SL4	SL1
4037					31,2064	14001	0	STODL	OD
4038	REF	5	LAST	619	31,2065	02207	0		WWVFL
4039					31,2066	77605	1	DMP	
4040	REF	2	LAST	620	31,2067	22170	1		1/SQRT3
4041					31,2070	00003	1	STORE	2D
4042					31,2071	72014	1	BON	LXA,1
4043	REF	11	LAST	595	31,2072	04307	1		SURFFLAG
4044	REF	1			31,2073	62103	1		V67SURF
4045					31,2074	00000	1		OD
4046					31,2075	72130	0	SXA,1	LXA,1
4047	REF	3	LAST	595	31,2076	02000	0		WRENDPOS
4048					31,2077	00002	0		2D
4049					31,2100	52130	1	SXA,1	GOTO
4050	REF	2	LAST	595	31,2101	02001	1		WRENDVEL
4051	REF	1			31,2102	62111	1		V67CLRF
4052					31,2103	66150	0	V67SURF	LXA,1
4053					31,2104	00000	1		OD
4054	REF	2	LAST	595	31,2105	02006	0		WSURFPOS
4055					31,2106	66150	0	LXA,1	SXA,1
4056					31,2107	00002	0		2D
4057	REF	2	LAST	595	31,2110	02007	1		WSURFVEL
4058					31,2111	77414	0	V67CLRF	CLEAR
4059	REF	9	LAST	595	31,2112	02676	1		RENDWFLG
4060	REF	35	LAST	619	31,2113	1 5472	1	TCF	ENEXT
4061					31,2114	40020	1	V67WW	STQ
4062	REF	5	LAST	393	31,2115	00051	0		S2
4063					31,2116	62117	1		+1
4064					31,2117	45014	0	CLEAR	CALL
4065	REF	3	LAST	619	31,2120	03667	0		V67FLAG
4066	REF	17	LAST	594	31,2121	27412	0		INSTALL
4067					31,2122	71331	0	SSP	DLOAD
4068	REF	6	LAST	398	31,2123	00051	0		S1
4069					31,2124	00006	1	DEC	6
4070	REF	6	LAST	592	31,2125	06424	0		ZEROVECS
4071	REF	8	LAST	620	31,2126	02205	1	STORE	WWPOS
4072	REF	6	LAST	620	31,2127	02207	0	STORE	WWVFL
4073					31,2130	77770	1	AXT,1	
4074					31,2131	00066	1	DEC	54
4075					31,2132	47573	0	NXPOSVEL	VLOAD* VSQ
4076	REF	15	LAST	595	31,2133	02467	0		W +54D,1
4077					31,2134	77615	0	DAD	
4078	REF	9	LAST	620	31,2135	02205	1		WWPOS
4079	REF	10	LAST	620	31,2136	02205	1	STORE	WWPOS
4080					31,2137	47573	0	VLOAD*	VSQ
4081	REF	16	LAST	620	31,2140	02555	0		W +108D,1
4082					31,2141	77615	0	DAD	
4083	REF	7	LAST	620	31,2142	02207	0		WWVFL

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4084	REF	8	LAST	620	31,2143	02207 0	STORE	WWVEL
4085					31,2144	75500 0	TIX,1	SORT
4086	RFF	1			31,2145	62132 0		NXPOSVEL
4087	REF	9	LAST	621	31,2146	16207 0	STODL	WWVEL
4088	REF	11	LAST	620	31,2147	02205 1		WWPOS
4089					31,2150	77766 0	SORT	
4090	REF	12	LAST	621	31,2151	02205 1	STORE	WWPOS
4091					31,2152	52000 0	BOV	GOTO
4092					31,2153	62155 1		+2
4093	REF	1			31,2154	62161 0		V67XXX
4094					31,2155	77745 1	DLOAD	
4095	REF	4	LAST	391	31,2156	06432 1		DPPOS MAX
4096	REF	13	LAST	621	31,2157	02205 1	STORF	WWPOS
4097	REF	10	LAST	621	31,2160	02207 0	STORE	WWVFL
4098					31,2161	66150 0	V67XXX LXA,1	SXA,1
4099	REF	6	LAST	620	31,2162	00051 0		S2
4100	REF	2	LAST	312	31,2163	00052 0		QPRFT
4101					31,2164	77776 1	EXIT	
4102	REF	38	LAST	574	31,2165	0 4635 0	TC	POST JUMP
4103	REF	2	LAST	312	31,2166	27427 0	CADR	INTWAKE
4104					31,2167	22363 1	1/SQRT3 2DEC	0.5773502
4104					31,2170	11620 0		
4105					31,2171	01543 1	V06N99 VN	0699

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P4106					25,3607				BANK	25		
4107					25,2000				SETLOC	RADARUPT		
4108	REF	3	LAST	566	25,3607				BANK			
4109					572:	209	212*		COUNT*	\$/RRUPT		
4110	REF	3	LAST	566 TO								
411005	REF	38	LAST	616	E7,1454				EBANK=	LOSCOUNT		
41101	REF	78	LAST	617	25,3607	3	4753	1	R12LITES	CA	ONE	
41102	REF	26	LAST	535	25,3610	7	1303	1		MASK	IMODES33	
41103	REF	211	LAST	619	25,3611	10	000	0		CCS	A	
41104	REF	1			25,3612	1	4707	1		TCF	ISWRETRN	
41105	REF	1			25,3613	0	3630	1		TC	HLIGHT	
41106	REF	2	LAST	622	25,3614	0	3625	0		TC	HLIGHT -3	
41107	REF	2	LAST	622	25,3615	1	4707	1		TCF	ISWRETRN	
4111	REF	35	LAST	583	25,3616	3	4753	1	RADLITES	CA	BIT1	
4112	REF	27	LAST	622	25,3617	7	1303	1		MASK	IMODES33	
4113	REF	212	LAST	622	25,3620	10	000	0		CCS	A	
4114	REF	180	LAST	619	25,3621	0	0002	0		TC	Q	
4115	REF	26	LAST	568	25,3622	4	4747	0		CS	BIT5	
4116	REF	28	LAST	571	25,3623	6	0061	0		AD	ITEMP1	
4117	REF	213	LAST	622	25,3624	10	000	0		CCS	A	
4118	REF	79	LAST	622	25,3625	4	4753	0		CS	ONE	
4119	REF	1			25,3626	1	3664	1		TCF	VLIGHT	
4120	REF	1			25,3627	1	4570	0		TCF	RRTRKF	
4121	REF	4	LAST	273	25,3630	54	065	0	HLIGHT	TS	ITEMP5	ZERO ITEMPS FOR H INDEX
4122	REF	1			25,3631	3	4747	1		CA	HLITE	
4123	REF	89	LAST	619	25,3632	54	001	1		TS	L	
4124	REF	8	LAST	570	25,3633	3	0107	1		CA	FLGWRD11	
4125	REF	3	LAST	570	25,3634	7	4751	1		MASK	SCABBIT	
4126	REF	214	LAST	622	25,3635	10	000	0		CCS	A	
4127	REF	1			25,3636	1	3656	0		TCF	ONLITES	
4128	REF	27	LAST	622	25,3637	3	4747	1		CA	BIT5	
4129	REF	112	LAST	616	25,3640	7	0110	0	BOTHLITES	MASK	RADMODES	
4130	REF	215	LAST	622	25,3641	10	000	0		CCS	A	
4131	REF	2	LAST	622	25,3642	1	3656	0		TCF	ONLITES	
4135	REF	9	LAST	622	25,3643	3	0107	1		CA	FLGWRD11	
4136	REF	5	LAST	622	25,3644	50	065	1		INDEX	ITEMP5	
4137	REF	1			25,3645	7	4753	0		MASK	HFLSHBIT	
4138	REF	216	LAST	622	25,3646	10	000	0		CCS	A	
4139	REF	2	LAST	622	25,3647	1	4570	0		TCF	RRTRKF	

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4140					25,3650	0 0006 1	LITIT	EXTEND	
4141	REF	3	LAST	195	25,3651	22 066 1		QXCH	ITEMP6
4142	REF	2	LAST	535	25,3652	0 4602 1		TC	IRKFLON +1
4143					25,3653	0 0006 1		EXTEND	
4144	REF	4	LAST	623	25,3654	22 066 1		QXCH	ITEMP6
4145	REF	3	LAST	622	25,3655	1 4570 0		TCF	RRTRKF
4146	REF	6	LAST	622	25,3656	50 065 1	ONLITES	INDEX	ITEMP5
4147	REF	2	LAST	622	25,3657	4 4753 0		CS	HFLSHBIT
4148	REF	10	LAST	622	25,3660	7 0107 0		MASK	FLGWRD11
4149	REF	11	LAST	623	25,3661	54 107 0		TS	FLGWRD11
4154	REF	90	LAST	622	25,3662	3 0001 0		CA	L
4155	REF	1			25,3663	1 3650 0		TCF	LITIT
4156	REF	7	LAST	623	25,3664	54 065 0	VLIGHT	TS	ITEMP5
4157	REF	1			25,3665	3 4751 0		CA	VLITE
4158	REF	91	LAST	623	25,3666	54 001 1		TS	L
4159	REF	27	LAST	567	25,3667	3 4744 1		CA	BIT8
4160	REF	1			25,3670	1 3640 1		TCF	BOTHLITS
4161	REF	28	LAST	622	4747		HLITE	EQUALS	BIT5
4162	REF	32	LAST	619	4751		VLITE	EQUALS	BIT3

*** END OF LEMP20S .114 ***

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P0023 PROGRAM DESCRIPTION P30 DATE 3-6-67

R0024 MCD.1 BY RAMA AIYAWAR
 R0025 FUNCTIONAL DESCRIPTION
 R0026 ACCEPT ASTRONAUT INPUTS OF TIG,DELV(LV)
 R0027 CALL IMU STATUS CHECK ROUTINE (R02)
 R0028 DISPLAY TIME TO GO, APOGEE, PERIGEE, DELV(MAG), MGA AT IGN
 R0029 REQUEST BURN PROGRAM

R0030 CALLING SEQUENCE VIA JOB FROM V37

R0031 EXIT VIA V37 CALL OR TO GOTOP00H (V34E)

R0032 SUBROUTINE CALLS-FLAGUP, PHASCHNG, BANKCALL, ENDOFJOB, GOFLASH, GOFLASHR
 R0033 GOPERF3R, INTPRET, BLANKET, GOTOP00H, R02B01H, S30.1,
 R0034 TTG/N35, MIDGIM, DISPMGA

R0035 ERASABLE INITIALIZATION- STATE VECTOR

R0036 OUTPUT-RINIT, VINIT, +MGA, VTIG, RTIG, DELVSIN, DELVSAB, DELVSLV, HAPD,
 R0037 HPER, TTOGO

R0038 DEBRIS- A,L, MPAC, PUSHLIST

00381				32,2772			BANK	32	
00382	REF	1		35,2000			SETLOC	P30S	
00383				35,2000			BANK		
00384	REF	2	LAST	329			EBANK=	+MGA	
0039	REF	1		E4,1656			COUNT*	\$\$/P30	
0040	REF	29	LAST	619	35,2000	0 5504 0	TC	UPFLAG	SET UPDATE FLAG
0041	REF	3	LAST	507	35,2001	00027 1	ADRES	UPDATFLG	
00411	REF	30	LAST	624	35,2002	0 5504 0	TC	UPFLAG	SET TRACK FLAG
00412	REF	4	LAST	514	35,2003	00031 0	ADRES	TRACKFLG	
0042	REF	1		35,2004	3 2025 1	P30N33	CAF	V06N33	T OF IGN
0043	REF	1		35,2005	0 3651 0		TC	VNP00H	RETURNS ON PROCEED, POOH ON TERMINATE
0051	REF	1		35,2006	3 3666 1		CAF	V06N81	DISPLAY DELTA V (LV)
0052	REF	2	LAST	624	35,2007	0 3651 0	TC	VNP00H	REDISPLAY ON RECYCLE
0057	REF	49	LAST	617	35,2010	0 5516 0	TC	DOWNFLAG	RESET UPDATE FLAG
0058	REF	4	LAST	624	35,2011	00027 1	ADRES	UPDATFLG	
0059	REF	58	LAST	619	35,2012	0 6036 1	TC	INTPPET	
0060				35,2013	77624 1		CALL		
0061	REF	1		35,2014	70000 0			S30.1	
0067				35,2015	77414 0		SET	EXIT	
00675	REF	5	LAST	624	35,2016	00470 1		UPDATFLG	
0068	REF	1		35,2017	3 2026 1	PARAM30	CAF	V06N42	DISPLAY APOGEE,PERIGEE ,DELTA V
0069	REF	3	LAST	624	35,2020	0 3651 0	TC	VNP00H	

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0070	REF	59	LAST	624	35,2021	0	6036	1
0071					35,2022		77614	1
0072	REF	1			35,2023		01027	0
0073	REF	1			35,2024		72504	0

TC	INTPPET
SETGO	
	XDELVFLG
	REVN1645

FOR P40'S: EXTERNAL DELTA-V GUIDANCE.
TRKMKCNT, TGO, +MGA DISPLAY

0100					35,2025	01441	1	V06N33	VN	0633
0102					35,2026	01452	0	V06N42	VN	0642

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P0105 PROGRAM DESCRIPTION S30.1 DATE 9NOV66

R0106 MCD NC 1 LOG SECTION P30,P37

R0107 MOD BY PAMA AIYAWAR **

R0108 FUNCTIONAL DESCRIPTION

R0109 BASED ON STORED TARGET PARAMETERS(R OF IGNITION(RTIG),V OF
 R0110 IGNITION(VTIG),TIME OF IGNITION (TIG)),COMPUTE PERIGEE ALTITUDE
 R0111 APOGEE ALTITUDE AND DELTAV REQUIRED(DELSIN).

R0112 CALLING SEQUENCE

R0113 L CALL

R0114 L+I S30.1

R0115 NORMAL EXIT MODE

R0116 AT L+2 OR CALLING SEQUENCE (GOTO L+2)

R0117 SUBROUTINES CALLED

R0118 LEMPREC

R0119 PERIAPO

R0120 ALARM OR ABORT EXIT MODES

R0121 NONE

R0122 ERASABLE INITIALIZATION REQUIRED

R0123 TIG TIME OF IGNITION DP B28CS

R0124 DELVSLV SPECIFIED DELTA-V IN LOCAL VERT.

R0125 COORDS. OF ACTIVE VEHICLE AT

R0126 TIME OF IGNITION VECTOR B+7 METERS/CS

R0127 OUTPUT

R0128 RTIG POSITION AT TIG VECTOR B+29 METERS

R0129 VTIG VELOCITY AT TIG VECTOR B+29 METERS/CS

R0130 PCL 4D APOGEE ALTITUDE DP B+29 M , B+27 METERS.

R01301 HAPD APOGEE ALTITUDE DP B+29 METERS

R0131 PCL 8D PERIGEE ALTITUDE DP B+29 M , B+27 METERS.

R01311 HPER PERIGEE ALTITUDE DP B+29 METERS

R0132 DELVSIN SPECIFIED DELTA-V IN INERTIAL

R0133 COORD. OF ACTIVE VEHICLE AT

R0134 TIME OF IGNITION VECTOR B+7 METERS/CS

R0135 DELVSAB MAG. OF DELVSIN VECTOR B+7 METERS/CS

R0136 DEBRIS QTEMP TEMP. ERASABLE

R0137 QPRET,MPAC

R0138 PUSHLIST

0139 REF 1 34,2000 SETLOC P30S1

0140 34,2000 BANK

0141 REF 1 COUNT* \$\$/S30S

0142 34,2000 71220 1 S30.1 STQ DLOAD

0143 REF 1 34,2001 03630 1 QTEMP

0144 REF 9 LAST 505 34,2002 03440 1 TIG TIME IGNITION SCALED AT 2(+28)CS

0145 REF 20 LAST 599 34,2003 34041 0 STCALL TDEC1

0146 REF 3 LAST 222 34,2004 27057 0 LEMPREC ENCKE ROUTINE FOR LEM

0147 34,2005 67175 0 VLOAD SXA,2

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01471	REF	10	LAST	599	34,2006	00001 0		RATT	
0148	REF	2	LAST	152	34,2007	03376 0		RTX2	
0150	REF	2	LAST	157	34,2010	03640 0	STORE	RTIG	RADIUS VECTOR AT IGNITION TIME
0153					34,2011	57456 1	UNIT	VCOMP	
0154	REF	2	LAST	157	34,2012	27654 0	STOVL	DELVSIN	ZRF/LV IN DELVSIN SCALED AT 2
0155	REF	6	LAST	599	34,2013	00007 0		VATT	VELOCITY VECTOR AT TIG, SCALED 2(7) M/CS
0156	REF	2	LAST	157	34,2014	03646 0	STORE	VTIG	
0158					34,2015	53435 0	VXV	UNIT	
0159	REF	3	LAST	627	34,2016	03640 0		RTIG	
0160					34,2017	66001 0	SETPD	SXA,1	
0161					34,2020	00001 0		0	
01611	REF	1			34,2021	03375 0		RTX1	
0162					34,2022	47206 0	PUSH	VXV	YRF/LV PDL 0 SCALED AT 2
0163	REF	3	LAST	627	34,2023	03654 0		DELVSIN	
0164					34,2024	63372 1	VSL1	PDVL	
0165					34,2025	63315 0	PDVL	PDVL	YRF/LV PDL 6 SCALED AT 2
0166	REF	4	LAST	627	34,2026	03654 0		DELVSIN	ZRF/LV PDL 12D SCALED AT 2
0167	REF	2	LAST	213	34,2027	03432 1		DELVSLV	
0168					34,2030	76505 0	VXM	VSL1	
0169					34,2031	00001 0		0	
0170	REF	5	LAST	627	34,2032	03654 0	STORE	DELVSIN	DELTAV IN INERT. COOR. SCALED TO R+7M/CS
0172					34,2033	77646 0	ABVAL		
0173	REF	2	LAST	157	34,2034	27662 0	STOVL	DELVSAB	DELTA V MAG.
0174	REF	4	LAST	627	34,2035	03640 0		RTIG	{FOR PERIAPO}
0175					34,2036	53315 0	PDVL	VAD	VREQUIRED = VTIG + DELVSIN {FOR PERIAPO}
0176	REF	3	LAST	627	34,2037	03646 0		VTIG	
0177	REF	6	LAST	627	34,2040	03654 0		DELVSIN	
01771					34,2041	77624 1	CALL		
0178	REF	1			34,2042	46277 1		PERIAPO1	
01781					34,2043	77624 1	CALL		
01782	REF	1			34,2044	46407 0		SHIFTRI	RESCALE IF NEEDED
017822					34,2045	77624 1	CALL		LIMIT DISPLAY TO 9999.9 N. MI.
017824	REF	1			34,2046	45636 0		MAXCHK	
01783	REF	2	LAST	329	34,2047	16325 1	STODL	4PER	PERIGEE ALT 2(29) METERS, FOR DISPLAY
01784					34,2050	00005 1		4D	
01785					34,2051	77624 1	CALL		
01786	REF	2	LAST	627	34,2052	46407 0		SHIFTRI	RESCALE IF NEEDED
01787					34,2053	77624 1	CALL		LIMIT DISPLAY TO 9999.9 N. MI.
01788	REF	2	LAST	627	34,2054	45636 0		MAXCHK	
0179	REF	4	LAST	329	34,2055	36323 0	STCALL	HAPO	APOGEE ALT 2(29) METERS, FOR DISPLAY
0180	REF	2	LAST	626	34,2056	03630 1		QTEMP	

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P0010 CCELLIPTIC SEQUENCE INITIATION (CSI) PROGRAMS (P32 AND P72)

R0011 MCD NC -1 LOG SFCTION - P32-P35, P72-P75
R0012 MCD BY WHITE.P DATE 1JUNE67

R0013 - PURPOSE

- R0014 (1) TO CALCULATE PARAMETERS ASSOCIATED WITH THE FOLLOWING
R0015 CONCENTRIC FLIGHT PLAN MANEUVERS - THE CO-ELLIPTIC SEQUENCE
R0016 INITIATION (CSI) MANEUVER AND THE CONSTANT DELTA ALTITUDE
R0017 (CDH) MANEUVER.
- R0018 (2) TO CALCULATE THESE PARAMETERS BASED UPON MANEUVER DATA
R0019 APPROVED AND KEYED INTO THE DSKY BY THE ASTRONAUT.
- R0020 (3) TO DISPLAY TO THE ASTRONAUT AND THE GROUND DEPENDENT VARIABLES
R0021 ASSOCIATED WITH THE CONCENTRIC FLIGHT PLAN MANEUVERS FOR
R0022 APPROVAL BY THE ASTRONAUT/GROUND.
- R0023 (4) TO STORE THE CSI TARGET PARAMETERS FOR USE BY THE DESIRED
R0024 THRUSTING PROGRAM.

R0025 ASSUMPTIONS

- R0026 (1) AT A SELECTED TPI TIME THE LINE OF SIGHT BETWEEN THE ACTIVE
R0027 AND PASSIVE VEHICLES IS SELECTED TO BE A PRESCRIBED ANGLE (E)
R0028 FROM THE HORIZONTAL PLANE DEFINED BY THE ACTIVE VEHICLE
R00285 POSITION.
- R0029 (2) THE TIME BETWEEN CSI IGNITION AND CDH IGNITION MUST BE
R0030 COMPUTED TO BE GREATER THAN 10 MINUTES FOR SUCCESSFUL
R0031 COMPLETION OF THE PROGRAM.
- R0032 (3) THE TIME BETWEEN CDH IGNITION AND TPI IGNITION MUST BE
R0033 COMPUTED TO BE GREATER THAN 10 MINUTES FOR SUCCESSFUL
R0034 COMPLETION OF THE PROGRAM.
- R0035 (4) CDH DELTA V IS SELECTED TO MINIMIZE THE VARIATION OF THE
R0036 ALTITUDE DIFFERENCE BETWEEN THE ORBITS.
- R0037 (5) CSI BURN IS DEFINED SUCH THAT THE IMPULSIVE DELTA V IS IN THE
R0038 HORIZONTAL PLANE DEFINED BY THE ACTIVE VEHICLE POSITION AT CSI
R00385 IGNITION.
- R0039 (6) THE PERICENTER ALTITUDE OF THE ORBIT FOLLOWING CSI AND CDH
R0040 MUST BE GREATER THAN 35,000 FT (LUNAR ORBIT) OR 85 NM (EARTH
R0041 ORBIT) FOR SUCCESSFUL COMPLETION OF THIS PROGRAM.
- R0042 (7) THE CSI AND CDH MANEUVERS ARE ORIGINALLY ASSUMED TO BE
R0043 PARALLEL TO THE PLANE OF THE CSM ORBIT. HOWEVER CREW

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R0044 MODIFICATION OF DELTA V (LV) COMPONENTS MAY RESULT IN AN
R0045 CUT-OF-PLANE CSI MANEUVER.

R0046 (8) STATE VECTOR UPDATES BY P27 ARE DISALLOWED DURING AUTOMATIC
R0047 STATE VECTOR UPDATING INITIATED BY P20 (SEE ASSUMPTION 10).

R0048 (9) COMPUTED VARIABLES MAY BE STORED FOR LATER VERIFICATION BY
R0049 THE GROUND. THESE STORAGE CAPABILITIES ARE NORMALLY LIMITED
R0050 ONLY TO THE PARAMETERS FOR ONE THRUSTING MANEUVER AT A TIME
R0051 EXCEPT FOR CONCENTRIC FLIGHT PLAN MANEUVER SEQUENCES.

R0052 (10) THE RENDEZVOUS RADAR MAY OR MAY NOT BE USED TO UPDATE THE LM
R0053 OR CSM STATE VECTORS FOR THIS PROGRAM. IF RADAR USE IS
R0054 DESIRED THE RADAR WAS TURNED ON AND LOCKED ON THE CSM BY
R0055 PREVIOUS SELECTION OF P20. RADAR SIGHTING MARKS WILL BE MADE
R0056 AUTOMATICALLY APPROXIMATELY ONCE A MINUTE WHEN ENABLED BY THE
R0057 TRACK AND UPDATE FLAGS (SEE P20). THE RENDEZVOUS TRACKING
R0058 MARK COUNTER IS ZEROED BY THE SELECTION OF P20 AND AFTER EACH
R0059 THRUSTING MANEUVER.

R0060 (11) THE ISS NEED NOT BE ON TO COMPLETE THIS PROGRAM.

R0061 (12) THE OPERATION OF THE PROGRAM UTILIZES THE FOLLOWING FLAGS -

R0062 ACTIVE VEHICLE FLAG - DESIGNATES THE VEHICLE WHICH IS
R0063 DOING RENDEZVOUS THRUSTING MANEUVERS TO THE PROGRAM WHICH
R0064 CALCULATES THE MANEUVER PARAMETERS. SET AT THE START OF
R0065 EACH RENDEZVOUS PRE-THRUSTING PROGRAM.

R0066 FINAL FLAG - SELECTS FINAL PROGRAM DISPLAYS AFTER CREW HAS
R0067 COMPLETED THE FINAL MANEUVER COMPUTATION AND DISPLAY
R0068 CYCLE.

R0069 EXTERNAL DELTA V STEERING FLAG - DESIGNATES THE TYPE OF
R0070 STEERING REQUIRED FOR EXECUTION OF THIS MANEUVER BY THE
R0071 THRUSTING PROGRAM SELECTED AFTER COMPLETION OF THIS
R0072 PROGRAM.

R0073 (13) IT IS NORMALLY REQUIRED THAT THE ISS BE ON FOR 1 HOUR PRIOR TO
R0074 A THRUSTING MANEUVER.

R0075 (14) THIS PROGRAM IS SELECTED BY THE ASTRONAUT BY DSKY ENTRY -

R0076 P32 IF THIS VEHICLE IS ACTIVE VEHICLE.

R0077 P72 IF THIS VEHICLE IS PASSIVE VEHICLE.

R0110 INPUT

R0111 (1) TCSI TIME OF THE CSI MANEUVER

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R0112 (2) NN NUMBER OF APSIDAL CROSSINGS THRU WHICH THE ACTIVE
R0113 VEHICLE ORBIT CAN BE ADVANCED TO OBTAIN THE CDH
R0114 MANEUVER POINT
R0115 (3) ELEV DESIRED LOS ANGLE AT TPI
R0116 (4) TTPI TIME OF THE TPI MANEUVER
R0130 OUTPUT

R0131 (1) TRKMKCNT NUMBER OF MARKS
R0132 (2) TTOGO TIME TO GO
R0133 (3) +MGA MIDDLE GIMBAL ANGLE
R0134 (4) DIFFALT DELTA ALTITUDE AT CDH
R0135 (5) T1TOT2 DELTA TIME FROM CSI TO CDH
R0136 (6) T2TOT3 DELTA TIME FROM CDH TO TPI
R0137 (7) DELVLVC DELTA VELOCITY AT CSI - LOCAL VERTICAL COORDINATES
R0138 (8) DELVLVC DELTA VELOCITY AT CDH - LOCAL VERTICAL COORDINATES

R0139 DOWNLINK

R01391 (1) TCSI TIME OF THE CSI MANEUVER
R01392 (2) TCDH TIME OF THE CDH MANEUVER
R01393 (3) TTPI TIME OF THE TPI MANEUVER
R01394 (4) TIG TIME OF THE CSI MANEUVER
R01395 (5) DELVEET1 DELTA VELOCITY AT CSI - REFERENCE COORDINATES
R01396 (6) DELVEET2 DELTA VELOCITY AT CDH - REFERENCE COORDINATES
R01397 (7) DIFFALT DELTA ALTITUDE AT CDH
R01398 (8) NN NUMBER OF APSIDAL CROSSINGS THRU WHICH THE ACTIVE
R01399 VEHICLE ORBIT CAN BE ADVANCED TO OBTAIN THE CDH
R0140 MANEUVER POINT
R01401 (9) ELEV DESIRED LOS ANGLE AT TPI

R01402 COMMUNICATION TO THRUSTING PROGRAMS

R01403 (1) TIG TIME OF THE CSI MANEUVER
R01404 (2) RTIG POSITION OF ACTIVE VEHICLE AT CSI - BEFORE ROTATION
R01405 INTO PLANE OF PASSIVE VEHICLE
R01406 (3) VTIG VELOCITY OF ACTIVE VEHICLE AT CSE - BEFORE ROTATION
R01407 INTO PLANE OF PASSIVE VEHICLE
R01408 (4) DELVSIN DELTA VELOCITY AT CSI - REFERENCE COORDINATES
R01409 (5) DELVSAB MAGNITUDE OF DELTA VELOCITY AT CSI
R0141 (6) XDELVFLG SET TO INDICATE EXTERNAL DELTA V VG COMPUTATION

R0150 SUBROUTINES USED

R0151 AVFLAGA
R0152 AVFLAGP
R01525 P2OFLGON
R0153 VARALARM
R0154 BANKCALL
R0155 GCFASH
R0156 GOTOPOOH

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R01562 VNPOCH
 R01564 GOF LASHR
 R0157 BLANKET
 R0158 ENDOFJOB
 R0159 SELECTMU
 R0160 ADVANCE
 R0161 INTINT
 R0162 PASSIVE
 R0163 CSI/A
 R0164 S32/33.1
 R0165 DISDVL VC
 R0166 VN1645

0400				35,2027			BANK	35	
0401	REF	1		35,2000			SETLOC	CSI/CDH	
0402				35,2027			BANK		
0403	REF	1		E7,1466			EBANK=	SUBEXIT	
0404	REF	1					COUNT*	\$/P3272	
0500	REF	1		35,2027	0 2313	1	P32	TC	AVFLAGA
0502	REF	1		35,2030	0 2032	1		TC	P32STRT
0503	REF	1		35,2031	0 2320	1	P72	TC	AVFLAGP
050305				35,2032	0 0006	1	P32STRT	EXTEND	
050306	REF	1		35,2033	3 2364	1		DCA	P30ZERO
050307	REF	3	LAST	329	35,2034	53'617	1	DXCH	CENTANG
05031	REF	1		35,2035	0 2053	0		TC	P32/P72A
05032				35,2036	77734	1	ALMXITA	SXA,2	
05033	REF	2	LAST	156	35,2037	03611	1		CSIALRM
05034				35,2040	77740	1	ALMXIT	LXC,1	
05035	REF	3	LAST	631	35,2041	03611	1		CSIALRM
05038				35,2042	77533	1		SLOAD*	EXIT
05039	REF	1		35,2043	32367	1			ALARM/TR -1,1
0504	REF	267	LAST	617	35,2044	3 0154	1	CA	MPAC
05041	REF	3	LAST	401	35,2045	0 5735	0	TC	VARALARM
05042	REF	1		35,2046	3 5006	1		CAF	V05N09
05043	REF	153	LAST	619	35,2047	0 4616	1	TC	BANKCALL
05044	REF	8	LAST	505	35,2050	20351	1	CADR	GOF LASH
05045	REF	9	LAST	505	35,2051	0 6001	0	TC	GOTOPOOH
05046				35,2052	0 2046	1		TC	-4
0505	REF	1		35,2053	0 2325	1	P32/P72A	TC	P20FLGON
05051	REF	2	LAST	631	35,2054	3 2363	0	CAF	P30ZERO
0506	REF	3	LAST	329	35,2055	55'465	0	TS	NN +1
0507	REF	1		35,2056	3 2354	1		CAF	V06N11
0508	REF	4	LAST	624	35,2057	0 3651	0	TC	VNPOCH
0509	REF	1		35,2060	3 3663	1		CAF	V06N55
0510	REF	154	LAST	631	35,2061	0 4616	1	TC	BANKCALL
0511	REF	9	LAST	631	35,2062	20351	1	CADR	GOF LASH
0512	REF	10	LAST	631	35,2063	0 6001	0	TC	GOTOPOOH
0513				35,2064	0 2066	0		TC	+2
0514				35,2065	0 2060	0		TC	-5
0518	REF	1		35,2066	3 3662	0		CAF	V06N37

TCSI

NN, ELEV(RGLDS)

TTPI

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0519	REF	5	LAST	631	35,2067	0 3651 0	TC	VNPOOH
0520	REF	60	LAST	625	35,2070	0 6036 1	TC	INTPRET
0521					35,2071	77745 1	DLOAD	
0522	REF	4	LAST	320	35,2072	03632 0		TCSI
0523	REF	10	LAST	626	35,2073	37440 0	STCALL	TIG
0524	REF	1			35,2074	20041 0		SELECTMU
0525					35,2075	77624 1	P32/P728 CALL	
0526	REF	1			35,2076	71016 0		ADVANCE
0527					35,2077	77201 1	SETPD	VLOAD
0528					35,2100	00001 0		OD
0529	REF	3	LAST	159	35,2101	03504 0		VPASS1
0530					35,2102	65315 0	PDVL	PDDL
0531	REF	2	LAST	156	35,2103	03476 1		RPASS1
0532	REF	5	LAST	632	35,2104	03632 0		TCSI
0533					35,2105	65325 0	PDDL	PDDL
0534	REF	4	LAST	321	35,2106	03634 0		TTPI
0535	REF	1			35,2107	33671 1		TWOPI
0536					35,2110	45006 0	PUSH	CALL
0537	REF	1			35,2111	73422 1		INTINT
0538					35,2112	77624 1	CALL	
0539	REF	1			35,2113	46373 1		PASSIVE
0540					35,2114	77624 1	CALL	
0541	REF	1			35,2115	70113 0		CSI/A
0542					35,2116	43014 0	P32/P72C BON	SET
0543	REF	1			35,2117	01311 0		FINALFLG
0544	REF	1			35,2120	72122 0		P32/P72D
0545	REF	6	LAST	624	35,2121	00470 1		UPDATFLG
0546					35,2122	77745 1	P32/P72D DLOAD	
0547	REF	4	LAST	331	35,2123	02257 0		T1TOT2
0548	REF	5	LAST	632	35,2124	02257 0	P32/P72E STORE	T1TOT2
0549					35,2125	51025 1	DSU	BPL
0550	REF	1			35,2126	32366 0		60MIN
0551	REF	1			35,2127	72124 0		P32/P72E
0552					35,2130	77745 1	DLOAD	
0553	REF	2	LAST	331	35,2131	02261 0		T2TOT3
0554	REF	3	LAST	632	35,2132	02261 0	P32/P72F STORE	T2TOT3
0555					35,2133	51025 1	DSU	BPL
0556	REF	2	LAST	632	35,2134	32366 0		60MIN
0557	REF	1			35,2135	72132 1		P32/P72F
0558					35,2136	77776 1	EXIT	
0559	REF	1			35,2137	3 2356 0	CAF	VO6N75
0560	REF	6	LAST	632	35,2140	0 3651 0	TC	VNPOOH
0561	REF	61	LAST	632	35,2141	0 6036 1	TC	INTPRET
0562					35,2142	45175 0	VLOAD	CALL
0563	REF	3	LAST	213	35,2143	02273 0		DELVEET1
0566	REF	1			35,2144	71100 0		S32/33.1
0567	REF	4	LAST	632	35,2145	26273 0	STOVL	DELVEET1
05671	REF	2	LAST	133	35,2146	02315 1		RACT2
05672	REF	2	LAST	133	35,2147	26307 1	STOVL	RACT1
0568	REF	3	LAST	213	35,2150	02301 1		DELVEET2

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0569			35,2151	45170 0	AXT,1	CALL
05691			35,2152	01522 0	VN	0682
0572	REF	1	35,2153	72334 0		DISDVLVC
0573			35,2154	77745 1	DLOAD	
05731	REF	5	35,2155	03634 0		ITPI
05732	REF	1	35,2156	37636 0	STCALL	ITPI0
0574	REF	1	35,2157	73542 0		VN1645
0575			35,2160	77650 1	GOTO	
0576	REF	1	35,2161	72075 0		P32/P72B

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P1010 CONSTANT DELTA HEIGHT (CDH) PROGRAMS (P33 AND P73)

R1011 MOD NO -1 LOG SECTION - P32-P35, P72-P75
R1012 MOD BY WHITE.P DATE 1JUNE67
R1013 PURPOSE

R1014 (1) TO CALCULATE PARAMETERS ASSOCIATED WITH THE CONSTANT DELTA
R1015 ALTITUDE MANEUVER (CDH).

R1016 (2) TO CALCULATE THESE PARAMETERS BASED UPON MANEUVER DATA
R1017 APPROVED AND KEYED INTO THE DSKY BY THE ASTRONAUT.

R1018 (3) TO DISPLAY TO THE ASTRONAUT AND THE GROUND DEPENDENT VARIABLES
R1019 ASSOCIATED WITH THE CDH MANEUVER FOR APPROVAL BY THE
R1020 ASTRONAUT/GROUND.

R1021 (4) TO STORE THE CDH TARGET PARAMETERS FOR USE BY THE DESIRED
R1022 THRUSTING PROGRAM.

R1023 ASSUMPTIONS

R1024 (1) THIS PROGRAM IS BASED UPON PREVIOUS COMPLETION OF THE
R1025 CO-ELLIPTIC SEQUENCE INITIATION (CSI) PROGRAM (P32/P72).
R1026 THEREFORE -

R1027 (A) AT A SELECTED TPI TIME (NOW IN STORAGE) THE LINE OF SIGHT
R1028 BETWEEN THE ACTIVE AND PASSIVE VEHICLES WAS SELECTED TO BE
R1029 A PRESCRIBED ANGLE (E) (NOW IN STORAGE) FROM THE
R1030 HORIZONTAL PLANE DEFINED BY THE ACTIVE VEHICLE POSITION.

R1031 (B) THE TIME BETWEEN CSI IGNITION AND CDH IGNITION WAS
R1032 COMPUTED TO BE GREATER THAN 10 MINUTES.

R1033 (C) THE TIME BETWEEN CDH IGNITION AND TPI IGNITION WAS
R1034 COMPUTED TO BE GREATER THAN 10 MINUTES.

R1035 (D) THE VARIATION OF THE ALTITUDE DIFFERENCE BETWEEN THE
R1036 ORBITS WAS MINIMIZED.

R1037 (E) CSI BURN WAS DEFINED SUCH THAT THE IMPULSIVE DELTA V WAS
R1038 IN THE HORIZONTAL PLANE DEFINED BY ACTIVE VEHICLE

R10385 POSITION AT CSI IGNITION.

R1039 (F) THE PERICENTER ALTITUDES OF THE ORBITS FOLLOWING CSI AND
R1040 CDH WERE COMPUTED TO BE GREATER THAN 35,000 FT FOR LUNAR
R1041 ORBIT OR 35 NM FOR EARTH ORBIT.

R1042 (G) THE CSI AND CDH MANEUVERS WERE ASSUMED TO BE PARALLEL TO
R1043 THE PLANE OF THE PASSIVE VEHICLE ORBIT. HOWEVER, CREW

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R1044 MODIFICATION OF DELTA V (LV) COMPONENTS MAY HAVE RESULTED
R1045 IN AN OUT-OF-PLANE MANEUVER.

R1046 (2) STATE VECTOR UPDATES BY R27 ARE DISALLOWED DURING AUTOMATIC
R1047 STATE VECTOR UPDATING INITIATED BY P20 (SEE ASSUMPTION 4).

R1048 (3) COMPUTED VARIABLES MAY BE STORED FOR LATER VERIFICATION BY
R1049 THE GROUND. THESE STORAGE CAPABILITIES ARE NORMALLY LIMITED
R1050 ONLY TO THE PARAMETERS FOR ONE THRUSTING MANEUVER AT A TIME
R1051 EXCEPT FOR CONCENTRIC FLIGHT PLAN MANEUVER SEQUENCES.

R1052 (4) THE RENOVZVOUS RAOAR MAY OR MAY NOT BE USED TO UPDATE THE LM
R1053 OR CSM STATE VECTORS FOR THIS PROGRAM. IF RAOAR USE IS
R1054 DESIRED THE RAOAR WAS TURNED ON AND LOCKED ON THE CSM BY
R1055 PREVIOUS SELECTION OF R20. RAOAR SIGHTING MARKS WILL BE MADE
R1056 AUTOMATICALLY APPROXIMATELY ONCE A MINUTE WHEN ENABLED BY THE
R1057 TRACK AND UPDATE FLAGS (SEE R20). THE RENOVZVOUS TRACKING
R1058 MARK COUNTER IS ZEROED BY THE SELECTION OF P20 AND AFTER EACH
R1059 THRUSTING MANEUVER.

R1060 (5) THE ISS NEED NOT BE ON TO COMPLETE THIS PROGRAM.

R1061 (6) THE OPERATION OF THE PROGRAM UTILIZES THE FOLLOWING FLAGS -

R1062 ACTIVE VEHICLE FLAG - DESIGNATES THE VEHICLE WHICH IS
R1063 DOING RENOVZVOUS THRUSTING MANEUVERS TO THE PROGRAM WHICH
R1064 CALCULATES THE MANEUVER PARAMETERS. SET AT THE START OF
R1065 EACH RENOVZVOUS RE-THRUSTING PROGRAM.

R1066 FINAL FLAG - SELECTS FINAL PROGRAM DISPLAYS AFTER CREW HAS
R1067 COMPLETED THE FINAL MANEUVER COMPUTATION AND DISPLAY
R1068 CYCLE.

R1069 EXTERNAL DELTA V STEERING FLAG - DESIGNATES THE TYPE OF
R1070 STEERING REQUIRED FOR EXECUTION OF THIS MANEUVER BY THE
R1071 THRUSTING PROGRAM SELECTED AFTER COMPLETION OF THIS
R1072 PROGRAM.

R1073 (7) IT IS NORMALLY REQUIRED THAT THE ISS BE ON FOR 1 HOUR PRIOR TO
R1074 A THRUSTING MANEUVER.

R1075 (8) THIS PROGRAM IS SELECTED BY THE ASTRONAUT BY OSKY ENTRY -

R1076 R33 IF THIS VEHICLE IS ACTIVE VEHICLE.

R1077 P73 IF THIS VEHICLE IS PASSIVE VEHICLE.

R1110 INPUT

R1111 (1) TTRIO TIME OF THE TRI MANEUVER - SAVED FROM R32/P72

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R1112 (2) ELEV DESIRED LOS ANGLE AT TPI - SAVED FROM P32/P72
R1113 (3) TCDH TIME OF THE CDH MANEUVER

R1130 OUTPUT

R1131 (1) TRKMKCNT NUMBER OF MARKS
R1132 (2) TTOGO TIME TO GO
R1133 (3) +MCA MIDDLE GIMBAL ANGLE
R1134 (4) DIFFALT DELTA ALTITUDE AT CDH
R1135 (5) T2TOT3 DELTA TIME FROM CDH TO COMPUTED TPI
R1136 (6) NOMPPI DELTA TIME FROM NOMINAL TPI TO COMPUTED TPI
R1137 (7) DELVLVC DELTA VELOCITY AT CDH - LOCAL VERTICAL COORDINATES

R1139 DCWNLINK

R11391 (1) TCDH TIME OF THE CDH MANEUVER
R11392 (2) TTPI TIME OF THE TPI MANEUVER
R11393 (3) TIG TIME OF THE CDH MANEUVER
R11394 (4) DELVEET2 DELTA VELOCITY AT CDH - REFERENCE COORDINATES
R11395 (5) DIFFALT DELTA ALTITUDE AT CDH
R11396 (6) ELEV DESIRED LOS ANGLE AT TPI
R11402 COMMUNICATION TO THRUSTING PROGRAMS

R11403 (1) TIG TIME OF THE CDH MANEUVER
R11404 (2) RTIG POSITION OF ACTIVE VEHICLE AT CDH - BEFORE ROTATION
R11405 INTO PLANE OF PASSIVE VEHICLE
R11406 (3) VTIG VELOCITY OF ACTIVE VEHICLE AT CDH - BEFORE ROTATION
R11407 INTO PLANE OF PASSIVE VEHICLE
R11408 (4) DELVSIN DELTA VELOCITY AT CDH - REFERENCE COORDINATES
R11409 (5) DELVSAB MAGNITUDE OF DELTA VELOCITY AT CDH
R1141 (6) XDELVFLG SET TO INDICATE EXTERNAL DELTA V VG COMPUTATION

R1150 SUBROUTINES USED

R1151 AVFLAGA
R1152 AVFLAGP
R11525 P2OFLGON
R1153 VNPOOH
R1154 SELECTMU
R1155 ADVANCE
R1156 CDHMVR
R1157 INTINT3P
R1158 ACTIVE
R1159 PASSIVE
R1160 S33/34.1
R1161 ALARM
R1162 BANKCALL
R1163 CDFLASH
R1164 GOTOPDOH
R1166 S32/33.1

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R1167

VN1645

1499	REF	1					COUNT*	\$\$/P3373
1500	REF	2	LAST	631	35,2162	0 2313 1	P33	TC AVFLAGA
1502	REF	1			35,2163	0 2165 1		TC P33/P73A
1503	REF	2	LAST	631	35,2164	0 2320 1	P73	TC AVFLAGP
1505	REF	2	LAST	631	35,2165	0 2325 1	P33/P73A	TC P20FLGON
15051	REF	1			35,2166	3 2355 0		CAF V06N13
1506	REF	7	LAST	632	35,2167	0 3651 0		TC VNPD0H
1507	REF	62	LAST	632	35,2170	0 6036 1		TC INTPRET
1508					35,2171	77745 1		DLOAD
15081	REF	2	LAST	633	35,2172	03636 1		TTPI0
15082	REF	6	LAST	633	35,2173	17634 0		STODL TTPI
1509	REF	4	LAST	320	35,2174	03374 1		TC DH
1510	REF	11	LAST	632	35,2175	37440 0		STCALL TIG
1511	REF	2	LAST	632	35,2176	20041 0		SFLFCTMU
1512					35,2177	77624 1	P33/P73B	CALL
1513	REF	2	LAST	632	35,2200	71016 0		ADVANCE
1514					35,2201	77624 1		CALL
1515	REF	1			35,2202	71133 0		CDHMVR
1516					35,2203	77201 1		SETPD VLOAD
1517					35,2204	00001 0		OD
1518	REF	2	LAST	156	35,2205	03542 1		VACT3
1519					35,2206	45115 0		PDVL CALL
1520	REF	3	LAST	632	35,2207	02315 1		RACT2
1521	REF	1			35,2210	71071 1		INTINT3P
1522					35,2211	77624 1		CALL
1523	REF	1			35,2212	46363 0		ACTIVE
1524					35,2213	77201 1		SETPD VLOAD
1525					35,2214	00001 0		OD
1526	REF	2	LAST	156	35,2215	03526 0		VPASS2
1527					35,2216	45115 0		PDVL CALL
1528	REF	2	LAST	156	35,2217	03520 0		RPASS2
1529	REF	2	LAST	637	35,2220	71071 1		INTINT3P
1530					35,2221	77624 1		CALL
1531	REF	2	LAST	632	35,2222	46373 1		PASSIVE
1532					35,2223	43145 0		DLOAD SFT
1533	REF	3	LAST	631	35,2224	32364 1		P30ZERO
1534	REF	1			35,2225	03460 0		ITSWICH
1535	REF	1			35,2226	36323 0		STCALL NOMTPI
1536	REF	1			35,2227	72726 1		S33/34.1
1537					35,2230	77454 1		BZE EXIT
1538	REF	1			35,2231	72246 1		P33/P73C
1539	REF	27	LAST	603	35,2232	0 5567 0		TC ALARM
1540					35,2233	00611 1		OCT 611
1541	REF	2	LAST	631	35,2234	3 5006 1		CAF V05N09
1542	REF	155	LAST	631	35,2235	0 4616 1		TC BANKCALL
1543	REF	10	LAST	631	35,2236	20351 1		CADR GQFLASH
1544	REF	11	LAST	631	35,2237	0 6001 0		TC GOTOPOOH
1545					35,2240	0 2242 1		TC +2

TCDH

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1546	REF	2	LAST	637	35,2241	0 2165	1	TC P33/P73A
1547	REF	63	LAST	637	35,2242	0 6036	1	TC INTPRET
1548					35,2243	77745	1	DLOAD
1549	REF	4	LAST	637	35,2244	32364	1	P30ZERO
1550	REF	2	LAST	637	35,2245	02323	1	STORE NDMTPI
1551					35,2246	43014	0	P33/P73C BON SET
1552	REF	2	LAST	632	35,2247	01311	0	FINALFLG
1553	REF	1			35,2250	72252	1	P33/P730
1554	REF	7	LAST	632	35,2251	00470	1	UPDATEFLG
1557					35,2252	43345	1	P33/P730 OLOAD DAO
1558	REF	3	LAST	638	35,2253	02323	1	NDMTPI
1559	REF	7	LAST	637	35,2254	03634	0	ITPI
1560	REF	8	LAST	638	35,2255	03634	0	STORE ITPI
1561					35,2256	77625	0	OSU
1562	REF	5	LAST	637	35,2257	03374	1	TCOH
1563					35,2260	51025	1	P33/P73E OSU BPL
1564	REF	3	LAST	632	35,2261	32366	0	60MIN
1565	REF	1			35,2262	72260	0	P33/P73E
1566					35,2263	77615	0	DAD
1567	REF	4	LAST	638	35,2264	32366	0	60MIN
1568	REF	6	LAST	632	35,2265	16257	0	STODL TITOT2
1569	REF	9	LAST	638	35,2266	03634	0	ITPI
1570					35,2267	41425	1	OSU PUSH
1571	REF	3	LAST	637	35,2270	03636	1	ITPI0
1572					35,2271	45246	0	P33/P73F ABS OSU
1573	REF	5	LAST	638	35,2272	32366	0	60MIN
1574					35,2273	43244	1	BPL DAD
1575	REF	1			35,2274	72271	0	P33/P73F
15751	REF	6	LAST	638	35,2275	32366	0	60MIN
15753					35,2276	45565	0	SIGN STADR
15755	REF	4	LAST	632	35,2277	75516	1	STORF T2T0T3
1576					35,2300	77776	1	EXIT
1577	REF	2	LAST	632	35,2301	3 2356	0	CAF VC6N75
1578	REF	8	LAST	637	35,2302	0 3651	0	TC VNPOOH
1579	REF	64	LAST	638	35,2303	0 6036	1	TC INTPRET
1580					35,2304	45175	0	VLOAD CALL
1581	REF	4	LAST	632	35,2305	02301	1	0ELVEET2
1584	REF	2	LAST	632	35,2306	71100	0	S32/33.1
1585	REF	5	LAST	638	35,2307	36301	0	STCALL DELVEET2
1589	REF	2	LAST	633	35,2310	73542	0	VN1645
1590					35,2311	77650	1	GOTO
1591	REF	1			35,2312	72177	0	P33/P73B

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P3800 AVFLAGA/P

R3850 SUBROUTINES USED

R3851 UPFLAG
R3852 DOWNFLAG

3900					35,2313	0 0006 1	AVFLAGA	EXTEND		AVFLAG = LEM
3901	REF	2	LAST	631	35,2314	23'466 1		QXCH	SUBEXIT	
3902	REF	31	LAST	624	35,2315	0 5504 0		TC	UPFLAG	
3903	REF	1			35,2316	00050 1		ADRES	AVFLAG	
3904	REF	3	LAST	639	35,2317	0 1466 1		TC	SUBEXIT	
3905					35,2320	0 0006 1	AVFLAGP	EXTEND		AVFLAG = CSM
3906	REF	4	LAST	639	35,2321	23'466 1		QXCH	SUBEXIT	
3907	REF	50	LAST	624	35,2322	0 5516 0		TC	DOWNFLAG	
3908	REF	2	LAST	639	35,2323	00050 1		ADRES	AVFLAG	
3909	REF	5	LAST	639	35,2324	0 1466 1		TC	SUBEXIT	
39091					35,2325	0 0006 1	P20FLGON	EXTEND		
39092	RFF	6	LAST	639	35,2326	23'466 1		QXCH	SUBEXIT	
39093	REF	32	LAST	639	35,2327	0 5504 0		TC	UPFLAG	
3910	REF	8	LAST	638	35,2330	00027 1		ADRES	UPDATFLG	SET UPDATFLG
39101	REF	33	LAST	639	35,2331	0 5504 0		TC	UPFLAG	
39102	REF	5	LAST	624	35,2332	00031 0		ADRES	TRACKFLG	SET TRACKFLG
3911	REF	7	LAST	639	35,2333	0 1466 1		TC	SUBEXIT	

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P4600 DISDLVLC

R4650 SUBROUTINES USED

R4651 S32/33.X

R4652 VNPOCH

4700	REF	11	LAST	331	35,2334	03432 1	DISDLVLC	STORE	DELVLVC
4701					35,2335	45020 1		STQ	CALL
4702	REF	1			35,2336	03461 1			NORMEX
47021	REF	1			35,2337	71120 1			S32/33.X
47022					35,2340	64375 1		VLOAD	MXV
47023	REF	12	LAST	640	35,2341	03432 1			DELVLVC
47024					35,2342	00001 0			OD
470241					35,2343	66172 0		VSL1	SXA,1
470243	REF	1			35,2344	03613 0			VERBNOUN
47025	REF	13	LAST	640	35,2345	03432 1		STORE	DELVLVC
47026					35,2346	77776 1		EXIT	
4703	REF	2	LAST	640	35,2347	3 1613 1		CA	VERBNOUN
4704	REF	9	LAST	638	35,2350	0 3651 0		TC	VNPOCH
4705	REF	65	LAST	638	35,2351	0 6036 1		TC	INTPRET
4706					35,2352	77650 1		GOTO	
4707	REF	2	LAST	640	35,2353	03461 1			NORMEX

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P4800 CONSTANTS

4901	35,2354	01413 0	VO6N11	VN	0611	
4902	35,2355	01415 0	VO6N13	VN	0613	
4903	35,2356	01513 1	VO6N75	VN	0675	
4914	35,2357	77776 1	SN359+	2DEC	-.000086601	
4914	35,2360	62460 1				
4915	35,2361	17777 0	CS359+	2DEC	+.499999992	
4915	35,2362	37776 0				
4916	35,2363	00000 1	P30 ZERO	2DEC	0	
4916	35,2364	00000 1				
4917	35,2365	00025 0	60MIN	2DEC	360000	
4917	35,2366	37100 1				
4919	35,2367	00600 1	ALARM/TB	OCT	00600	NO 1
4920	35,2370	00601 0		OCT	00601	2
4921	35,2371	00602 0		OCT	00602	3
4922	35,2372	00603 1		OCT	00603	4
4923	35,2373	00604 0		OCT	00604	5
4924	35,2374	00605 1		OCT	00605	6
4925	35,2375	00606 1		OCT	00606	7

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P5000 CSI/A

R5150 SUBROUTINES USED

R5152 VECSHIFT
 R5153 TIMETHET
 R5154 PERIAP0
 R5155 SHIFTR1
 R5156 INTINT2C
 R5157 CDHMR
 R5158 PERIAP01
 R5159 INTINT
 R5160 ACTIVE

5400			34,2057		BANK 34		
5401	REF	1	34,2000		SFTLOC CSI/CDH1		
5402			34,2057		BANK		
5403	REF	8 LAST 639	E7,1466		EBANK= SUBEXIT		
5404	REF	1			COUNT* \$\$/CSI		
5413			34,2057	00000 1	LOOPMX	2DEC 16	
5413			34,2060	00020 0			
5414			34,2061	00003 1	INITST	2DEC .03048 B-7	INITIAL DELDV = 10 FPS
5414			34,2062	34661 1			
5415			34,2063	00606 1	DVMAX1	2DEC 3.0480 B-7	MAXIMUM DVI = 1000 FPS
5415			34,2064	04467 0			
5416			34,2065	00601 0	DVMAX2	2DEC 3.014472 B-7	989 FPS
5416			34,2066	33216 1			
5417			34,2067	10000 0	1DPB2	2DEC 1.0B-2	
5417			34,2070	00000 1			
5418			34,2071	00000 1	1DPB28	2DEC 1	
5418			34,2072	00001 0			
5419			34,2073	00004 0	PMINE	2DEC 157420 B-29	85 NM - MUST BE 8 WORDS BEFORE PMINM
5419			34,2074	31566 0			
5420			34,2075	00000 1	EPSILN1	2DEC .0003048 B-7	.1 FPS
5420			34,2076	01177 1			
5421			34,2077	00002 0	NICKELDP	2DEC .021336 B-7	7 FPS (CHANGED FROM .05 FPS)
5421			34,2100	27311 1			
5422			34,2101	77754 1	FIFPSDP	2DEC -.152400 B-7	50 FPS
5422			34,2102	57611 0			
5423			34,2103	00000 1	PMINM	2DEC 10668 B-29	35000 FT - MUST BE 8 WORDS AFTER PMINE
5423			34,2104	12326 0			
5424			34,2105	00116 1	DELMAX1	2DEC .6096000 B-7	200 FPS
5424			34,2106	00730 0			
5425			34,2107	00000 1	ONETHTH	2DEC .0001 B-3	
5425			34,2110	06433 0			
5426			34,2111	00003 1	TMIN	2DEC 60000	10 MIN
5426			34,2112	25140 0			
5500			34,2113	43014 0	CSI/A	CLEAR SET	INITIALIZE INDICATORS
5501	RFF	1	34,2114	03260 0		S32.1F1	DVT1 HAS EXCEEDED MAX INDICATOR
5502	REF	1	34,2115	03061 0		S32.1F2	FIRST PASS FOR NEWTON ITERATION INDICATR

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5503				34,2116	43014 0	CLEAR	SET		
5504	REF	1		34,2117	03262 1		S32.1F3A	00=1ST 2 PASSES 2ND CYCLE 01=FIRST CYCLE	
5505	REF	1		34,2120	03063 1		S32.1F3B	10=2ND CYCLE 11=50FPS STAGE 2ND CYCLE	
5506				34,2121	77745 1	DLOAD			
5507	REF	5	LAST	638	34,2122	32364 1	P30ZERO		
5508	REF	1			34,2123	03604 0	LCOPCT		
5509	REF	4	LAST	631	34,2124	03612 1	STORE CSIALRM		
5510					34,2125	77201 1	SETPD VLOAD		
5511					34,2126	00001 0	QC		
5512	REF	3	LAST	632	34,2127	02307 1	RACT1		
5513					34,2130	41446 1	ABVAL PUSH	RA1	B29 PL02D
5514					34,2131	70501 1	NORM SR1		
5515	REF	2	LAST	499	34,2132	00050 1	X2		B29-N2+ B1 PL04D
5516					34,2133	51515 1	PDVL ABVAL		
5517	REF	1			34,2134	03550 1	RPASS3		
5518					34,2135	55301 0	NORM BDDV	RA1/RP3	B1 PL02D
5519	REF	5	LAST	597	34,2136	00047 1	X1		
5520					34,2137	53664 0	XSU,2 SR*		B2
5521	REF	6	LAST	643	34,2140	00046 0	XI		
5522					34,2141	57175 0	1,2		
5523					34,2142	41215 1	DAD DMP	{1+(RA1/RP3)}RA1	B29+B2=B31 PL00D
5524	REF	1			34,2143	30070 0	1D PB2		
5525					34,2144	65301 0	NORM PDDL		PL02D
5526	REF	7	LAST	643	34,2145	00047 1	X1		
5527	REF	1			34,2146	02325 1	RTMU		
5528					34,2147	56342 1	SR1 DDV		B38-B31= B7 PL00D
5529					34,2150	75457 0	SL* SQRT		B7
5530					34,2151	20172 1	0 -7,1		
5531					34,2152	53515 0	PDVL UNIT		PL02D
5532	REF	4	LAST	643	34,2153	02307 1	RACT1		
5533					34,2154	47315 0	PDVL VVX		
5534	REF	2	LAST	133	34,2155	02265 1	UPI		
5535					34,2156	77656 1	UNIT	UNIT(URP1 X UVPI X URA1) = UH1	
5536					34,2157	72441 0	DOT	VAL . UH1	B7
5537	REF	2	LAST	159	34,2160	03470 1	VACT1		
5538					34,2161	45421 1	BDSU STADR		PL00D
5539	REF	3	LAST	156	34,2162	60205 0	STODL DELVCSI		
5540	REF	1			34,2163	30062 0	INITST	10 FPS	
5541	REF	4	LAST	157	34,2164	03610 0	STORE DELDV		
5542					34,2165	43345 1	DLOAD DAD	IF LOOPCT = 16	
5543	REF	2	LAST	643	34,2166	03604 0	LOOPCT		
5544	REF	1			34,2167	30072 1	1DPR28		
5545	REF	3	LAST	643	34,2170	03604 0	STORE LOOPCT		
5546					34,2171	77025 0	DSU AXT,2		
5547	REF	1			34,2172	30060 1	LOOPMX		
5548					34,2173	00006 1	6		
5549					34,2174	77644 1	BPL		
5550	REF	1			34,2175	70776 0	SCNDSOL		
5551					34,2176	77601 0	CSI/B2 SETPD		
5552					34,2177	00001 0	OD		

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5553					34,2200	51545	1		DLOAD	ABS		
5554	REF	4	LAST	643	34,2201	03572	1			DELVCSI		
5555					34,2202	50025	0		DSU	BNN		
5556	REF	1			34,2203	30064	0			DVMAX1		
5557	REF	1			34,2204	70224	1			CSI/B23		
5558					34,2205	43174	1		AXT,2	BON		
5559					34,2206	00007	0			7		
5560	REF	2	LAST	642	34,2207	03300	1			S32.1F1		
5561	REF	2	LAST	643	34,2210	70776	0			SCNDSOL		
5562					34,2211	43014	0		BOFF	BON		
5563	REF	2	LAST	643	34,2212	03342	1			S32.1F3A		
5564	REF	1			34,2213	70216	0			CSI/B22	FLAG 3 NEQ 3	
5565	REF	2	LAST	643	34,2214	03303	1			S32.1F3B		
5566	REF	3	LAST	644	34,2215	70776	0			SCNDSOL		
5567					34,2216	71214	0	CSI/B22	SET	DLOAD		
5568	REF	3	LAST	644	34,2217	03060	1			S32.1F1		
5569	REF	1			34,2220	30066	1			DVMAX2		
5570					34,2221	77765	0		SIGN			
5571	REF	5	LAST	644	34,2222	03572	1			DELVCSI		
5572	REF	6	LAST	644	34,2223	03572	1		STORE	DELVCSI		
5573					34,2224	41575	0	CSI/B23	VLOAD	PUSH		
5574	REF	5	LAST	643	34,2225	02307	1			RACT1		
5575					34,2226	63256	0		UNIT	PDVL		
5576	REF	3	LAST	643	34,2227	02265	1			UP1		
5577					34,2230	53435	0		VXV	UNIT	UNIT(URP1 X UVP1 X URA1) = UH1	
5578					34,2231	76561	1		VXSC	VSL1		
5579	REF	7	LAST	644	34,2232	03572	1			DELVCSI		
5580	REF	5	LAST	632	34,2233	02273	0		STORE	DELVEET1		
5581					34,2234	40055	0		VAD	BCV		
5582	REF	3	LAST	643	34,2235	03470	1			VACT1		
5583	REF	1			34,2236	70237	0			CSI/B23D		
5584	REF	2	LAST	157	34,2237	37564	1	CSI/B23D	STCALL	VACT4		
5585	REF	1			34,2240	46377	0			VECSHIFT		
5586	REF	3	LAST	506	34,2241	26744	1		STOVL	VVEC		
5587					34,2242	77614	1		SET			
5588	REF	2	LAST	506	34,2243	03466	0			RVSW		
5589	REF	2	LAST	506	34,2244	26655	0		STOVL	RVEC		
5590	REF	1			34,2245	32360	0			SN359+		
5591	REF	3	LAST	506	34,2246	36730	0		STCALL	SNTH	ALSO C5TH	
5592	REF	2	LAST	506	34,2247	24745	1			TIME THET		
5593					34,2250	72142	0		SR1	LXA,1		
5594	REF	2	LAST	627	34,2251	03375	0			RTX1		
5595	REF	1			34,2252	37602	1		STCALL	HAEP1		
5596	REF	1			34,2253	46307	1			PERIAPD		
5597					34,2254	77624	1		CALL			
5598	REF											

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Address	Op	Op2	Op3	Op4	Op5	Op6	Op7	Op8	Op9	Op10	Op11	Op12	Op13	Op14	Op15	Op16	Op17	Op18	Op19	Op20	Op21	Op22	Op23	Op24	Op25	Op26	Op27	Op28	Op29	Op30	Op31	Op32	Op33	Op34	Op35	Op36	Op37	Op38	Op39	Op40	Op41	Op42	Op43	Op44	Op45	Op46	Op47	Op48	Op49	Op50	Op51	Op52	Op53	Op54	Op55	Op56	Op57	Op58	Op59	Op60	Op61	Op62	Op63	Op64	Op65	Op66	Op67	Op68	Op69	Op70	Op71	Op72	Op73	Op74	Op75	Op76	Op77	Op78	Op79	Op80	Op81	Op82	Op83	Op84	Op85	Op86	Op87	Op88	Op89	Op90	Op91	Op92	Op93	Op94	Op95	Op96	Op97	Op98	Op99	Op100	Op101	Op102	Op103	Op104	Op105	Op106	Op107	Op108	Op109	Op110	Op111	Op112	Op113	Op114	Op115	Op116	Op117	Op118	Op119	Op120	Op121	Op122	Op123	Op124	Op125	Op126	Op127	Op128	Op129	Op130	Op131	Op132	Op133	Op134	Op135	Op136	Op137	Op138	Op139	Op140	Op141	Op142	Op143	Op144	Op145	Op146	Op147	Op148	Op149	Op150	Op151	Op152	Op153	Op154	Op155	Op156	Op157	Op158	Op159	Op160	Op161	Op162	Op163	Op164	Op165	Op166	Op167	Op168	Op169	Op170	Op171	Op172	Op173	Op174	Op175	Op176	Op177	Op178	Op179	Op180	Op181	Op182	Op183	Op184	Op185	Op186	Op187	Op188	Op189	Op190	Op191	Op192	Op193	Op194	Op195	Op196	Op197	Op198	Op199	Op200	Op201	Op202	Op203	Op204	Op205	Op206	Op207	Op208	Op209	Op210	Op211	Op212	Op213	Op214	Op215	Op216	Op217	Op218	Op219	Op220	Op221	Op222	Op223	Op224	Op225	Op226	Op227	Op228	Op229	Op230	Op231	Op232	Op233	Op234	Op235	Op236	Op237	Op238	Op239	Op240	Op241	Op242	Op243	Op244	Op245	Op246	Op247	Op248	Op249	Op250	Op251	Op252	Op253	Op254	Op255	Op256	Op257	Op258	Op259	Op260	Op261	Op262	Op263	Op264	Op265	Op266	Op267	Op268	Op269	Op270	Op271	Op272	Op273	Op274	Op275	Op276	Op277	Op278	Op279	Op280	Op281	Op282	Op283	Op284	Op285	Op286	Op287	Op288	Op289	Op290	Op291	Op292	Op293	Op294	Op295	Op296	Op297	Op298	Op299	Op300	Op301	Op302	Op303	Op304	Op305	Op306	Op307	Op308	Op309	Op310	Op311	Op312	Op313	Op314	Op315	Op316	Op317	Op318	Op319	Op320	Op321	Op322	Op323	Op324	Op325	Op326	Op327	Op328	Op329	Op330	Op331	Op332	Op333	Op334	Op335	Op336	Op337	Op338	Op339	Op340	Op341	Op342	Op343	Op344	Op345	Op346	Op347	Op348	Op349	Op350	Op351	Op352	Op353	Op354	Op355	Op356	Op357	Op358	Op359	Op360	Op361	Op362	Op363	Op364	Op365	Op366	Op367	Op368	Op369	Op370	Op371	Op372	Op373	Op374	Op375	Op376	Op377	Op378	Op379	Op380	Op381	Op382	Op383	Op384	Op385	Op386	Op387	Op388	Op389	Op390	Op391	Op392	Op393	Op394	Op395	Op396	Op397	Op398	Op399	Op400	Op401	Op402	Op403	Op404	Op405	Op406	Op407	Op408	Op409	Op410	Op411	Op412	Op413	Op414	Op415	Op416	Op417	Op418	Op419	Op420	Op421	Op422	Op423	Op424	Op425	Op426	Op427	Op428	Op429	Op430	Op431	Op432	Op433	Op434	Op435	Op436	Op437	Op438	Op439	Op440	Op441	Op442	Op443	Op444	Op445	Op446	Op447	Op448	Op449	Op450	Op451	Op452	Op453	Op454	Op455	Op456	Op457	Op458	Op459	Op460	Op461	Op462	Op463	Op464	Op465	
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5648					34,2344	00021	1		STORE	16D	
5649					34,2345	53575	0		VLOAD	UNIT	
5650					34,2346	00015	0			12D	
5651	REF	4	LAST	644	34,2347	26730	1		STOVL	SNTH	ALSO STORES CSTD AND O
5652	REF	8	LAST	645	34,2350	02307	1			RACT1	
5653					34,2351	75315	1		PDLV	SIGN	
5654	REF	5	LAST	645	34,2352	03564	0			VACT4	
5655	REF	3	LAST	645	34,2353	03615	0			RDOTV	
5656					34,2354	45076	1		VCOMP	CALL	
5657	REF	2	LAST	644	34,2355	46377	0			VECSHIFT	
5658	REF	4	LAST	644	34,2356	26744	1		STOVL	VVEC	
5659					34,2357	77614	1		SET		
5660	REF	3	LAST	644	34,2360	03466	0			RVSX	
5661	REF	3	LAST	644	34,2361	36655	1		STCALL	RVEC	
5662	REF	3	LAST	644	34,2362	24745	1			TIMETHET	
5663					34,2363	51125	0		PDDL	BPL	
5664	REF	4	LAST	646	34,2364	03615	0			RDOTV	
5665	REF	1			34,2365	70376	1			NTP/2	
5666					34,2366	45345	1		DLOAD	DSU	
5667	REF	2	LAST	644	34,2367	03602	0			HAFPA1	
5668					34,2370	52006	0		PUSH	GOTO	
5669	REF	2	LAST	646	34,2371	70376	1			NTP/2	
5670					34,2372	71201	1	CIRCL	SETPD	DLOAD	
5671					34,2373	00001	0			OOD	
5672	REF	7	LAST	645	34,2374	32364	1			P30ZERO	
5673					34,2375	77606	1		PUSH		
5674					34,2376	41345	0	NTP/2	DLOAD	DMP	
5675	REF	4	LAST	631	34,2377	03465	0			NN	
5676	REF	3	LAST	646	34,2400	03602	0			HAFPA1	
5677					34,2401	45261	0		SL	DSU	
5678					34,2402	20217	1			14D	
5679					34,2403	77615	0		DAD		
5680	REF	6	LAST	632	34,2404	03632	0			TCSI	
5681	REF	6	LAST	638	34,2405	03374	1		STORE	TCDH	
5682					34,2406	77021	1		BDSU	AXT,2	
5683	REF	10	LAST	638	34,2407	03634	0			TTPI	
5684					34,2410	00005	1			SD	
5685					34,2411	40240	0		BMN	SETPD	
5686	REF	4	LAST	644	34,2412	70776	0			SCND SQL	
5687					34,2413	00001	0			OD	
5688					34,2414	63375	0		VLOAD	PDLV	
5689	REF	6	LAST	646	34,2415	03564	0			VACT4	
5690	REF	9	LAST	646	34,2416	02307	1			RACT1	
5691					34,2417	77624	1		CALL		
5692	REF	1			34,2420	71062	0			INT1NT2C	
5693	REF	4	LAST	637	34,2421	26315	1		STOVL	RACT2	
5694	REF	7	LAST	627	34,2422	00007	0			VATT	
5695	REF	1			34,2423	27512	1		STOVL	VACT2	
5696	REF	4	LAST	632	34,2424	03504	0			VPASS1	

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5698				34,2426	00001 0		OD		
5699	REF	3	LAST	632	34,2427	03476 1	RFASS1		
5700					34,2430	77624 1	CALL		
5701	REF	2	LAST	646	34,2431	71062 0	INTINT2C		
5702	REF	3	LAST	637	34,2432	27520 0	STOVL	RPASS2	
5703	REF	8	LAST	646	34,2433	00007 0	VATT		
5704	REF	3	LAST	637	34,2434	37526 1	STCALL	VPASS2	
5705	REF	2	LAST	637	34,2435	71133 0	CDHMVR		
5706					34,2436	40375 1	VLOAD	SETPD	
5707	REF	5	LAST	646	34,2437	02315 1	RACT2		
5708					34,2440	00001 0	OD		
5709					34,2441	45115 0	PDVL	CALL	
5710	REF	3	LAST	637	34,2442	03542 1	VACT3		
5711	REF	2	LAST	627	34,2443	46277 1	PERI APO1		
5712					34,2444	77624 1	CALL		
5713	REF	6	LAST	645	34,2445	46407 0	SHIFTR1		
5714	REF	2	LAST	156	34,2446	27602 0	STOVL	POSTCDH	
5715	REF	4	LAST	647	34,2447	03542 1	VACT3		
5716					34,2450	63201 1	SETPD	PDVL	
5717					34,2451	00001 0	OD		
5718	REF	6	LAST	647	34,2452	02315 1	RACT2		
5719					34,2453	65325 0	PDDL	PDDL	
5720	REF	7	LAST	646	34,2454	03374 1	ICDH		
5721	REF	11	LAST	646	34,2455	03634 0	TIP1		
5722					34,2456	41525 0	PDDL	PUSH	
5723	REF	2	LAST	632	34,2457	33671 1	TWOP1		
5724					34,2460	77624 1	CALL		
5725	REF	2	LAST	632	34,2461	73422 1	INTINT		
5726					34,2462	77624 1	CALL		
5727	REF	2	LAST	637	34,2463	46363 0	ACTIVE		
5728					34,2464	77745 1	DLOAD		
5738	REF	4	LAST	329	34,2465	02263 1	ELEV		
5739					34,2466	73401 0	SETPD	SINE	
5740					34,2467	00007 0	6D		
5741					34,2470	53515 0	PDVL	UNIT	
5742	REF	1			34,2471	03534 0	RACT3		
5743					34,2472	00001 0	STORE	OOD	URA3 AT OOD
5744					34,2473	47315 0	PDVL	VXV	PL140,PL08D
5745	REF	4	LAST	644	34,2474	02265 1	UPI		
5746					34,2475	77656 1	UNIT		
5747					34,2476	71525 0	PDDL	COSINE	UNIT{URA3XUVA3XURA3} = UH3
5748	REF	5	LAST	647	34,2477	02263 1	ELEV		B1 PL14D
5749					34,2500	45561 1	VXSC	STADP	{COSLOS}(UH3)
5750					34,2501	77754 1	STORE	18D	PLUS
5751					34,2502	74345 0	DLOAD	VXSC	{SINLOS}(URA3) = U
5752					34,2503	76455 1	VAD	VSL1	B2 PL08D
5753					34,2504	00023 0	18D		B1
5754					34,2505	50206 0	PUSH	DOT	PL06D
5755	REF	2	LAST	647	34,2506	03534 0	RACT3		{U . RA3} = TEMPI
5756					34,2507	41552 0	SL1	PUSH	B1 +929=830 B29 PL08D

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5757		34,2510	72316 0	DSQ	TLOAD	TEMP1**2 B58
5758	REF 268 LAST 631	34,2511	00155 0		MPAC	
5759		34,2512	50315 0	PDVL	DOT	PL110
5760	REF 3 LAST 647	34,2513	03534 0		RACT3	
5761	REF 4 LAST 648	34,2514	03534 0		%ACT3	
5762		34,2515	57551 1	TLOAD	DCOMP	RA3,RA3
5763	REF 269 LAST 648	34,2516	00155 0		MPAC	
5764		34,2517	50315 0	PDVL	DOT	RP3,RP3 858 PL140
5765	REF 2 LAST 643	34,2520	03550 1		RPASS3	
5766	REF 3 LAST 648	34,2521	03550 1		RPASS3	PL110
5767		34,2522	76371 0	TAO	TAD	TEMP1**2+RA3.RA3+RP3.RP3=TEMP2 PL080
5768		34,2523	71244 0	BPL	DLOAD	
5769	REF 1	34,2524	70542 0		K10RK2	
5770	REF 4 LAST 643	34,2525	03604 0		LOOPCT	
5771		34,2526	77025 0	DSU	AXT,2	
5772	REF 2 LAST 643	34,2527	30072 1		ICPB28	
5773		34,2530	00001 0		10	
5774		34,2531	77654 0	BZE		
5775	REF 1	34,2532	72036 1		ALMXITA	
5776		34,2533	70545 1	DLOAD	SR1	
5777	REF 5 LAST 643	34,2534	03610 0		DEL DV	
5778	REF 6 LAST 648	34,2535	03610 0	STORE	DEL DV	
5779		34,2536	77621 1	8DSU		
5780	REF 1	34,2537	03574 1		DVPREV	
5781	REF 8 LAST 644	34,2540	37572 0	STCALL	DEL VCSI	
5782	REF 1	34,2541	70165 1		CS1/81	
5783		34,2542	41566 1	K10RK2 SQRT	PUSH	TEMP3 = TEMP2**5 829 PL100
5784		34,2543	45276 0	OCOMP	DSU	
5785		34,2544	00007 0		060	-TEMP1-TEMP3 =K2 AT 100
5786		34,2545	14013 0	STODL	100	PL080
5787		34,2546	45425 0	DSU	STADR	PL060
5788		34,2547	77762 1	STORE	120	-TEMP1+TEMP3 =K1 AT 120
5789		34,2550	77646 0	ABS		
5790		34,2551	14017 1	STODL	140	
5791		34,2552	00013 0		100	
5792		34,2553	45246 0	ABS	DSU	
5793		34,2554	00017 1		140	
5794		34,2555	71240 1	BMN	DLOAD	
5795	REF 1	34,2556	70561 1		K2.	
5796		34,2557	00015 0		120	
5797		34,2560	00013 0	STORE	100	K=K1
5798		34,2561	77745 1	K2. DLOAD		
5799		34,2562	00013 0		100	
5800		34,2563	76561 1	VXSC	VSL1	
5801		34,2564	53455 0	VAD	UNIT	V=RA3+KU UNIT B1
5802	REF 5 LAST 648	34,2565	03534 0		RACT3	
5803		34,2566	53515 0	POVL	UNIT	PL060
5804	REF 4 LAST 648	34,2567	03550 1		RPASS3	
5805		34,2570	53515 0	PDVL	UNIT	PL120
5806	REF 1	34,2571	03556 1		VPASS3	

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5807				34,2572	63235 0	VXV	PDVL	UVP3 X URP3	PL18D
5808				34,2573	00007 0		06D		
5809				34,2574	00007 0		06D		
5810				34,2575	50235 0	VXV	DOT		
5811				34,2576	00001 0		00D		
5812				34,2577	77626 0	STADR			PL12D
5813				34,2600	53762 1	STOVL	12D	(URP3XV).(UVP3XURP3)=TEMP	PL06D
5814				34,2601	72441 0	DOT	SL1		PL00D
5815				34,2602	75326 1	ARCCOS	SIGN		
5816				34,2603	00015 0		12D		B0
5817				34,2604	41542 1	SR1	PUSH	GAMMA=SIGN(TEMP)ARCOS(UNITV.URP3)	PL02D
5818				34,2605	71214 0	BON	DLOAD		
5819	REF	2	LAST	642	34,2606		S32.1F2		
5820	REF	1			34,2607		FRSTPAS		
5821					34,2610		00D	NOT THE FIRST PASS OF A CYCLE	
5822					34,2611	DSU	PDDL	GAMMA-GAMPREV	B1 PL04D
5823	REF	2	LAST	157	34,2612		GAMPREV		
5824	REF	9	LAST	648	34,2613		DELVCSI		
5825					34,2614	DSU	NORM		B7
5826	REF	2	LAST	648	34,2615		DVPREV		
5827	REF	9	LAST	645	34,2616		X1		
5828					34,2617	BDDV	PDDL	(GAM-GAMPREV)/(DV-DVPREV)	B-6+N1 PL06D
5829					34,2620		02D	= SLOPE	
5830	REF	10	LAST	649	34,2621		DELVCSI		
5831	REF	3	LAST	649	34,2622	STORE	DVPREV		
5832					34,2623	BOFF	BOFF		
5833	REF	3	LAST	644	34,2624		S32.1F3A		
5834	REF	1			34,2625		THRDCHK		
5835	REF	3	LAST	644	34,2626		S32.1F3B		
5836	REF	2	LAST	649	34,2627		THRDCHK		
5837					34,2630	DLOAD	DMP		
5838					34,2631		02D		
5839	REF	3	LAST	649	34,2632		GAMPREV		
5840					34,2633	BPL	DLOAD		
5841	REF	1			34,2634		FIFTYFPS		
5842	REF	2	LAST	643	34,2635		INITST		
5843					34,2636	SIGN			
5844	REF	7	LAST	648	34,2637		DELDV		
5845	REF	8	LAST	649	34,2640	STORE	DELDV		
5846					34,2641	SET	CLEAR		
5847	REF	4	LAST	649	34,2642		S32.1F3A		
5848	REF	4	LAST	649	34,2643		S32.1F3B		
5849					34,2644	FRSTPAS	DLOAD		
5850					34,2645		00D		
5851	REF	4	LAST	649	34,2646		GAMPREV		
5852	REF	11	LAST	649	34,2647	STOVL	DELVCSI		
5853	REF	4	LAST	649	34,2650	STORE	DVPREV		
5854					34,2651	DSU	CLEAR		
5855	REF	9	LAST	649	34,2652		DELDV		
5856	REF	3	LAST	649	34,2653		S32.1F2		

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5857	REF	12	LAST	649	34,2654	37572 0	STCALL	DELVCSI
5858	REF	2	LAST	648	34,2655	70165 1		CSI/B1
5859					34,2656	43014 0	THRDCHK	BON
5860	REF	5	LAST	649	34,2657	03302 0		S32.1F3A
5861	REF	1			34,2660	70702 0		NEWTN
5862	REF	5	LAST	649	34,2661	03303 1		S32.1F3B
5863	REF	2	LAST	650	34,2662	70702 0		NEWTN
5864					34,2663	75345 1	FIFTYFPS	DLOAD
5865	REF	1			34,2664	30102 1		SIGN
5866					34,2665	00005 1		FIFPSDP
5867					34,2666	77765 0		04D
5868	REF	5	LAST	649	34,2667	03606 1	SIGN	GAMPREV
5869	REF	10	LAST	649	34,2670	03610 0	STORE	DELDV
5870					34,2671	43276 0	DCOMP	DAD
5871	REF	13	LAST	650	34,2672	03572 1		DELVCSI
5872	REF	14	LAST	650	34,2673	17572 1	STODL	DELVCSI
5873					34,2674	00001 0		OOD
5874					34,2675	43014 0	SET	SET
5875	REF	6	LAST	650	34,2676	03063 1		S32.1F3B
5876	REF	6	LAST	650	34,2677	03062 0		S32.1F3A
5877	REF	6	LAST	650	34,2700	37606 0	STCALL	GAMPREV
5878	REF	1			34,2701	70176 0		CSI/B2
5879					34,2702	60345 0	NEWTN	DLOAD
5880					34,2703	00005 1		NORM
5881	REF	5	LAST	645	34,2704	00050 1		04D
5882					34,2705	54065 0	BDDV	X2
5883					34,2706	00001 0		XSU,1
5884	REF	6	LAST	650	34,2707	00047 1		OOD
5885					34,2710	77657 0		X2
5886					34,2711	20601 1	SR*	
5887	REF	11	LAST	650	34,2712	17610 0		0,1
5888					34,2713	00001 0	STODL	DELDV
5889	REF	7	LAST	650	34,2714	03606 1		OOD
5890					34,2715	51545 1	STORE	GAMPREV
5891	REF	12	LAST	650	34,2716	03610 0	DLOAD	ABS
5892					34,2717	45206 1		DELDV
5893	REF	1			34,2720	30076 0	PUSH	DSU
5894					34,2721	71240 1		EPSILN1
5895	REF	1			34,2722	70737 0	BMN	DLOAD
5896					34,2723	50025 0		CSI/SOL
5897	REF	1			34,2724	30106 0	DSU	BMN
5898	REF	1			34,2725	70732 0		DFLMAX1
5899					34,2726	75345 1		CSISTEP
5900	REF	2	LAST	650	34,2727	30106 0	DLOAD	SIGN
5901	REF	13	LAST	650	34,2730	03610 0		DELMAX1
5902	REF	14	LAST	650	34,2731	03610 0	STORE	DELDV
5903					34,2732	45345 1	DLOAD	DSU
5904	REF	15	LAST	650	34,2733	03572 1	CSISTEP	DELVCSI
5905	REF	15	LAST	650	34,2734	03610 0		DELDV
5906	REF	16	LAST	650	34,2735	37572 0	STCALL	DELVCSI

PL08D

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5907	REF	3	LAST	650	34,2736	70165	1			CSI/B1	
5908					34,2737	77145	1	CSI/SOL	DLOAD	AXT,2	
5909	REF	2	LAST	644	34,2740	03600	1			POSTCS1	
5910					34,2741	00002	0			2	
5911					34,2742	77750	0		LXA,1		
5912	REF	3	LAST	644	34,2743	03375	0			RTX1	
5913					34,2744	50023	0		DSU*	BMN	
5914	REF	1			34,2745	30072	1			PMINF -2,1	
5915	REF	5	LAST	646	34,2746	70776	0			SCNDSOL	
5916					34,2747	71374	1		AXT,2	DLOAD	
5917					34,2750	00003	1			3	
5918	REF	3	LAST	647	34,2751	03602	0			POSTCDH	
5919					34,2752	50023	0		DSU*	BMN	
5920	REF	2	LAST	651	34,2753	30072	1			PMINE -2,1	
5921	REF	6	LAST	651	34,2754	70776	0			SCNDSOL	
5922					34,2755	45345	1		DLOAD	DSU	
5923	REF	8	LAST	647	34,2756	03374	1			TCDH	
5924	REF	7	LAST	646	34,2757	03632	0			TCSI	
5925	REF	7	LAST	638	34,2760	02257	0		STORE	T1TOT2	
5926					34,2761	45374	0		AXT,2	DSU	
5927					34,2762	00004	0			4	
5928	REF	1			34,2763	30112	0			TMIN	
5929					34,2764	77040	0		BMN	AXT,2	
5930	REF	7	LAST	651	34,2765	70776	0			SCNDSOL	
5931					34,2766	00005	1			5	
5932					34,2767	45345	1		DLOAD	DSU	
5933	REF	12	LAST	647	34,2770	03634	0			ITPI	
5934	REF	9	LAST	651	34,2771	03374	1			TCDH	
5935	REF	5	LAST	638	34,2772	02261	0		STORE	T2TOT3	
5936					34,2773	51025	1		DSU	BPL	
5937	REF	2	LAST	651	34,2774	30112	0			TMIN	
5938	REF	1			34,2775	72116	1			P32/P72C	
5939					34,2776	43014	0	SCNDSOL	BON	BOFF	
5940	REF	7	LAST	650	34,2777	03302	0			S32.1F3A	
5941	REF	1			34,3000	72040	0			ALMXIT	
5942	REF	7	LAST	650	34,3001	03343	0			S32.1F3B	
5943	REF	2	LAST	651	34,3002	72040	0			ALMXIT	
5944					34,3003	71334	0		SXA,2	DLOAD	
5945	REF	5	LAST	643	34,3004	03611	1			CSIALRM	
5946	REF	8	LAST	646	34,3005	32364	1			P30ZFRD	
5947					34,3006	43014	0		CLEAR	SET	
5948	REF	4	LAST	644	34,3007	03260	0			S32.1E1	
5949	REF	4	LAST	649	34,3010	03061	0			S32.1F2	
5950					34,3011	43014	0		CLEAR	CLEAR	
5951	REF	8	LAST	651	34,3012	03262	1			S32.1F3A	
5952	REF	8	LAST	651	34,3013	03263	0			S32.1F3B	
5953	REF	5	LAST	648	34,3014						

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P6000 ADVANCE

R6050 SLBRROUTINES USED

R6051 PRECSET
R6052 ROTATE

6100					34,3016	71220 1	ADVANCE	STQ	DLOAD
6101	REF	9	LAST	642	34,3017	03466 0			SUBEXIT
6102	REF	12	LAST	637	34,3020	03440 1			TIG
6103	REF	21	LAST	626	34,3021	34041 0		STCALL	TDEC1
6104	REF	1			34,3022	46341 0			PRECSET
6105					34,3023	77214 0		SET	VLOAD
61055	REF	2	LAST	625	34,3024	01067 1			XDELVFLG
6106	RFF	2	LAST	648	34,3025	03556 1			VPASS3
6107	REF	4	LAST	647	34,3026	03526 0		STORE	VPASS2
6108	REF	5	LAST	646	34,3027	27504 0		STOVI	VPASS1
6109	REF	5	LAST	648	34,3030	03550 1			RPASS3
6110	REF	4	LAST	647	34,3031	03520 0		STORE	RPASS2
6111	REF	4	LAST	647	34,3032	03476 1		STORE	RPASS1
6112					34,3033	47256 0		UNIT	VXV
6113	REF	6	LAST	652	34,3034	03504 0			VPASS1
6114					34,3035	77656 1		UNIT	
6115	REF	5	LAST	647	34,3036	26265 1		STOVL	UPI
6116	REF	6	LAST	648	34,3037	03534 0			RACT3
6117	REF	5	LAST	627	34,3040	37640 1		STCALL	RTIG
6118	REF	1			34,3041	71052 0			ROTATE
6119	REF	7	LAST	647	34,3042	02315 1		STORE	RACT2
6120	REF	10	LAST	646	34,3043	26307 1		STOVL	RACT1
6121	REF	5	LAST	647	34,3044	03542 1			VACT3
6122	REF	4	LAST	627	34,3045	37646 1		STCALL	VTIG
6123	REF	2	LAST	652	34,3046	71052 0			ROTATE
6124	REF	2	LAST	646	34,3047	03512 1		STORE	VACT2
6125	REF	4	LAST	644	34,3050	37470 0		STCALL	VACT1
6126	REF	10	LAST	652	34,3051	03466 0			SUBEXIT

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P6200 ROTATE

6300				34,3052	41406 0	ROTATE	PUSH	PUSH
6301				34,3053	74241 0		DOT	VXSC
6302	REF	6	LAST	652	34,3054	02265 1		UP1
6303	REF	7	LAST	653	34,3055	02265 1		UP1
6304				34,3056	51352 1		VSL2	BVSU
6305				34,3057	63256 0		UNIT	PDVL
6306				34,3060	74246 1		ABVAL	VXSC
6307				34,3061	43572 0		VSL1	RVQ

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P7000 INTINTNA

7100				34,3062	65325 0	INTINT2C PDDL	PDDL
7101	REF	8	LAST	651	34,3063	03632 0	TCSI
7102	REF	10	LAST	651	34,3064	03374 1	TCDH
7103				34,3065	41525 0		PDDL
7104	REF	3	LAST	647	34,3066	33671 1	TWOPI
7105				34,3067	77650 1	GOTO	
7106	REF	3	LAST	647	34,3070	73422 1	INTINT
7107				34,3071	65325 0	INTINT3P PDDL	PDDL
7108	REF	11	LAST	654	34,3072	03374 1	TCDH
7109	REF	13	LAST	651	34,3073	03634 0	TIP1
7110				34,3074	41525 0		PDDL
7111	REF	9	LAST	651	34,3075	32364 1	P30ZERO
7112				34,3076	77650 1	GOTO	
7113	REF	4	LAST	654	34,3077	73422 1	INTINT

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P7400 S32/33.1

R7450 SUBROUTINES USED

R7451 S32/33.X

7500				34,3100	76020 1	S32/33.1 STQ	AXT,1
75001	REF	11	LAST	652	34,3101	03466 0	SUBEXIT
75002				34,3102	01521 0	VN	0681
75003				34,3103	77624 1	CALL	
75004	REF	2	LAST	633	34,3104	72334 0	DISDVLVC
7501				34,3105	77624 1	CALL	
7502	REF	2	LAST	640	34,3106	71120 1	S32/33.X
7503				34,3107	61375 1	VLOAD	VXM
7504	REF	14	LAST	640	34,3110	03432 1	DELVLVC
7505				34,3111	00001 0		OD
75051				34,3112	77772 0	VSL1	
7506	REF	7	LAST	627	34,3113	03654 0	STORE DELVSIN
7507				34,3114	51406 1	PUSH	ABVAL
7508	REF	3	LAST	627	34,3115	27662 0	STOVL DELVSAB
7509				34,3116	77650 1	GOTO	
7510	REF	12	LAST	655	34,3117	03466 0	SUBEXIT

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P7800 S32/33.X

7900				34,3120	77201 1	S32/33.X SETPD	VLOAD
7901				34,3121	00007 0		6D
7902	REF	8	LAST	653	34,3122	02265 1	UP1
7903				34,3123	63276 1	VCOMP	PDVL
7904	REF	11	LAST	652	34,3124	02307 1	RACT1
7905				34,3125	57456 1	UNIT	VCOMP
7906				34,3126	47206 0	PUSH	VXV
7907	REF	9	LAST	656	34,3127	02265 1	UP1
7908				34,3130	77772 0	VSL1	
7909				34,3131	00001 0	STORE	OD
7910				34,3132	77616 0	RVQ	

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P8000 CDHMVR

R8050 SUBROUTINES USED

R8051 VECSHIFT
 R8052 TIME THET
 R8053 SHIFTRI

8100				34,3133	77220 1	CDHMVR	STQ	VLDAD	
8101	REF	13	LAST	655	34,3134			SUBEXIT	
8102	REF	8	LAST	652	34,3135			RACT2	
8103					34,3136		PUSH	UNIT	
8104	REF	1			34,3137		STOVL	UNVEC	UR SUB A
8105	REF	5	LAST	652	34,3140			RPASS2	
8106					34,3141		UNIT	DOT	
8107	REF	2	LAST	657	34,3142			UNVEC	
8108					34,3143		PUSH	SL1	
8109	REF	3	LAST	506	34,3144		STODL	CSTH	
8110					34,3145		DSQ	PDDL	
8111	REF	4	LAST	596	34,3146			DP1/4TH	
8112					34,3147		SR2	DSU	
8113					34,3150		SQRT	SL1	
8114					34,3151		PDVL	VCDMP	
8115					34,3152		VXV		
8116	REF	6	LAST	657	34,3153			RPASS2	
8117					34,3154		DOT	PDDL	
8118	REF	10	LAST	656	34,3155			UP1	
8119					34,3156		SIGN	STADP	
8120	REF	5	LAST	646	34,3157		STOVL	SNTH	
8121	REF	7	LAST	657	34,3160			RPASS2	
8122					34,3161		PDVL	CALL	
8123	REF	5	LAST	652	34,3162			VPASS2	
8124	REF	3	LAST	646	34,3163			VECSHIFT	
8125	REF	5	LAST	646	34,3164		STOVL	VVEC	
8126					34,3165		CLEAR		
8127	REF	4	LAST	646	34,3166			RVSU	
8128	REF	4	LAST	646	34,3167		STCALL	RVEC	
8129	REF	4	LAST	646	34,3170			TIME THET	
8130					34,3171		LXA,2	VSL*	
8131	REF	3	LAST	627	34,3172			RTX2	
8132					34,3173			0,2	
8133					34,3174		STORE	18D	
8134					34,3175		DOT	SL1R	
8135	REF	3	LAST	657	34,3176			UNVEC	
8136					34,3177		PDVL	ABVAL	OD = V SUB PV
8137					34,3200		SL*	PDVL	
8138					34,3201			0,2	
8139	REF	9	LAST	657	34,3202			RACT2	
8140					34,3203		ABVAL	PDDL	2D = LENGTH OF R SUB A
8141					34,3204		DSU		

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8142				34,3205	00003 1		02D				
8143	REF	4	LAST	331	34,3206	17576 0	STODL	DIFF ALT	DELTA H IN METERS	B+29	
8144	REF	2	LAST	140	34,3207	02742 1		RIA			
8145					34,3210	65301 0	NORM	PDDL	2 - R V** / MU		04D
8146	REF	10	LAST	649	34,3211	00047 1		X1			
8147	REF	3	LAST	645	34,3212	00041 1		R1			
8148					34,3213	77624 1	CALL				
8149	RFF	7	LAST	647	34,3214	46407 0		SHIFTRI			
8150					34,3215	56362 0	SR1R	DDV			
8151					34,3216	41457 1	SL*	PUSH			
8152					34,3217	20174 1		0 -5,1			
8153					34,3220	65225 1	DSU	PDDL	A SUB A	B+29	04D
8154	RFF	5	LAST	658	34,3221	03576 0		DIFF ALT			
8155					34,3222	56302 0	SR2	DDV	A SUB P	B+31	
8156					34,3223	00005 1		04D		B+2	
8157					34,3224	75406 1	PUSH	SQRT	A SUB P/A SUB A	06D	
8158					34,3225	41275 1	DMPR	DMP			
8159					34,3226	00007 0		06D			
8160					34,3227	00001 0		00D			
8161					34,3230	65272 0	SL3R	PDDL	V SUB AV METERS/CS	B+7	08D
8162					34,3231	00003 1		02D	R SUB A MAGNITUDE	B+29	
8163					34,3232	65301 0	NORM	PDDL			
8164	REF	11	LAST	658	34,3233	00047 1		X1			
8165	REF	2	LAST	643	34,3234	02325 1		RTMU			
8166					34,3235	56342 1	SP1	DDV	2MU B+38		
8167					34,3236	65257 1	SL*	PDDL	2 MU/R SUBAA	B+14	10D
8168					34,3237	20174 1		0 -5,1			
8169					34,3240	00005 1		04D	ASUBA	B+29	
8170					34,3241	65301 0	NORM	PDDL			
8171	REF	7	LAST	650	34,3242	00050 1		X2			
8172	REF	3	LAST	658	34,3243	02325 1		RTMU			
8173					34,3244	56342 1	SR1	DDV			
8174					34,3245	44257 1	SL*	BDSU			
8175					34,3246	57604 1		0 -6,2	2U/R - U/A	B+14 (METERS/CS)SQ	
8176					34,3247	63525 0	PDDL	DSQ			10D
8177					34,3250	00011 1		08D			
8178					34,3251	75421 1	BDSU	SQRT			
8179					34,3252	47315 0	PDVL	VXV	SQRT(MU(2/R SUB A-1/A SUB A)-VSUBA2)10D		
8180	REF	11	LAST	657	34,3253	02265 1		UPI			
8181	REF	4	LAST	657	34,3254	03542 1		UNVEC			
8182					34,3255	74256 0	UNIT	VXSC			
8183					34,3256	00013 0		10D			
8184					34,3257	74315 0	PDVL	VXSC			
8185	REF	5	LAST	658	34,3260	03542 1		UNVFC			
8186					34,3261	00011 1		08D			
8187					34,3262	76455 1	VAD	VSL1			
8188					34,3263	77626 0	STADR				
8189	RFF	6	LAST	652	34,3264	74235 0	STORE	VACT3			
8190					34,3265	77651 0	VSU				
8191	REF	3	LAST	652	34,3266	03512 1		VACT2			

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8199	REF	6	LAST	638	34,3267	36301 0
8200	REF	14	LAST	657	34,3270	03466 0

STCALL DELVEET2
SU8EXIT

DELTA VCDH - REFERENCE COORDINATES

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P8201 COMPTGO

R8202 SUBROUTINES USED

R8203 CLOK TASK
R8204 2PHSCHNG

8205				35,2376	BANK 35
8206	REF	2	LAST	631	35,2000
8207				35,2376	SETLOC CSI/CDH
					BANK

8208	REF	1		E7,1463	EBANK= RTRN
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8209	REF	1			COUNT* \$\$/P3575
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8210				35,2376	0 0006 1	COMPTGO	EXTEND
8211	REF	2	LAST	660	35,2377	23'463 1	QXCH RTRN
8212	REF	127	LAST	617	35,2400	3 4755 1	CAF ZERO
8213	REF	1			35,2401	55'163 0	TS DISPDEX
8214	REF	40	LAST	616	35,2402	3 4752 0	CAF RIT2
8215					35,2403	0 0004 0	INHINT
8216	REF	29	LAST	615	35,2404	0 5203 0	TC WAITLIST
8217	REF	2	LAST	257	E7,1453		EBANK= WHICH
8218	REF	2	LAST	258	35,2405	02722 1	2CABR CLOK TASK
8219					35,2406	74067 0	
8220	REF	3	LAST	514	35,2407	0 5327 1	TC 2PHSCHNG
8221					35,2410	40036 0	OCT 40036
8222					35,2411	05024 1	OCT 05024
8223	REF	3	LAST	660	35,2412	13000 0	OCT 13000
					35,2413	0 1463 1	TC RTRN

L GENERAL LAMBERT AIMPDINT GUIDANCE

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P0001 GENERAL LAMBERT AIMPOINT GUIDANCE **

R0002 WRITTEN BY RAMA M AIYAWAR

R0003 PROGRAM P-31 DESCRIPTION **

R0004 1. TO ACCEPT TARGETING PARAMETERS OBTAINED FROM A SOURCE EXTERNAL
R0005 TO THE LEM AND COMPUTE THERE FROM THE REQUIRED-VELOCITY AND
R0006 OTHER INITIAL CONDITIONS REQUIRED BY LM FOR DESIRED MANEUVER.
R0007 THE TARGETING PARAMETERS ARE TIG (TIME OF IGNITION), TARGET
R0008 VECTDR (RTARG), AND THE TIME FROM TIG UNTIL THE TARGET IS
R0009 REACHED(DELTT4), DESIRED TIME OF FLIGHT FROM RINIT TO RTARG..

R0010 ASSUMPTIONS **

R0011 1. THE TARGET PARAMETERS MAY HAVE BEEN LOADED PRIOR TO THE
R0012 EXECUTION OF THIS PROGRAM.
R0013 2. THIS PROGRAM IS APPLICABLE IN EITHER EARTH OR LUNAR ORBIT.
R0014 3. THIS PROGRAM IS DESIGNED FOR ONE-MAN OPERATION, AND SHOULD
R0015 BE SELECTED BY THE ASTRONAUT BY DSKY ENTRY V37 E31.

R0016 SUBROUTINES USED **

R0017 MANUPARM, TTG/N35, R02BOTH, MIDGIM, DISPMGA, FLAGDOWN, BANKCALL,
R0018 GCTOPCCH, ENDDFJOB, PHASCHNG, GOFLASHR, GOFLASH.

R0019 MANUPARM CALCULATES APOGEE, PERIGEE ALTITUDES AND DELTAV DESIRED
R0020 FOR THE MANEUVER.

R0021 TTG/N35 CLOCKTASK - UPDATES CLOCK.

R0022 MIDGIM CALCULATES MIDDLE GIMBAL ANGLE FOR DISPLAY.

R0023 R02BOTH IMU - STATUS CHECK ROUTINE.

R0024 DISPLAYS USED IN P-31LM **

R0025 VC6N33 DISPLAY SORTED TIG (IN HRS. MINS. SECS)
R0026 VC6N42 DISPLAY APOGEE, PERIGEE, DELTAV.
R0027 V16N35 DISPLAY TIME FROM TIG.
R0028 V06N45 TIME FROM IGNITION AND MIDDLE GIMBAL ANGLE.

R0029 ERASABLE INITIALIZATION REQUIRED **

R0030 TIG TIME OF IGNITION DP (B+28) CS.

R0031 DELTT4 DESIRED TIME OF FLIGHT DP (B+28) CS
R0032 FROM RINIT TO RTARG .

R0033 RTARG RADIUS VECTOR OF TARGET POSITION VVECTOR
R0034 RADIUS VECTOR SCALED TO (B+29) METERS IF EARTH ORBIT

L GENERAL LAMBERT AIMPOINT GUIDANCE

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R0035 RADIUS VECTOR SCALED TO (B+27) METERS IF MOON ORBIT

R0036 OUTPUT **

R0037 HAPD APOGEE ALTITUDE
 R0038 HPER PERIGEE ALTITUDE
 R0039 VGDISP MAG.OF DELTAV FOR DISPLAY, SCALING B+7 M/CS EARTH
 R0040 MAG.OF DELTAV FOR DISPLAY, SCALING B+5 M/CS MOON

R0041 MIDGIM MIDDLE GIMBAL ANGLE
 R0042 XDELVFLG RESETS XDELVFLG FOR LAMBERT VG COMPUTATIONS

R0043 ALARMS OR ABORTS NONE **

R0044 RESTARTS ARE VIA GROUP 4 **

0045 REF 1 35,2000 SETLOC GLM
 0046 35,2414 BANK

0047 REF 15 LAST 659 E7,1466 EBANK= SUBEXIT

0048	REF	1						COUNT*	\$/P31	
0049	REF	3	LAST	637	35,2414	0	2325	1	P31	TC P20FLGON
0051	REF	2	LAST	624	35,2415	3	2025	1		CAF V06N33 TIG
0052	REF	10	LAST	640	35,2416	0	3651	0		TC VNPOOH
0053	REF	66	LAST	640	35,2417	0	6036	1		TC INTPRET
0054					35,2420	7	1214	0		CLEAR DLOAD
0055	REF	9	LAST	639	35,2421	0	0670	0		UPDATFLG
0056	REF	13	LAST	652	35,2422	0	3440	1		TIG
0057	REF	22	LAST	652	35,2423	3	4041	0		STCALL TDEC1 INTEGRATE STATE VECTORS TO TIG
0058	REF	4	LAST	626	35,2424	2	7057	0		LMPREC
0059					35,2425	4	0375	1		VLOAD SETPD
0060	REF	11	LAST	627	35,2426	0	0001	0		RATT
0061					35,2427	0	0001	0		OD
0062	REF	6	LAST	652	35,2430	0	0364	0		STORE RTIG
0063	REF	1			35,2431	2	6327	0		STOVL RINIT
0064	REF	9	LAST	647	35,2432	0	0007	0		VATT
0065	REF	5	LAST	652	35,2433	0	0364	0		STORE VTIG
0066	REF	1			35,2434	1	6335	0		STODL VINIT
0067	REF	10	LAST	654	35,2435	3	2364	1		P30ZERO
0068					35,2436	6	5206	0		PUSH PDDL E4 AND NUMIT = 0
0069	REF	3	LAST	213	35,2437	0	0345	0		DELLT4
0070					35,2440	6	6015	0		DAD SXA,1
0071	REF	14	LAST	662	35,2441	0	0344	1		TIG
0072	REF	4	LAST	651	35,2442	0	0337	0		RTX1
0073	REF	4	LAST	213	35,2443	0	0362	1		STORE TPASS4
0074					35,2444	4	5134	0		SXA,2 CALL
0075	REF	4	LAST	657	35,2445	0	0337	0		RTX2
0076	REF	1			35,2446	2	2000	1		INITVEL
0077					35,2447	4	1575	0		VLOAD PUSH

L GENERAL LAMBERT AIMPOINT GUIDANCE

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0078	REF	3	LAST	213	35,2450	03366	1		DELVEET3	
0079	REF	8	LAST	655	35,2451	03654	0	STORE	DELVSIN	
0080					35,2452	43046	1	ABVAL	CLEAR	
0081	REF	3	LAST	652	35,2453	01267	0		XDELVFLG	
0082	REF	3	LAST	329	35,2454	37662	1	STCALL	VGDISP	
0083	REF	1			35,2455	20021	0		GET.LVC	
0084					35,2456	63375	0	VLOAD	PDVL	
0085	REF	7	LAST	662	35,2457	03640	0		RTIG	
0086	REF	1			35,2460	02343	1		VIPRIME	
0087					35,2461	77624	1	CALL		
0088	REF	3	LAST	647	35,2462	46277	1		PERIAP01	
0089					35,2463	77624	1	CALL		
0090	REF	8	LAST	658	35,2464	46407	0		SHIFTR1	
00902					35,2465	77624	1	CALL		LIMIT DISPLAY TO 9999.9 N. MI.
00904	REF	3	LAST	627	35,2466	45636	0		MAXCHK	
0091	REF	3	LAST	627	35,2467	16325	1	STODL	HPER	
0092					35,2470	00005	1		4D	
0093					35,2471	77624	1	CALL		
0094	REF	9	LAST	663	35,2472	46407	0		SHIFTR1	
00942					35,2473	77624	1	CALL		LIMIT DISPLAY TO 9999.9 N. MI.
00944	REF	4	LAST	663	35,2474	45636	0		MAXCHK	
0095	REF	5	LAST	627	35,2475	02323	1	STORE	HAPO	
0096					35,2476	77776	1	EXIT		
0097	REF	2	LAST	624	35,2477	3 3666	1	CAF	V06N81	DELVLVC
0098	REF	11	LAST	662	35,2500	0 3651	0	TC	VNPOOH	
0099	REF	2	LAST	624	35,2501	3 2026	1	CAF	V06N42	HAPO, HPER, VGDISP
0100	REF	12	LAST	663	35,2502	0 3651	0	TC	VNPOOH	
0101	REF	67	LAST	662	35,2503	0 6036	1	TC	INTPRET	
0102					35,2504	45014	0	REVN1645 SET	CALL	TRKMKCNT, TTOGO, +MGA
0103	REF	3	LAST	638	35,2505	01071	0		FINALFLG	
0104	REF	3	LAST	638	35,2506	73542	0		VN1645	
0105					35,2507	77650	1	GOTO		
0106	REF	2	LAST	625	35,2510	72504	0		REVN1645	

*** END OF LEMP30S .102 ***

L GROUND TRACKING DETERMINATION PROGRAM - P21

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P0001 GROUND TRACKING DETERMINATION PROGRAM P21

R0002 PROGRAM DESCRIPTION

R0003 MCD NO - 1

R0004 MCD BY - N.M.NEVILLE

R0005 FUNCTIONAL DESCRIPTION-

R0006 TO PROVIDE THE ASTRONAUT DETAILS OF THE LM OR CSM GROUND TRACK WITHOUT

R0007 THE NEED FOR GROUND COMMUNICATION (REQUESTED BY DSKY).

R0008 CALLING SEQUENCE -

R0009 ASTRONAUT REQUEST THROUGH DSKY V37E21E

R0010 SUBROUTINES CALLED-

R0011

R0012

R0013

R0014 GCPREF4

R0015 GCFLASH

R0016 THISPREC

R0017 OTHPREC

R0018 LAT-LONG

R0019 NORMAL EXIT MODES-

R0020

R0021 ASTRONAUT REQUEST THROUGH DSKY TO TERMINATE PROGRAM V34E

R0022 ALARM OR ABORT EXIT MODES-

R0023

R0024 NCNE

R0025 OUTPUT -

R0026

R0027 OCTAL DISPLAY OF OPTION CODE AND VEHICLE WHOSE GROUND TRACK IS TO BE

R0028 COMPUTED

R0029 OPTION CODE 00002

R0030 THIS 00001

R0031 OTHER 00002

R0032 DECIMAL DISPLAY OF TIME TO BE INTEGRATED TO HOURS , MINUTES , SECONDS

R0033 DECIMAL DISPLAY OF LAT, LONG, ALT

R0034 ERASABLE INITIALIZATION REQUIRED

R0035

R0036 AXD 2DEC 4.652459653 E-5 RADIANS %68-69 CONSTANTS"

R0037

R0038 -AYD 2DEC 2.147535898 E-5 RADIANS

R0039

R0040 AZD 2DEC .7753206164 REVOLUTIONS

R0041 FOR LUNAR ORBITS 504LM VECTOR IS NEEDED

R0042

R0043 504LM 2DEC -2.700340600 E-5 RADIANS

R0044

R0045 504LM _2 2DEC -7.514128400 E-4 RADIANS

R0046

R0047 504LM _4 2DEC -2.553198641 E-4 RADIANS

R0048

R0049 NCNE

R0050 DEBRIS

L GROUND TRACKING DETERMINATION PROGRAM - P21

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R0051
R0052 CENTRALS-A,Q,L
R0053 OTHER-THOSE USED BY THE ABOVE LISTED SUBROUTINES
R0054 SEE LEMPREC,LAT-LONG
0055 REF 8 LAST 504 30,2000 SBANK= LOWSUPER FOR LOW 2CADR'S.

0056 33,2200 BANK 33
0057 REE 8 LAST 616 24,2000 SETLOC P20S
0058 24,3402 BANK

0059 REE 3 LAST 255 E7,1756 EBANK= P21TIME
0060 REF 1 COUNT* $$/P21
0061 REE 80 LAST 622 24,3402 3 4753 1 PROG21 CAE ONE
0062 REE 3 LAST 505 24,3403 55'145 1 TS OPTION2 ASSUMED VEHICLE IS LM , R2 = 00001
0063 REF 41 LAST 660 24,3404 3 4752 0 CAF BIT2 OPTION 2
0064 REF 156 LAST 637 24,3405 0 4616 1 TC BANKCALL
0065 REE 2 LAST 505 24,3406 20506 0 CADR GOPERE4
0066 REE 12 LAST 637 24,3407 0 6001 0 TC GOTOPPOOH
0067 24,3410 0 3412 0 TC +2
0068 24,3411 0 3404 1 TC -5
0069 REF 1 24,3412 3 3503 1 P21PROG1 CAF V6N34
0070 REE 157 LAST 665 24,3413 0 4616 1 TC BANKCALL
0071 REF 11 LAST 637 24,3414 20351 1 CADR GOF1ASH
0072 REE 13 LAST 665 24,3415 0 6001 0 TC GOTOPPOOH
0073 24,3416 0 3420 1 TC +2
0074 24,3417 0 3412 0 TC -5
0075 REE 68 LAST 663 24,3420 0 6036 1 TC INTPRET
0076 24,3421 77745 1 DLOAD
0077 REF 23 LAST 581 24,3422 01046 1 DSPTM1
0078 REF 4 LAST 665 24,3423 03757 1 STORE P21TIME
0079 24,3424 45335 0 SLOAD DSU
0080 REE 4 LAST 665 24,3425 01146 0 OPT1CN2
0081 REF 1 24,3426 11501 0 P21ONENN
0082 24,3427 71230 0 BHIZ DLOAD
0083 REF 1 24,3430 51443 0 P21PROG2
0084 REF 5 LAST 665 24,3431 03757 1 P21TIME
0085 REE 23 LAST 662 24,3432 34041 0 STCALL TDEC1
0086 REE 1 24,3433 27043 0 DTHPREC
0087 24,3434 46135 1 P21PROGA SLOAD BHIZ
0088 REE 8 LAST 658 24,3435 00050 1 X2
0089 REE 1 24,3436 51451 0 P21PROG3
0090 24,3437 43175 0 VLOAD SETGO
0091 REF 12 LAST 662 24,3440 00001 0 RATT
0092 REF 1 24,3441 01423 0 LUNAFLAG
0093 REE 1 24,3442 51454 0 P21PROG4
0094 24,3443 77745 1 P21PROG2 DLOAD
0095 REE 6 LAST 665 24,3444 03757 1 P21TIME
0096 REF 24 LAST 665 24,3445 34041 0 STCALL TDEC1
0097 REF 1 24,3446 27057 0 DTHPREC
0098 24,3447 77650 1 GOTO

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L GROUND TRACKING DETERMINATION PROGRAM - P21

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0099	REF	1		24,3450	51434 0		P21PROGA	
0100				24,3451	43175 0	P21PROG3	VLOAD	CLEAR
0101	REF	13	LAST	665	24,3452	00001 0		RATT
0102	REF	2	LAST	665	24,3453	01663 0		LUNAFLAG
0103	REF	2	LAST	130	24,3454	16032 1	P21PROG4	STODL
0104	REF	7	LAST	599	24,3455	00015 0		ALPHAV
0105				24,3456	45014 0			IAT
0106	REF	1		24,3457	00662 0		CLEAR	CALL
0107	REF	1		24,3460	26351 1			ERADFLAG
0108				24,3461	77776 1			LAT-LONG
0109	REF	1		24,3462	3 3502 0		EXIT	
0110	REF	158	LAST	665	24,3463	0 4616 1	CAF	V06N43
0111	REF	12	LAST	665	24,3464	20351 1	IC	BANKCALL
0112	REF	14	LAST	665	24,3465	0 6001 0	CADR	GCFLASH
0113	REF	15	LAST	666	24,3466	0 6001 0	TC	GOTOPODH
0114	REF	69	LAST	665	24,3467	0 6036 1	TC	GOTOPODH
0115				24,3470	43345 1		TC	INTPRET
0116	REF	7	LAST	665	24,3471	03757 1	DLOAD	V32E RECYCLE
0117	REF	1		24,3472	11477 0			DAD
0118	REF	24	LAST	665	24,3473	01046 1		P21TIME
0119				24,3474	77634 0		STORE	600SEC
0120	REF	1		24,3475	51412 1		RTB	600 SECONDS OR 10 MIN
0121				24,3476	00003 1	600SEC	2DEC	DSPTM1
0122				24,3500	00001 0			P21PROG1
0123				24,3501	00000 1	P21ONENN	OCT	60000
0124				24,3502	01453 1		OCT	10 MIN
0125				24,3503	01442 1	V06N43	VN	00001
						V6N34	VN	00000
								00643
								00634
								NEEDED TO DETERMINE VEHICLE
								TO BE INTEGRATED

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P0010 TRANSFER PHASE INITIATION (TPI) PROGRAMS (P34 AND P74)

R0011 MOD NO -1 LOG SECTION - P32-P35, P72-P75
R0012 MOD BY WHITE.P DATE 1JUNE67

R0013 PURPOSE

R0014 (1) TO CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL CONDITIONS
R0015 REQUIRED BY THE ACTIVE VEHICLE FOR EXECUTION OF THE TRANSFER
R0016 PHASE INITIATION (TPI) MANEUVER, GIVEN -R0017 (A) TIME OF IGNITION TIG (TPI) OR THE ELEVATION ANGLE (E) OF
R0018 THE ACTIVE/PASSIVE VEHICLE LOS AT TIG (TPI).R0019 (B) CENTRAL ANGLE OF TRANSFER (CENTANG) FROM TIG (TPI) TO
R0020 INTERCEPT TIME (TIG (TPF)).

R0021 (2) TO CALCULATE TIG (TPI) GIVEN E OR E GIVEN TIG (TPI).

R0022 (3) TO CALCULATE THESE PARAMETERS BASED UPON MANEUVER DATA
R0023 APPROVED AND KEYED INTO THE OSKY BY THE ASTRONAUT.R0024 (4) TO DISPLAY TO THE ASTRONAUT AND THE GROUND CERTAIN DEPENDENT
R0025 VARIABLES ASSOCIATED WITH THE MANEUVER FOR APPROVAL BY THE
R0026 ASTRONAUT/GROUND.R0027 (5) TO STORE THE TPI TARGET PARAMETERS FOR USE BY THE DESIRED
R0028 THRUSTING PROGRAM.

R0029 ASSUMPTIONS

R0030 (1) LM ONLY - THIS PROGRAM IS BASED UPON PREVIOUS COMPLETION OF
R0031 THE CONSTANT DELTA ALTITUDE (CDH) PROGRAM (P33/P73).
R0032 THEREFORE -R0033 (A) AT A SELECTED TPI TIME (NOW IN STORAGE) THE LINE OF SIGHT
R0034 BETWEEN THE ACTIVE AND PASSIVE VEHICLES WAS SELECTED TO BE
R0035 A PRESCRIBED ANGLE (E) (NOW IN STORAGE) FROM THE
R0036 HORIZONTAL PLANE DEFINED BY THE ACTIVE VEHICLE POSITION.R0037 (B) THE TIME BETWEEN COH IGNITION AND TPI IGNITION WAS
R0038 COMPUTED TO BE GREATER THAN 10 MINUTES.R0039 (C) THE VARIATION OF THE ALTITUDE DIFFERENCE BETWEEN THE
R0040 ORBITS WAS MINIMIZED.

R0041 (D) THE PERICENTER ALTITUDES OF ORBITS FOLLOWING CSI AND

R0042 COH WERE COMPUTED TO BE GREATER THAN 35,000 FT FOR LUNAR

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R0043 ORBIT OR 85 NM FOR EARTH ORBIT.

R0044 (E) THE CSI AND COH MANEUVERS WERE ASSUMED TO BE PARALLEL TO
R0045 THE PLANE OF THE PASSIVE VEHICLE ORBIT. HOWEVER, CREW
R0046 MODIFICATION OF DELTA V (LV) COMPONENTS MAY HAVE RESULTED
R0047 IN AN OUT-OF-PLANE MANEUVER.

R0048 (2) STATE VECTOR UPDATED BY P27 ARE DISALLOWED DURING AUTOMATIC
R0049 STATE VECTOR UPDATING INITIATED BY P20 (SEE ASSUMPTION (4)).

R0050 (3) THIS PROGRAM MUST BE DONE OVER A TRACKING STATION FOR REAL
R0051 TIME GROUND PARTICIPATION IN DATA INPUT AND OUTPUT. COMPUTED
R0052 VARIABLES MAY BE STORED FOR LATER VERIFICATION BY THE GROUND.
R0053 THESE STORAGE CAPABILITIES ARE LIMITED ONLY TO THE PARAMETERS
R0054 FOR ONE THRUSTING MANEUVER AT A TIME EXCEPT FOR CONCENTRIC
R0055 FLIGHT PLAN MANEUVER SEQUENCES.

R0056 (4) THE RENDEZVOUS RADAR MAY OR MAY NOT BE USED TO UPDATE THE LM
R0057 OR CSM STATE VECTORS FOR THIS PROGRAM. IF RADAR USE IS
R0058 DESIRED THE RADAR WAS TURNED ON AND LOCKED ON THE CSM BY
R0059 PREVIOUS SELECTION OF P20. RADAR SIGHTING MARKS WILL BE MADE
R0060 AUTOMATICALLY APPROXIMATELY ONCE A MINUTE WHEN ENABLED BY THE
R0061 TRACK AND UPDATE FLAGS (SEE P20). THE RENDEZVOUS TRACKING
R0062 MARK COUNTER IS ZEROED BY THE SELECTION OF P20 AND AFTER EACH
R0063 THRUSTING MANEUVER.

R0064 (5) THE ISS NEED NOT BE ON TO COMPLETE THIS PROGRAM.

R0065 (6) THE OPERATION OF THE PROGRAM UTILIZES THE FOLLOWING FLAGS -

R0066 ACTIVE VEHICLE FLAG - DESIGNATES THE VEHICLE WHICH IS
R0067 DOING RENDEZVOUS THRUSTING MANEUVERS TO THE PROGRAM WHICH
R0068 CALCULATES THE MANEUVER PARAMETERS. SET AT THE START OF
R0069 EACH RENDEZVOUS PRE-THRUSTING PROGRAM.

R0070 FINAL FLAG - SELECTS FINAL PROGRAM DISPLAYS AFTER CREW HAS
R0071 SELECTED THE FINAL MANEUVER COMPUTATION CYCLE.

R0072 EXTERNAL DELTA V FLAG - DESIGNATES THE TYPE OF STEERING
R0073 REQUIRED FOR EXECUTION OF THIS MANEUVER BY THE THRUSTING
R0074 PROGRAM SELECTED AFTER COMPLETION OF THIS PROGRAM.

R0075 (7) ONCE THE PARAMETERS REQUIRED FOR COMPUTATION OF THE MANEUVER
R0076 HAVE BEEN COMPLETELY SPECIFIED, THE VALUE OF THE ACTIVE
R0077 VEHICLE CENTRAL ANGLE OF TRANSFER IS COMPUTED AND STORED.
R0078 THIS NUMBER WILL BE AVAILABLE FOR DISPLAY TO THE ASTRONAUT
R0079 THROUGH THE USE OF V06N52.

R0080 THE ASTRONAUT WILL CALL THIS DISPLAY TO VERIFY THAT THE
R0081 CENTRAL ANGLE OF TRANSFER OF THE ACTIVE VEHICLE IS NOT WITHIN

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R0082 170 TO 190 DEGREES. IF THE ANGLE IS WITHIN THIS ZCNF THE
 R0083 ASTRONAUT SHOULD REASSESS THE INPUT TARGETING PARAMETERS BASED
 R0084 UPON DELTA V AND EXPECTED MANEUVER TIME.

R0085 (8) THIS PROGRAM IS SELECTED BY THE ASTRONAUT BY DSKY ENTRY -

R0086 P34 IF THIS VEHICLE IS ACTIVE VEHICLE.

R0087 P74 IF THIS VEHICLE IS PASSIVE VEHICLE.

R0088 INPUT

R0089 (1) TTPI TIME OF THE TPI MANEUVER
 R0090 (2) ELEV DESIRED LOS ANGLE AT TPI
 R0091 (3) CENTANG ORBITAL CENTRAL ANGLE OF THE PASSIVE VEHICLE DURING
 R0092 TRANSFER FROM TPI TO TIME OF INTERCEPT

R0093 OUTPUT

R0094 (1) TRKMKCNT NUMBER OF MARKS
 R0095 (2) TTOGO TIME TO GO
 R0096 (3) +MGA MIDDLE GIMBAL ANGLE
 R0097 (4) TTPI COMPUTED TIME OF TPI MANEUVER
 R0098 OR
 R0099 ELEV COMPUTED LOS ANGLE AT TPI
 R0100 (5) POSTTPI PERIGEE ALTITUDE AFTER THE TPI MANEUVER
 R0101 (6) DELVTPI MAGNITUDE OF DELTA V AT TPI
 R0102 (7) DELVTPF MAGNITUDE OF DELTA V AT INTERCEPT
 R0103 (8) DVLOS DELTA VFLOCITY AT TPI - LINE OF SIGHT
 R0104 (9) DELVLVC DELTA VELOCITY AT TPI - LOCAL VERTICAL COORDINATES

R0105 DC&NLINK

R0114 (1) TTPI TIME OF THE TPI MANEUVER
 R0115 (2) TIG TIME OF THE TPI MANEUVER
 R0116 (3) ELEV DESIRED LOS ANGLE AT TPI
 R0117 (4) CENTANG ORBITAL CENTRAL ANGLE OF THE PASSIVE VEHICLE DURING
 R0118 TRANSFER FROM TPI TO TIME OF INTERCEPT
 R0119 (5) DELVEET3 DELTA VELOCITY AT TPI - REFERENCE COORDINATES
 R0120 (6) TPASS4 TIME OF INTERCEPT
 R0121 COMMUNICATION TO THRUSTING PROGRAMS

R0122 (1) TIG TIME OF THE TPI MANEUVER
 R0123 (2) RTARG OFFSET TARGET POSITION
 R0124 (3) TPASS4 TIME OF INTERCEPT
 R0125 (4) XDELVLFG RESET TO INDICATE LAMBERT (AIMPOINT) VG COMPUTATION

R0126 SUBROUTINES USED

R0127 AVFLAGA

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R0128 AVFLAGP
 R0129 VNPOCH
 R0130 DISPLAYE
 R0131 SELECTMU
 R0132 PRECSET
 R0133 S33/34.1
 R0134 ALARM
 R0135 BANKCALL
 R0136 GOFFLASH
 R0137 GOTOPOOH
 R0138 TIMEHET
 R0139 S34/35.2
 R0140 PERIAP01
 R0141 SHIFTR1
 R0142 S34/35.5
 R0143 VN1645

0144	REF	3	LAST	660	35,2000			SETLOC	CSI/CDH	
0145					35,2511			BANK		
0146	REF	16	LAST	662	E7,1466			EBANK=	SUBEXIT	
0147	REF	1						COUNT*	\$/P3474	
0148	REF	3	LAST	637	35,2511	0 2313	1	P34	TC	AVFLAGA
0149	REF	1			35,2512	0 2514	0		TC	P34/P74A
0150	REF	3	LAST	637	35,2513	0 2320	1	P74	TC	AVFLAGP
0151	REF	4	LAST	662	35,2514	0 2325	1	P34/P74A	TC	P23FLGON
01515	REF	2	LAST	631	35,2515	3 3662	0		CAF	VO6N37
0152	REF	13	LAST	663	35,2516	0 3651	0		TC	VNPOCH
01521					35,2517	0 0006	1		EXTEND	
01522	REF	1			35,2520	3 3706	0		DCA	130DEG
01523	REF	5	LAST	644	35,2521	53'617	1		DXCH	CENTANG
0153	REF	1			35,2522	0 3630	1		TC	DISPLAIE
0154	REF	70	LAST	666	35,2523	0 6036	1		TC	INTPRET
0155					35,2524	71214	0		CLEAR	DLOAD
0156	REF	2	LAST	85	35,2525	01270	0			ETPIFLAG
0157	REF	14	LAST	654	35,2526	03634	0			TTPI
0158	REF	15	LAST	662	35,2527	17440	1		STDDL	TIC
0159	REF	6	LAST	647	35,2530	02263	1			ELEV
0160					35,2531	43054	1		BZE	SET
0161	REF	1			35,2532	72534	0			P34/P74B
0162	REF	3	LAST	670	35,2533	01070	1			ETPIFLAG
0163					35,2534	77624	1	P34/P74B	CALL	
0164	REF	3	LAST	637	35,2535	20041	0			SELECTMU
0165					0032			DELELO	EQUALS	26D
0166					35,2536	43145	0	P34/P74C	DLOAD	SET
0167	REF	7	LAST	620	35,2537	06424	0			ZEROVECS
0168	REF	2	LAST	637	35,2540	03460	0			ITSWICH
0169					35,2541	43014	0		BON	CLEAR
0170	REF	4	LAST	670	35,2542	01310	1			ETPIFLAG
0171	REF	1			35,2543	72545	0			SWCHSET
0172	REF	3	LAST	670	35,2544	03660	1			ITSWICH

SET UPDATFLG, TRACKFLG
 TTPI

ELEV AND CENTANG

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0173	REF	4	LAST	638	35,2545	02323	1	SWCHSET	STORE	NOMTPI	
0174					35,2546	43345	1	INTLOOP	DLOAD	DAD	
0175	REF	15	LAST	670	35,2547	03634	0			ITPI	
0176	REF	5	LAST	671	35,2550	02323	1			NOMTPI	
0177	REF	25	LAST	665	35,2551	34041	0		STCALL	TDEC1	
0178	REF	2	LAST	652	35,2552	46341	0			PRECSET	
0179					35,2553	77624	1		CALL		
0180	REF	2	LAST	637	35,2554	72726	1			S33/34.1	
0181					35,2555	77454	1		BZE	EXIT	
0182	REF	1			35,2556	72567	0			SWCHCLR	
0183	REF	28	LAST	637	35,2557	0 5567	0		TC	ALARM	
0184					35,2560	00611	1		OCT	611	
0185	REF	3	LAST	637	35,2561	3 5006	1		CAF	V05N09	
0186	REF	159	LAST	666	35,2562	0 4616	1		TC	BANKCALL	
0187	REF	13	LAST	666	35,2563	20351	1		CADR	GOFFLASH	
0188	REF	16	LAST	666	35,2564	0 6001	0		TC	GOTOPOOH	
0189	REF	2	LAST	670	35,2565	0 2514	0		TC	P34/P74A	PROCEED
0190					35,2566	0 2557	1		TC	-7	V32
0191					35,2567	43014	0	SWCHCLR	BONCLR	BON	
0192	REF	4	LAST	670	35,2570	03600	1			ITSWICH	
0193	REF	1			35,2571	72546	0			INTLOOP	
0194	REF	5	LAST	670	35,2572	01310	1			ETPIFLAG	
0195	REF	1			35,2573	72577	1			P34/P74D	DISPLAY ITPI
0196					35,2574	77776	1		EXIT		
0197	REF	2	LAST	670	35,2575	0 3630	1		TC	DISPLEYE	DISPLAY ELEV AND CENTANG
0198	REF	1			35,2576	0 2602	1		TC	P34/P74E	
0199					35,2577	77776	1	P34/P74D	EXIT		
0200	REF	3	LAST	670	35,2600	3 3662	0		CAF	V06N37	TTPI
0201	REF	14	LAST	670	35,2601	0 3651	0		TC	VNPOOH	
0202	REF	71	LAST	670	35,2602	0 6036	1	P34/P74E	TC	INTPRET	
0203					35,2603	71201	1		SETPD	DLOAD	
0204					35,2604	00001	0			OD	
0205	REF	5	LAST	662	35,2605	03376	0			RTX1	
0206	REF	12	LAST	658	35,2606	14047	1		STODL	X1	
0207	REF	6	LAST	670	35,2607	03617	1			CENTANG	
0208					35,2610	71406	0		PUSH	COS	
0209	REF	4	LAST	657	35,2611	16732	0		STODL	CSTH	
0210					35,2612	77756	0		SIN		
0211	REF	6	LAST	657	35,2613	26730	1		STOVL	SNTH	
0212	REF	6	LAST	652	35,2614	03550	1			RPASS3	
0213					35,2615	77657	0		VSR*		
0214					35,2616	57176	0			0,2	
0215	REF	5	LAST	657	35,2617	26655	0		STOVL	RVEC	
0216	REF	3	LAST	652	35,2620	03556	1			VPASS3	
0217					35,2621	43057	1		VSR*	SFT	
0218					35,2622	57176	0			0,2	
0219	REF	5	LAST	657	35,2623	03466	0			RVSU	
0220	REF	6	LAST	657	35,2624	36744	0		STCALL	VVEC	
0221	REF	5	LAST	657	35,2625	24745	1			TIMETHET	

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0222				35,2626	77745 1
0223	REF	16	LAST	671	35,2627 03634 0
0224	REF	1			35,2630 03606 1
0225					35,2631 77615 0
0226	REF	2	LAST	506	35,2632 00037 0
0227	REF	5	LAST	662	35,2633 37627 0
0228	REF	1			35,2634 73250 1
0229					35,2635 51575 1
0230	REF	4	LAST	663	35,2636 03366 1
0231	REF	6	LAST	330	35,2637 27574 1
0232	REF	1			35,2640 03504 0
0233					35,2641 51451 0
0234	REF	1			35,2642 03564 0
0235	REF	3	LAST	330	35,2643 26354 1
0236	REF	7	LAST	652	35,2644 03534 0
0237					35,2645 45115 0
0238	REF	2	LAST	663	35,2646 02343 1
0239	REF	4	LAST	663	35,2647 46277 1
0240					35,2650 77624 1
0241	REF	10	LAST	663	35,2651 46407 0
0242	REF	4	LAST	330	35,2652 17604 0
0243	REF	17	LAST	672	35,2653 03634 0
0244	REF	16	LAST	670	35,2654 03440 1
0245					35,2655 77776 1
0246	REF	1			35,2656 3 3664 0
0247	REF	15	LAST	671	35,2657 0 3651 0
0248	REF	72	LAST	671	35,2660 0 6036 1
0249					35,2661 77624 1
0250	REF	1			35,2662 73456 1
0251					35,2663 77624 1
0252	REF	4	LAST	663	35,2664 73542 0
0253					35,2665 77650 1
0254	REF	1			35,2666 72536 1

DLOAD	
TTPI	
STORE	INTIME
DAD	FOR INITVEL
T	RENDEZVOUS TIME
STCALL	TPASS4
	S34/35.2
VLOAD	ABVAL
	DELVEET3
STOVL	DELVTPI
	VPASS4
VSU	ABVAL
	VTPFIME
STOVL	DELVTPI
	RACT3
PDVL	CALL
	VIPRIME
	PERIAPQ1
CALL	
	SHIFTR1
STODL	POSTTPI
	TTPI
STORE	TIG
EXIT	
CAF	V06N58
TC	VNPOCH
TC	INTPRET
CALL	
	S34/35.5
CALL	
	VN1645
GOTO	
	P34/P74C

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P0255 RENDEZVOUS MID-COURSE MANEUVER PROGRAMS (P35 AND P75)

R0256 MGD NO -1 LOG SECTION - P32-P35, P72-P75
R0257 MOD BY WHITE.P DATE 1JUNE67

R0258 PURPOSE

R0259 (1) TO CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL CONDITIONS
R0260 REQUIRED BY THE ACTIVE VEHICLE FOR EXECUTION OF THE NEXT
R0261 MIDCOURSE CORRECTION OF THE TRANSFER PHASE OF AN ACTIVE
R0262 VEHICLE RENDEZVOUS.R0263 (2) TO DISPLAY TO THE ASTRONAUT AND THE GROUND CERTAIN DEPENDENT
R0264 VARIABLES ASSOCIATED WITH THE MANEUVER FOR APPROVAL BY THE
R0265 ASTRONAUT/GROUND.R0266 (3) TO STORE THE TPM TARGET PARAMETERS FOR USE BY THE DESIRED
R0267 THRUSTING PROGRAM.

R0268 ASSUMPTIONS

R0269 (1) THE ISS NEED NOT BE ON TO COMPLETE THIS PROGRAM.

R0270 (2) STATE VECTOR UPDATES BY P27 ARE DISALLOWED DURING AUTOMATIC
R0271 STATE VECTOR UPDATING INITIATED BY P20 (SEE ASSUMPTION (3)).R0272 (3) THE RENDEZVOUS RADAR IS ON AND IS LOCKED ON THE CSM. THIS WAS
R0273 DONE DURING PREVIOUS SELECTION OF P20. RADAR SIGHTING MARKS
R0274 WILL BE MADE AUTOMATICALLY APPROXIMATELY ONCE A MINUTE WHEN
R0275 ENABLED BY THE TRACK AND UPDATE FLAGS (SEE P20). THE
R0276 RENDEZVOUS TRACKING MARK COUNTER IS ZEROED BY THE SELECTION OF
R0277 P20 AND AFTER EACH THRUSTING MANEUVER.

R0278 (4) THE OPERATION OF THE PROGRAM UTILIZES THE FOLLOWING FLAGS -

R0279 ACTIVE VEHICLE FLAG - DESIGNATES THE VEHICLE WHICH IS
R0280 DOING RENDEZVOUS THRUSTING MANEUVERS TO THE PROGRAM WHICH
R0281 CALCULATES THE MANEUVER PARAMETERS. SET AT THE START OF
R0282 EACH RENDEZVOUS PRE-THRUSTING PROGRAM.R0283 FINAL FLAG - SELECTS FINAL PROGRAM DISPLAYS AFTER CREW HAS
R0284 SELECTED THE FINAL MANEUVER COMPUTATION CYCLE.R0285 EXTERNAL DELTA V FLAG - DESIGNATES THE TYPE OF STEERING
R0286 REQUIRED FOR EXECUTION OF THIS MANEUVER BY THE THRUSTING
R0287 PROGRAM SELECTED AFTER COMPLETION OF THIS PROGRAM.R0288 (5) THE TIME OF INTERCEPT (T(INT)) WAS DEFINED BY PREVIOUS
R0289 COMPLETION OF THE TRANSFER PHASE INITIATION (TPI) PROGRAM
R0290 (P34/P74) AND IS PRESENTLY AVAILABLE IN STORAGE.

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R0291 (6) ONCE THE PARAMETERS REQUIRED FOR COMPUTATION OF THE MANEUVER
R0292 HAVE BEEN COMPLETELY SPECIFIED, THE VALUE OF THE ACTIVE
R0293 VEHICLE CENTRAL ANGLE OF TRANSFER IS COMPUTED AND STOPPED.
R0294 THIS NUMBER WILL BE AVAILABLE FOR DISPLAY TO THE ASTRONAUT
R0295 THROUGH THE USE OF V06N52.

R0296 THE ASTRONAUT WILL CALL THIS DISPLAY TO VERIFY THAT THE
R0297 CENTRAL ANGLE OF TRANSFER OF THE ACTIVE VEHICLE IS NOT WITHIN
R0298 170 TO 190 DEGREES. IF THE ANGLE IS WITHIN THIS ZONE THE
R0299 ASTRONAUT SHOULD REASSESS THE INPUT TARGETING PARAMETERS BASED
R0300 UPON DELTA V AND EXPECTED MANEUVER TIME.

R0301 (7) THIS PROGRAM IS SELECTED BY THE ASTRONAUT BY DSKY ENTPY -

R0302 P35 IF THIS VEHICLE IS ACTIVE VEHICLE.

R0303 P75 IF THIS VEHICLE IS PASSIVE VEHICLE.

R0304 INPUT

R0305 (1) TPASS4 TIME OF INTERCEPT - SAVED FROM P34/P74
R0306 OUTPUT

R0307 (1) TRMKCNT NUMBER OF MARKS
R0308 (2) TTOGO TIME TO GO
R0309 (3) +MGA MIDDLE GIMBAL ANGLE
R0310 (4) OVLOS DELTA VELOCITY AT MID - LINE OF SIGHT
R0311 (5) DELVLVC DELTA VELOCITY AT MID - LOCAL VERTICAL COORDINATES

R0312 DOWNLINK

R0325 (1) TIG TIME OF THE TPM MANEUVER
R0326 (2) DELVEET3 DELTA VELOCITY AT TPM - REFERENCE COORDINATES
R0327 (3) TPASS4 TIME OF INTERCEPT
R0328 COMMUNICATION TO THRUSTING PROGRAMS

R0329 (1) TIG TIME OF THE TPM MANEUVER
R0330 (2) RTARG OFFSET TARGET POSITION
R0331 (3) TPASS4 TIME OF INTERCEPT
R0332 (4) XOELVFLG RESET TO INDICATE LAMBERT (AIMPOINT) VG COMPUTATION

R0333 SUBROUTINES USED

R0334 AVFLAGA
R0335 AVFLAGP
R0336 LOADTIME
R0337 SELECTMU
R0338 PRECSET
R0339 S34/35.1
R0340 S34/35.2

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R0341 S34/35.5
R0342 VN1645

0343	REF	2	LAST	660	TO	662:	14	14*	COUNT*	\$\$/P3575
0344	REF	1				E7,1573			EBANK=	KT
0345	REF	4	LAST	670		35,2667	0	2313	1	P35
0346						35,2670	0	0006	1	
0347	REF	3	LAST	400		35,2671	3	1401	0	
0348	REF	1				35,2672	0	2676	1	
0349	REF	4	LAST	670		35,2673	0	2320	1	P75
0350						35,2674	0	0006	1	
0351	REF	1				35,2675	3	1403	1	
0352	REF	2	LAST	675		35,2676	53	1574	1	P35/P75A
03525	REF	5	LAST	670		35,2677	0	2325	1	
0353	REF	73	LAST	672		35,2700	0	6036	1	
0359						35,2701	77	624	1	
0360	REF	4	LAST	670		35,2702	20	041	0	
0361						35,2703	77	634	0	P35/P75B
0362	REF	12	LAST	599		35,2704	21	462	1	RTB
03621	REF	2	LAST	298		35,2705	03	610	0	
03622						35,2706	77	615	0	
03623	REF	3	LAST	675		35,2707	03	574	1	
03624	REF	17	LAST	672		35,2710	03	440	1	
0363	REF	2	LAST	672		35,2711	03	606	1	
0364	REF	26	LAST	671		35,2712	34	041	0	
0365	REF	3	LAST	671		35,2713	46	341	0	
0366						35,2714	77	624	1	
0367	REF	1				35,2715	73	236	1	
0368						35,2716	77	624	1	
0369	REF	2	LAST	672		35,2717	73	250	1	
0370						35,2720	77	624	1	
0371	REF	2	LAST	672		35,2721	73	456	1	
0372						35,2722	77	624	1	
0373	REF	5	LAST	672		35,2723	73	542	0	
0379						35,2724	77	650	1	
0380	REF	1				35,2725	72	703	0	

SET UPDATFLG, TRACKFLG

FOR INITVEL

ADVANCE BOTH VEHICLES

GET NORM AND LOS FOR TRANSFORM

GET DELTA V(LV)

P35/P75B

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P0381 S33/34.1

0382				35,2726	66220	1	S33/34.1	STQ	SSP	
0383	REF	3	LAST	640	35,2727	03461	1		NORMEX	
0384	REF	1			35,2730	03612	1		TITER	
0385					35,2731	40000	0	OCT	40000	
0386					35,2732	40345	1	DLOAD	SETPD	
0387	REF	1			35,2733	33673	0		MAX250	
0388					35,2734	00001	0		OD	
0389	REF	1			35,2735	27572	1	STOVL	SECMAX	
0390	REF	8	LAST	672	35,2736	03534	0		RACT3	
0391	REF	1			35,2737	27476	1	STOVL	RAPREC	
0392	REF	7	LAST	658	35,2740	03542	1		VACT3	
0393	REF	1			35,2741	27504	0	STOVL	VAPREC	
0394	REF	7	LAST	671	35,2742	03550	1		RPASS3	
0395	REF	1			35,2743	27520	0	STOVL	RPPREC	
0396	REF	4	LAST	671	35,2744	03556	1		VPASS3	
0397	REF	1			35,2745	03526	0	STORE	VPPREC	
0398					35,2746	77624	1	ELCALC	CALL	
0399	REF	2	LAST	675	35,2747	73236	1		S34/35.1	NORMAL AND LOS
0400					35,2750	63235	0	VXV	PDVL	
0401	REF	9	LAST	676	35,2751	03534	0		RACT3	(RA*VA)*RA OD
0402					35,2752	53515	0	PDVL	UNIT	ULOS AT 6D
0403	REF	10	LAST	676	35,2753	03534	0		RACT3	
0404					35,2754	46315	1	PDVL	VPROJ	XCHNJ AND UP
0405					35,2755	51352	1	VSL2	BVSU	
0406	REF	1			35,2756	02315	1		ULOS	
0407					35,2757	63256	0	UNIT	PDVL	UP AT OD
0408					35,2760	63241	0	DOT	PDVL	UP.UN*RA AT OD
0409					35,2761	00001	0		OD	UP IN MPAC
0410					35,2762	75241	1	DOT	SIGN	
0411	REF	2	LAST	676	35,2763	02315	1		ULOS	
0412					35,2764	65552	0	SL1	ACOS	
0413					35,2765	50315	0	PDVL	DOT	EA AT OD
0414	REF	3	LAST	676	35,2766	02315	1		ULOS	
0415	REF	11	LAST	676	35,2767	03534	0		RACT3	
0416					35,2770	71244	0	BPL	DLOAD	
0417	REF	1			35,2771	72774	0		TESTY	
0418	REF	5	LAST	621	35,2772	06432	1		DPPOS MAX	
0419					35,2773	41425	1	DSU	PUSH	
0420					35,2774	71214	0	BOFF	DLOAD	
0421	REF	5	LAST	671	35,2775	03740	1		ITSWICH	
0422	REF	1			35,2776	73223	0		ELEX	
0423	REF	1			35,2777	03574	1		DELFL	
0424	REF	1			35,3000	14033	1	STODL	DELELO	
0425					35,3001	77625	0	DSU		
0426	REF	7	LAST	670	35,3002	02263	1		ELEV	
0427	REF	2	LAST	676	35,3003	03574	1	STORE	DELEL	
0428					35,3004	45246	0	ABS	DSU	
0429	REF	1			35,3005	33677	1		ELEPS	

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0430				35,3006	77640 0	BMN		
0431	REF	1		35,3007	73233 1		TIME X	COMMERCIALS EVERYWHERE
0432				35,3010	70535 0	FIGTIME	SLOAD	
0433	REF	2	LAST	676	35,3011	03612 1		TITER
0434				35,3012	72030 1		BHIZ	LXA,1
0435	REF	4	LAST	676	35,3013	03461 1		NORMEX
0436	REF	270	LAST	648	35,3014	00154 1		MPAC
0437				35,3015	77330 1		SXA,1	VLOAD
0438	REF	3	LAST	677	35,3016	03611 1		TITER
0439	REF	8	LAST	676	35,3017	03550 1		RPASS3
0440				35,3020	65256 0		UNIT	PDDL
0441				35,3021	00045 0			36D
0442				35,3022	53515 0		PDVL	UNIT
0443	REF	12	LAST	676	35,3023	03534 0		RACT3
0444				35,3024	77725 1		PDDL	
0445				35,3025	41525 0		PDDL	PUSH
0446				35,3026	00045 0			36D
0447				35,3027	77621 1		BDSU	
0448				35,3030	00015 0			12D
0449				35,3031	14037 0		STODL	30D
0450	REF	8	LAST	603	35,3032	06422 0		DPHALF
0451				35,3033	41425 1		DSU	PUSH
0452	REF	8	LAST	676	35,3034	02263 1		ELEV
0453				35,3035	50165 0		SIGN	BMN
0454				35,3036	00037 0			30D
0455	REF	5	LAST	677	35,3037	03461 1		NORMEX
0456				35,3040	71545 0		DLOAD	COS
0457				35,3041	56205 0		DMP	DDV
0458				35,3042	00017 1			14D
0459				35,3043	00015 0			12D
0460				35,3044	77676 0		DCOMP	
0461				35,3045	00035 1		STORE	28D
0462				35,3046	44246 1		ABS	BDSU
0463	REF	9	LAST	677	35,3047	06422 0		DPHALF
0464				35,3050	77240 1		BMN	VLOAD
0465	REF	6	LAST	677	35,3051	03461 1		NORMEX
0466	REF	1			35,3052	02265 1		UNRM
0467				35,3053	53435 0		VXV	UNIT
0468				35,3054	00007 0			6D
0469				35,3055	41241 0		DOT	DMP
0470	REF	8	LAST	676	35,3056	03542 1		VACT3
0471				35,3057	00015 0			12D
0472				35,3060	47315 0		PDVL	VXV
0473				35,3061	00001 0			0D
0474	REF	5	LAST	676	35,3062	03556 1		VPASS3
0475				35,3063	53435 0		VXV	UNIT
0476				35,3064	00001 0			0D
0477				35,3065	41241 0		DOT	DMP
0478	REF	6	LAST	677	35,3066	03556 1		VPASS3
0479				35,3067	00017 1			14D

PP - RA MAGNITUDES

SINCE COS(180-A)=-COS A

UN*RA

(RP*VP)*RP

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0480				35,3070	77621 1	BDSU		
0481				35,3071	63301 0	NORM	PDVL	NORMALIZED WA - WP 12D
0482	REF	13	LAST	671	35,3072		X1	
0483					35,3073		6D	
0484					35,3074	VXV	DOT	
0485					35,3075		0D	
0486	REF	2	LAST	677	35,3076		UNRM	RA*RP.UN 14D
0487					35,3077	PDVL	DOT	
0488					35,3100		0D	
0489					35,3101		6D	
0490					35,3102	SL1	ACDS	
0491					35,3103	SIGN		
0492					35,3104	DSU	DAD	ALPHA PI
0493	REF	10	LAST	677	35,3105		DPHALF	
0494	REF	9	LAST	677	35,3106		ELEV	
0495					35,3107	PDDL	ACDS	
0496					35,3110		28D	
0497					35,3111	BDSU	SIGN	
0498	REF	11	LAST	678	35,3112		DPHALF	
0499					35,3113		30D	CONTAINS RP-RA
0500					35,3114	DAD		
0501					35,3115	DMP	DDV	
0502	REF	4	LAST	654	35,3116		TWOPI	
0503					35,3117	DMP		
0504					35,3120	SL*	DMP	
0505					35,3121		0 -3,1	
0506					35,3122	PUSH	ABS	
0507					35,3123	DSU	BMN	
0508	REF	2	LAST	676	35,3124		SECMAX	
0509	REF	1			35,3125		OKMAX	
0510					35,3126	DLOAD	SIGN	REPLACE TIME WITH MAX TIME SIGNED
0511	REF	3	LAST	678	35,3127		SECMAX	
0512					35,3130	PUSH		
0513					35,3131	SLOAD	BPL	TEST FIRST ITERATION
0514	REF	4	LAST	677	35,3132		TITER	
0515	REF	1			35,3133		REPETE	
0516					35,3134	SSP	DLOAD	
0517	REF	5	LAST	678	35,3135		TITER	
0518					35,3136	OCT	37777	
0519					35,3137	GOTO		
0520	REF	1			35,3140		STERDELT	
0521					35,3141	REPETE	DLOAD	
0522	REF	3	LAST	676	35,3142		DLEL	
0523	REF	2	LAST	676	35,3143		DELELO	
0524					35,3144	BPL	DLOAD	
0525	REF	1			35,3145		NEXTES	
0526	REF	4	LAST	678	35,3146		SECMAX	
0527					35,3147	DMP		
0528	REF	1			35,3150		THIRD	
0529	REF	5	LAST	678	35,3151	STODL	SECMAX	

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0530				35,3152	70446 0	ABS	SR1	CROSSED OVER SOLUTION
0531				35,3153	52076 1	DCOMP	GOTO	DT=(-SIGN(DT0)/DT//)/2
0532	REF	1		35,3154	73165 1		RESIGN	
0533				35,3155	51545 1	NEXTES	DLOAD	ABS
0534	REF	4	LAST	678	35,3156	03574 1		DELFL
0535				35,3157	51525 1		PDDL	ABS
0536	REF	3	LAST	678	35,3160	00033 1		DELFL0
0537				35,3161	77625 0		OSU	
0538				35,3162	71240 1		BMN	
0539	REF	1		35,3163	73170 0			REVERS
0540				35,3164	77646 0		ABS	WRONG DIRECTION
0541				35,3165	52165 1	RESIGN	SIGN	GOTD
0542	REF	1		35,3166	03604 0			DELTEED
0543	REF	2	LAST	678	35,3167	73177 1		STORDEL
0544				35,3170	57545 1	REVERS	DLOAD	DCOMP
0545	REF	2	LAST	679	35,3171	03604 0		DELTEED
0546				35,3172	70406 1		PUSH	SR1
0547	REF	3	LAST	679	35,3173	03604 0		STORE
0548				35,3174	77615 0			DELTEED
0549				35,3175	77650 1		DAD	
0550	REF	1		35,3176	73200 1		GOTO	
0551	REF	4	LAST	679	35,3177	03604 0		ADTIME
0552				35,3200	77615 0	STORDEL	STORE	DELTEED
0553	REF	6	LAST	671	35,3201	02323 1	ADTIME	DAD
0554	REF	7	LAST	679	35,3202	02323 1		NOMIPI
0555				35,3203	63375 0		STORE	NOMIPI
0556	REF	2	LAST	676	35,3204	03504 0	VLOAD	PDVL
0557	REF	2	LAST	676	35,3205	03476 1		VAPREC
0558				35,3206	77624 1			RAPREC
0559	REF	1		35,3207	73416 0		CALL	
0560				35,3210	77624 1		GINT	
0561	REF	3	LAST	647	35,3211	46363 0		CALL
0562				35,3212	63375 0		ACTIVE	STORE NEW RACT3 VACT3
0563	REF	2	LAST	676	35,3213	03526 0	VLOAD	POVL
0564	REF	2	LAST	676	35,3214	03520 0		VPPREC
0565				35,3215	77624 1		RPPREC	
0566	REF	2	LAST	679	35,3216	73416 0	CALL	
0567				35,3217	77624 1		GINT	
0568	REF	3	LAST	637	35,3220	46373 1	CALL	PASSIVE
0569				35,3221	77650 1			STORE NEW RPASS3 VPASS3
0570	REF	1		35,3222	72746 1		GOTO	
0571				35,3223	43345 1	ELEX	OLOAD	ELCALC
0572	REF	18	LAST	672	35,3224	03634 0		DAO
0573	REF	8	LAST	679	35,3225	02323 1		TTPI
0574	REF	19	LAST	679	35,3226	17634 0		NOMIPI
0575				35,3227	77614 1		STODL	TTPI
0576	REF	6	LAST	671	35,3230	01310 1	BON	
0577	REF	2	LAST	677	35,3231	73233 1		ETPIFLAG
0578	REF	10	LAST	678	35,3232	02263 1		TIMEX
0579				35,3233	52145 0		STORE	ELEV
							OLOAD	GOTO

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0580	REF	8	LAST	670	35,3234	06424 0
0581	REF	7	LAST	677	35,3235	03461 1

ZEROVECS
NORMEX

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P0582 S34/35.1

R0583 COMPUTE UNIT NORMAL AND LINE OF SIGHT VECTORS GIVEN THE ACTIVE AND
R0584 PASSIVE POS AND VEL AT TIME T3

0585				35,3236	52375 1	S34/35.1 VLOAD	VSU
0586	REF	9	LAST	677	35,3237	03550 1	RPASS3
0587	REF	13	LAST	677	35,3240	03534 0	RACT3
0588				35,3241	41456 0		PUSH
0589	REF	4	LAST	676	35,3242	26315 1	UNIT
0590	REF	14	LAST	681	35,3243	03534 0	STOVL
0591				35,3244	53435 0		ULOS
0592	REF	9	LAST	677	35,3245	03542 1	RACT3
0593	REF	3	LAST	678	35,3246	02265 1	UNIT
0594				35,3247	77616 0		VACT3
						STORE	UNRM
						RVQ	

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P0595 S34/35.2

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R0596 ADVANCE PASSIVE VEH TO RENDEZVOUS TIME AND GET REQ VEL FROM LAMBERT
0597          35,3250 77220 1 S34/35.2 STQ VLOAD
0598 REF 17 LAST 670 35,3251 03466 0 SUBEXIT
0599 REF 7 LAST 677 35,3252 03556 1 VPASS3
0600          35,3253 65315 0 PDVL PDDL
0601 REF 10 LAST 681 35,3254 03550 1 RPASS3
0602 REF 3 LAST 675 35,3255 03606 1 INTIME
0603          35,3256 65325 0 PDDL PDDL
0604 REF 6 LAST 672 35,3257 03627 1 TPASS4
0605 REF 9 LAST 680 35,3260 06424 0 ZEROVECS
0606          35,3261 45006 0 PUSH CALL
0607 REF 5 LAST 654 35,3262 73422 1 INTINT GET TARGET VECTOR
0608 REF 3 LAST 213 35,3263 27442 0 S3435.25 STQVL RTARG
0609 REF 10 LAST 662 35,3264 00007 0 VATT
0610 REF 2 LAST 672 35,3265 27504 0 STQVL VPASS4
0611 REF 4 LAST 682 35,3266 03442 0 RTARG

R0612 CCMPUTE PHI = PI +(ACOS(UNIT RA.UNIT RP)-PI)SIGN(RA*RP.U)
0613          35,3267 63256 0 UNIT PDVL UNIT RP
0614 REF 15 LAST 681 35,3270 03534 0 RACT3
0615          35,3271 41456 0 UNIT PUSH UNIT RA
0616          35,3272 50235 0 VXV DOT
0617          35,3273 00001 0 OD
0618 REF 4 LAST 681 35,3274 02265 1 UNRM RA*RP.U
0619          35,3275 77715 1 PDVL
0620          35,3276 72441 0 DOT SLI UNIT RA.UNIT RP
0621          35,3277 00001 0 OD
0622          35,3300 75326 1 ACOS SIGN
0623          35,3301 43244 1 BPL DAD
0624 REF 1          35,3302 73304 1 NOPIE
0625 REF 6 LAST 676 35,3303 06432 1 NOPIE STODL REASONABLE TWO PI
0626 REF 2 LAST 329 35,3304 15756 1 ACTCENT
0627 REF 7 LAST 682 35,3305 03627 1 TPASS4
0628          35,3306 77625 0 DSU
0629 REF 4 LAST 682 35,3307 03606 1 INTIME
0630 REF 4 LAST 662 35,3310 03450 0 STORE DELLT4
0631          35,3311 40335 0 SLOAD SETPD
0632 RFF 1          35,3312 33701 1 DECTWO
0633          35,3313 00001 0 OD
06331          35,3314 63325 0 PDDL PDVL
06332 REF 1          35,3315 33704 1 EPSFCUR
06333 REF 16 LAST 682 35,3316 03534 0 RACT3
06334 REF 2 LAST 662 35,3317 26327 0 STQVL PINIT
06335 REF 10 LAST 681 35,3320 03542 1 VACT3
06336 REF 2 LAST 662 35,3321 36335 1 STCALL VINIT
06337 REF 2 LAST 662 35,3322 22000 1 INITVEL
0634          35,3323 77624 1 CALL
0635 REF 1          35,3324 73403 1 LOMAT
0636          35,3325 64375 1 VLOAD MXV

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DELVEET3  
OD  
VSL1  
STCALL DELVLVC  
SUBEXIT
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P0642 S34/35.3

0643				35,3333	45020 1	S34/35.3 STQ	CALL	
0644	RFF	8	LAST	680	35,3334		NORMEX	
0645	REF	2	LAST	682	35,3335		LOMAT	GET MATRIX IN PUSH LIST
0646				35,3336	61375 1	VLOAD	VXM	
0647	RFF	16	LAST	683	35,3337		DELVLVC	NEW DEL V TPI
0648				35,3340	00001 0		OD	
0649				35,3341	77772 0	VSL1		
0650	RFF	6	LAST	683	35,3342		DFLVEET3	SAVE FOR TRANSFORM
0651				35,3343	63255 0	VAD	PDVL	
0652	RFF	11	LAST	682	35,3344		VACT3	NEW V REQ
0653	RFF	17	LAST	682	35,3345		RACT3	
0654				35,3346	65325 0	PDDL	PDDL	
0655	RFF	18	LAST	675	35,3347		TIG	
0656	RFF	8	LAST	682	35,3350		TPASS4	
0657				35,3351	41525 0	PDDL	PUSH	
0658	RFF	7	LAST	682	35,3352		DPPDSMAX	
0659				35,3353	77624 1	CALL		INTEG. FOR NEW TARGET VEC
0660	REF	6	LAST	682	35,3354		INTINT	
0661				35,3355	77775 1	VLOAD		
0662	RFF	14	LAST	666	35,3356		RATT	
0663	REF	5	LAST	682	35,3357		RTARG	
0664				35,3360	41575 0	NOVRWRT	PUSH	
0665	RFF	5	LAST	681	35,3361		ULOS	
0666				35,3362	57435 1	VXV	VCOMP	
0667	RFF	5	LAST	682	35,3363		UNRM	
0668				35,3364	41456 0	UNIT	PUSH	
0669				35,3365	76435 1	VXV	VSL1	
0670	RFF	6	LAST	684	35,3366		ULOS	
0671				35,3367	77715 1	PDVL		
0672				35,3370	64315 1	PDVL	MXV	
0673	REF	7	LAST	684	35,3371		DELVEET3	
0674				35,3372	00001 0		OD	
0675				35,3373	77772 0	VSL1		
0676	REF	5	LAST	330	35,3374		STCALL	DVLOS
0677	RFF	9	LAST	684	35,3375			NORMFX

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P0678 S34/35.4

0679				35,3376	40220 0	S34/35.4 STQ	SETPD	NO ASTRONAUT OVERWRITE
0680	REF	10	LAST	684	35,3377	03461 1	NORMEX	
0681					35,3400	00001 0	OD	
0682					35,3401	77650 1	GOTO	
0683	REF	1			35,3402	73360 0	NOVRWRT	

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P0684 LOMAT

0685				35,3403	57575 1	LOMAT	VLOAD	VCOMP	
0686	REF	6	LAST	684	35,3404			UNRM	
0687					24007 0		STOVL	6D	Y
0688	REF	18	LAST	684	35,3406			RACT3	
0689					57456 1		UNIT	VCOMP	
0690					00015 0		STORE	120	
0691					35,3411		VXV	VSL1	
0692	REF	7	LAST	686	35,3412			UNRM	Z*-Y
0693					35,3413		STORE	OD	
0694					35,3414		SETPD	RVQ	
0695					35,3415			18D	
0696					35,3416	GOINT	PDDL		DD
0697	REF	10	LAST	682	35,3417			ZEROVECS	NOT
0698	REF	9	LAST	679	35,3420			NOMTPI	
0699					35,3421		PUSH		ORDER OR INSERT BEFORE INTINT
0700					35,3422	INTINT	STQ	CALL	
0701	REF	4	LAST	660	35,3423			RTRN	
0702	REF	18	LAST	620	35,3424			INTSTALL	
0703					35,3425		CLEAR	DLOAD	
0704	REF	6	LAST	594	35,3426			INTYPFLG	
0705					35,3427		BZE	SET	
0706					35,3430			+2	
0707	REF	7	LAST	686	35,3431			INTYPFLG	
0708					35,3432		DLOAD	STADR	
0709	REF	27	LAST	675	35,3433		STODL	TDEC1	
0710					35,3434		SET	LXA,2	
0711	REF	1			35,3435			MOONFLAG	
0712	REF	5	LAST	662	35,3436			RTX2	
0713					35,3437		BON	CLEAR	
0714	REF	3	LAST	645	35,3440			CMOONFLG	
0715	REF	1			35,3441			ALLSET	
0716	REF	2	LAST	686	35,3442			MOONFLAG	
0717	REF	5	LAST	507	35,3443	ALLSET	STOVL	TFT	
0718					35,3444		VSR*		
0719					35,3445			0,2	
0720	REF	5	LAST	507	35,3446		STOVL	RCV	
0721					35,3447		VSR*		
0722					35,3450			0,2	
0723	REF	4	LAST	335	35,3451		STCALL	VCV	
0724	REF	1			35,3452			INTEGRVS	
0725					35,3453		VLOAD	GOTO	
0726	REF	15	LAST	684	35,3454			RATT	
0727	REF	5	LAST	686	35,3455			RTRN	

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P0728 S34/35.5
 R0729 SUBROUTINES USED

R0730 BANKCALL
 R0731 GOFLASH
 R0732 GOTOPDOH
 R0733 S34/35.3
 R0734 S34/35.4
 R0735 VNPOOH

0736					35,3456	43020	1	S34/35.5	STQ	BON	
0737	REF	19	LAST	683	35,3457	03466	0			SUBEXIT	
0738	REF	4	LAST	663	35,3460	01311	0			FINALFLG	
0739	REF	1			35,3461	73465	1			FLAGON	
0740					35,3462	52014	0		SET	GOTO	
0741	REF	10	LAST	662	35,3463	00470	1			UPDATFLG	
0742	REF	1			35,3464	73532	1			FLAGCFF	
0743					35,3465	77214	0		FLAGON	CLEAR	VLOAD
0744	REF	1			35,3466	03274	0			NTARGFLG	
07441	REF	17	LAST	684	35,3467	03432	1			DELVLVC	
07442	REF	2	LAST	121	35,3470	01237	0		STORE	GDT/2	
07443					35,3471	77776	1		EXIT		
0745	REF	3	LAST	663	35,3472	3 3666	1	+5	CAF	V06N81	
0746	REF	160	LAST	671	35,3473	0 4616	1		TC	BANKCALL	
0747	REF	14	LAST	671	35,3474	20351	1		CADR	GOFLASH	
0748	REF	17	LAST	671	35,3475	0 6001	0		TC	GOTCPOOH	
0749					35,3476	0 3500	1		TC	+2	PRO
0750	REF	2	LAST	687	35,3477	0 3472	0		TC	FLAGON +5	LOAD
0751	REF	3	LAST	400	35,3500	3 5016	0	+2	CA	EBANK7	
07511	REF	16	LAST	473	35,3501	54 003	0		TS	EBANK	TO BE SURE
07512					35,3502	22 007	0		ZL		
07513	REF	13	LAST	611	35,3503	3 4756	1		CA	FIVE	
07514	REF	181	LAST	622	35,3504	54 002	1	NTARGCHK	TS	Q	
07515	REF	182	LAST	687	35,3505	50 002	0		INDEX	Q	
07516	REF	18	LAST	687	35,3506	4 1431	1		CS	DELVLVC	
07517	REF	183	LAST	687	35,3507	50 002	0		INDEX	Q	
07518	REF	3	LAST	687	35,3510	6 1236	1		AD	GDT/2	
07519	REF	92	LAST	623	35,3511	26 001	1		ADS	L	
0752	REF	184	LAST	687	35,3512	10 002	1		CCS	Q	
07521	REF	1			35,3513	1 3504	1		TCF	NTARGCHK	
07522	REF	217	LAST	622	35,3514	22 000	1		LXCH	A	
07523					35,3515	0 0006	1		EXTEND		
07524					35,3516	1 3521	0		BZF	+3	
07525	REF	34	LAST	639	35,3517	0 5504	0		TC	UPFLAG	
0753	REF	2	LAST	687	35,3520	00146	1		ADRES	NTARGFLG	
0754	REF	74	LAST	675	35,3521	0 6036	1		TC	INTPRET	
0755					35,3522	45014	0		BOFF	CALL	
0756	REF	3	LAST	687	35,3523	03354	0			NTARGFLG	

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0757	REF	1		35,3524	73526 1			NOCHG
0758	REF	1		35,3525	73333 0			S34/35.3
0759				35,3526	77214 0	NOCHG	CLEAR	VLOAD
0760	REF	4	LAST 663	35,3527	01267 0			XDELVFLG
0761	REF	8	LAST 684	35,3530	03366 1			DELVEET3
0762	REF	9	LAST 663	35,3531	03654 0		STORE	DELVSIN
0763				35,3532	77624 1	FLAGOFF	CALL	
0764	REF	1		35,3533	73376 1			S34/35.4
0765				35,3534	77776 1		EXIT	
0766	REF	1		35,3535	3 3665 1		CAF	V06N59
0767	REF	16	LAST 672	35,3536	0 3651 0		TC	VNPDOH
0768	REF	75	LAST 687	35,3537	0 6036 1		TC	INTPRET
0769				35,3540	77650 1		GOTO	
0770	REF	20	LAST 687	35,3541	03466 0			SUBEXIT

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P0771 VN1645

R0772 SUBROUTINES USED

R0773 P3XORP7X
 R0774 GET+MGA
 R0775 8ANKCALL
 R0776 OELAYJOB
 R0777 COMPTGO
 R0778 GOFLASHR
 R0779 GOTOPDOH
 R0780 FLAGUP

0781				35,3542	71220 1	VN1645	STQ	OLOAO	
0782	REF	21	LAST	688	35,3543			SUBEXIT	
0783	REF	1			35,3544			DP-.01	
0784	REF	3	LAST	624	35,3545		STORF	+MGA	MGA = -.01
0785					35,3546		BOFF	DLOAD	
0786	RFF	5	LAST	687	35,3547			FINALFLG	
0787	RFF	1			35,3550			GET45	
0788	RFF	2	LAST	689	35,3551			DP-.01	
0789					35,3552		DAO		
0790	RFF	3	LAST	689	35,3553			OP-.01	
0791	RFF	4	LAST	689	35,3554		STORE	+MGA	MGA = -.02
0792					35,3555		BOFF	EXIT	
0793	REF	1			35,3556			RFFSMFLG	
0794	RFF	2	LAST	689	35,3557			GET45	
0795	RFF	1			35,3560	0 3643	TC	P3XORP7X	
0796					35,3561	0 3563	TC	+2	P3X
0797	RFF	3	LAST	689	35,3562	0 3571	TC	GET45 +1	P7X
0798	REF	76	LAST	688	35,3563	0 6036	TC	INTPPET	
0799					35,3564	41575 0	VLOAD	PUSH	
0800	REF	10	LAST	688	35,3565	03654 0		DELVSIN	
0801					35,3566	77624 1	CALL		COMPUTE MGA
0802	REF	1			35,3567	20005 0		GFT+MGA	
0803					35,3570	77776 1	GET45 EXIT		
0804	REF	1			35,3571	0 2376	TC	COMPTGO	INITIATE TASK TO UPDATE TLOGO
0805	RFF	22	LAST	689	35,3572	3 1466	CA	SUBEXIT	
0806	REF	1			35,3573	55'462 1	TS	QSAVED	
0807	RFF	6	LAST	615	35,3574	3 4777	CAF	1SEC	
0808	RFF	161	LAST	687	35,3575	0 4616	TC	8ANKCALL	
0809	RFF	10	LAST	526	35,3576	01735 1	CADR	OELAYJOB	
0810	REF	1			35,3577	3 3667	CAF	V16N45	TRKMKCNT, TLOGO, +MGA
0811	RFF	162	LAST	689	35,3600	0 4616	TC	8ANKCALL	
0812	REF	15	LAST	687	35,3601	20351 1	CADR	GOFLASH	
0813	REF	1			35,3602	0 3605	TC	KILCLOCK	TERMINATE
0814	RFF	1			35,3603	0 3610	TC	N45PROC	PROCFED
0815	REF	1			35,3604	0 3620	TC	CLUPDATE	RECYCLE - RETURN FOR INITIAL COMPUTATION
0816	REF	13	LAST	443	35,3605	3 0005	KILCLOCK CA	Z	
0817	RFF	2	LAST	660	35,3606	55'163 0	TS	DISPDEX	

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0818	REF	18	LAST	687	35,3607	0 6001 0		TC	GOTOPDOH	
0819	REF	16	LAST	615	35,3610	4 0076 1	N45PROC	CS	FLAGWRD2	
0820	REF	39	LAST	572	35,3611	7 4746 1		MASK	BIT6	
0821					35,3612	0 0006 1		EXTEND		
0822	REF	2	LAST	689	35,3613	1 3605 0		BZF	KILCLOCK	FINALFLG IS SET-FLASH V37-AWAIT NEW PGM
0823	REF	25	LAST	530	35,3614	0 5353 1		TC	PHASCHNG	
0824					35,3615	04024 0		OCT	04024	
0825	REF	35	LAST	687	35,3616	0 5504 0		TC	UPFLAG	SET
0826	REF	6	LAST	689	35,3617	00047 1		ADRES	FINALFLG	FINALFLG
0827	REF	14	LAST	689	35,3620	3 0005 1	CLUPDATE	CA	Z	
0828	REF	3	LAST	689	35,3621	55'163 0		TS	DISPDEX	
0829	REF	26	LAST	690	35,3622	0 5353 1		TC	PHASCHNG	
0830					35,3623	04024 0		OCT	04024	
0831	REF	77	LAST	689	35,3624	0 6036 1		TC	INTPRET	
0832					35,3625	52014 0		CLEAR	GOTO	
0833	REF	11	LAST	687	35,3626	00670 0			UPDATFLG	
0834	REF	2	LAST	689	35,3627	03462 1			QSAVED	

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P0835 DISPLAYE

R0836 SUBROUTINES USED

R0837 BANKCALL
 R0838 GOFLASHR
 R0839 GOTOPDOH
 R0840 BLANKET
 R0841 ENDOFJOB

0842				35,3630	0 0006	1	DISPLAY	EXTEND	
0843	REF	11	LAST	685	35,3631	23'461	0	QXCH	NORMEX
0844	REF	2	LAST	631	35,3632	3 3663	1	CAF	V06N55
0845	REF	163	LAST	689	35,3633	0 4616	1	TCR	BANKCALL
0846	REF	1			35,3634	20510	1	CADR	GOFLASHR
0847	REF	19	LAST	690	35,3635	1 6001	1	TCF	GOTOPDOH
0848	REF	12	LAST	691	35,3636	0 1461	0	TC	NORMEX
0849					35,3637	1 3632	1	TCF	-5
0850	REF	36	LAST	622	35,3640	3 4753	1	CAF	BIT1
0851	REF	10	LAST	619	35,3641	0 5464	1	TCR	BLANKET
0852	REF	101	LAST	619	35,3642	1 5155	1	TCF	ENDOFJOB

BLANK R1

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P0853 P3XORP7X

0854	REF	2	LAST	261	35,3643	3 7743 0	P3XORP7X	CAF	HIGH9
0855	REF	11	LAST	509	35,3644	7 1011 1		MASK	MODREG
0856					35,3645	0 0006 1		EXTEND	
0857					35,3646	1 3650 0		BZF	+2
0858	REF	185	LAST	687	35,3647	24 002 0		INCR	0
0859					35,3650	0 0002 0		RETURN	

R0860 VNPOOH

R0861 SUBROUTINES USED

R0862 BANKCALL
 R0863 GOFLASH
 R0864 GOTOPOOH

0865					35,3651	0 0006 1	VNPOOH	EXTEND	
0866	REF	6	LAST	686	35,3652	23 463 1		QXCH	RTRN
0867	REF	3	LAST	640	35,3653	55 613 0		TS	VERB NOUN
0868	REF	4	LAST	692	35,3654	3 1613 1		CA	VERB NOUN
0869	REF	164	LAST	691	35,3655	0 4616 1		TCR	BANKCALL
0870	REF	16	LAST	689	35,3656	20351 1		CADR	GOFLASH
0871	REF	20	LAST	691	35,3657	1 6001 1		ICF	GOTOPOOH
0872	REF	7	LAST	692	35,3660	0 1463 1		TC	RTRN
0873					35,3661	1 3654 1		TCF	-5

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P0874 CONSTANTS

0875	35,3662	01445 0	V06N37	VN	0637		
0876	35,3663	01467 0	V06N55	VN	0655		
0877	35,3664	01472 1	V06N58	VN	0658		
0878	35,3665	01473 0	V06N59	VN	0659		
0879	35,3666	01521 0	V06N81	VN	0681		
0880	35,3667	04055 0	V16N45	VN	1645		
0881	35,3670	14441 0	TWOPI	2DEC	6.283185307	B-4	
0881	35,3671	37325 1					
0882	35,3672	00001 0	MAX250	2DEC	25 F3		
0882	35,3673	20650 0					
0883	35,3674	12525 0	THIRD	2DEC	.333333333		
0883	35,3675	12525 0					
0884	35,3676	00004 0	ELEPS	2DEC	.27777777	E-3	
0884	35,3677	21505 1					
0885	35,3700	00002 0	DECTWO	OCT	2		
0886	35,3701	77777 0	DP-.01	OCT	77777	CONSTANTS	
0887	35,3702	61337 1		OCT	61337	ADJACENT	-.01 FOR MGA DSP
08871	35,3703	01252 0	EPSFOUR	2DEC	.041666666		
08871	35,3704	25253 1					
08872	35,3705	13434 0	130DEG	2DEC	.361111111		
08872	35,3706	16162 0					

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P0888 INITVEL

R0889 MCD NG -1 LOG SECTION - P34-P35, P74-P75
R0890 MOD BY WHITE.P DATE 21NOV67

R0891 FUNCTIONAL DESCRIPTION

R0892 THIS SUBROUTINE COMPUTES THE REQUIRED INITIAL VELOCITY VECTOR FOR
R0893 A TRAJECTORY OF SPECIFIED TRANSFER TIME BETWEEN SPECIFIED INITIAL
R0894 AND TARGET POSITIONS. THE TRAJECTORY MAY BE EITHER CONIC OR
R0895 PRECISION DEPENDING ON AN INPUT PARAMETER (NAMELY, NUMBER OF
R0896 OFFSETS). IN ADDITION, IN THE PRECISION TRAJECTORY CASE, THE
R0897 SUBROUTINE ALSO COMPUTES AN OFFSET TARGET VECTOR, TO BE USED
R0898 DURING PURE-CONIC CROSS-PRODUCT STEERING. THE OFFSET TARGET
R0899 VECTOR IS THE TERMINAL POSITION VECTOR OF A CONIC TRAJECTORY WHICH
R0900 HAS THE SAME INITIAL STATE AS A PRECISION TRAJECTORY WHOSE
R0901 TERMINAL POSITION VECTOR IS THE SPECIFIED TARGET VECTOR.

R0902 IN ORDER TO AVOID THE INHERENT SINGULARITIES IN THE 180 DEGREE
R0903 TRANSFER CASE WHEN THE (TRUE OR OFFSET) TARGET VECTOR MAY BE
R0904 SLIGHTLY OUT OF THE ORBITAL PLANE, THIS SUBROUTINE ROTATES THIS
R0905 VECTOR INTO A PLANE DEFINED BY THE INPUT INITIAL POSITION VECTOR
R0906 AND ANOTHER INPUT VECTOR (USUALLY THE INITIAL VELOCITY VECTOR),
R0907 WHENEVER THE INPUT TARGET VECTOR LIES INSIDE A CONE WHOSE VERTEX
R0908 IS THE ORIGIN OF COORDINATES, WHOSE AXIS IS THE 180 DEGREE
R0909 TRANSFER DIRECTION, AND WHOSE CONE ANGLE IS SPECIFIED BY THE USER.

R0910 THE LAMBERT SUBROUTINE IS UTILIZED FOR THE CONIC COMPUTATIONS AND
R0911 THE COASTING INTEGRATION SUBROUTINE IS UTILIZED FOR THE PRECISION
R0912 TRAJECTORY COMPUTATIONS.

R0913 CALLING SEQUENCE

R0914 L CALL
R0915 L+1 INITVEL
R0916 L+2 (RETURN - ALWAYS)

R0917 INPUT

R0918 (1) RINIT INITIAL POSITION RADIUS VECTOR
R0919 (2) VINIT INITIAL POSITION VELOCITY VECTOR
R0920 (3) RTARG TARGET POSITION RADIUS VECTOR
R0921 (4) DELLT4 DESIRED TIME OF FLIGHT FROM RINIT TO RTARG
R0922 (5) INTIME TIME OF RINIT
R0923 (6) OD NUMBER OF ITERATIONS OF LAMBERT/INTEGRVS
R0924 (7) 2D ANGLE TO 180 DEGREES WHEN ROTATION STARTS
R0925 (8) RTX1 -2 FOR EARTH, -100 FOR LUNAR
R09251 (9) RTX2 COORDINATE SYSTEM ORIGIN - 0 FOR EARTH, 2 FOR LUNAR
R0926 PUSHLOC SET AT 4D

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R0927 OUTPUT

R0928 (1) RTARG OFFSET TARGET POSITION VECTOR
 R0929 (2) VIPRIME MANEUVER VELOCITY REQUIRED
 R0930 (3) VTPRIME VELOCITY AT TARGET AFTER MANEUVER
 R0931 (4) DELVEET3 DELTA VELOCITY REQUIRED FOR MANEUVER

R0932 SUBROUTINES USED

R0933 LAMBERT
 R0934 INSTALL
 R0935 INTEGRVS

0936 REF 1 11,2000 SETLOC INTVEL
 0937 11,2000 BANK

0938 REF 1 11,2000 77614 1 INITVEL COUNT* \$\$/INITV
 0958 11,2001 00475 1 SET COGA GUESS NOT AVAILABLE
 0959 REF 1 11,2002 44175 1 HAVEGUES VLOAD

0960 11,2003 03442 0 STO GUESSW
 0961 REF 6 LAST 684 11,2004 03461 1 RTARG STO
 0962 REF 13 LAST 691 11,2005 03470 1 NORMEX RTARG1
 0963 REF 1 11,2006 46135 1 STORE BHIZ
 0964 11,2007 03377 1 SLOAD RTX2
 0965 REF 6 LAST 686 11,2010 22022 1 INITVEL1
 0967 REF 1 11,2011 72575 0 VLOAD VSL2
 0968 11,2012 02327 0 RINIT B29
 0969 REF 3 LAST 682 11,2013 26327 0 STOVL RINIT B27
 0970 REF 4 LAST 695 11,2014 02335 0 VINIT B7
 0971 REF 3 LAST 682 11,2015 77752 1 VSL2
 0972 11,2016 26335 0 STOVL VINIT B5
 0973 REF 4 LAST 695 11,2017 03470 1 RTARG1
 0974 REF 2 LAST 695 11,2020 77752 1 VSL2
 0975 11,2021 03470 1 STORE RTARG1
 0976 REF 3 LAST 695
 R0977 INITIAL IZATION

0978 11,2022 71331 0 INITVEL1 SSP DLOAD SET ITCTR TO -1,LOAD MPAC WITH F4(PL 2D)
 0979 REF 1 11,2023 03615 0 ITCTR
 0980 11,2024 77776 1 0 -1
 0981 11,2025 70546 1 COSINE SRI CALCULATE COSINE (E4) (+2)
 0982 REF 1 11,2026 17665 1 STODL COZY4 SET COZY4 TO COSINE(E4) (PL 0D)
 0983 11,2027 67154 0 LXA,2 SXA,2
 0984 REF 271 LAST 677 11,2030 00154 1 MPAC
 0985 REF 2 LAST 140 11,2031 02701 0 VTARGETAG SET VTARGETAG TO 0D (SP)
 0986 11,2032 77775 1 VLOAD
 0987 REF 5 LAST 695 11,2033 02327 0 RINIT
 0988 REF 3 LAST 140 11,2034 26655 0 STOVL RIVEC RIVEC EQ RINIT
 0989 REF 4 LAST 695 11,2035 03470 1 RTARG1
 0990 REF 2 LAST 140 11,2036 16663 0 STODL R2VEC R2VEC EQ RTARG

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0991	REF	5	LAST	632	11,2037	03450 0		DELLT4		
0992	REF	2	LAST	140	11,2040	02671 0	STORE	TDESIRE	EQ DELLT4	
0993					11,2041	77201 1	SETPD	VLOAD		
0994					11,2042	00001 0		OD	INITIALIZE PL TO OD	
0995	REF	6	LAST	695	11,2043	02327 0		RINIT	MPAC EQ RINIT (+29)	
0996					11,2044	41456 0	UNIT	PUSH	UNIT(RI) (+1)	(PL 6D)
0997					11,2045	53435 0	VXV	UNIT		
0998	REF	5	LAST	695	11,2046	02335 0		VINIT	MPAC EQ UNIT(RI) X VI	(+8)
0999	REF	2	LAST	140	11,2047	26674 0	STOVL	UN		
1000	REF	5	LAST	695	11,2050	03470 1		RTARG1		
1001					11,2051	50256 0	UNIT	DOT	TEMP=URT.URI	(+2)
1002					11,2052	43015 1	DAD	CLEAR		(PL 0D)
1003	REF	2	LAST	695	11,2053	03665 1		COZY4		
1004	REF	1			11,2054	03665 1		NORMSW		
1005	REF	3	LAST	696	11,2055	03665 1	STORE	COZY4		
1006					11,2056	43044 0	INITVEL2	BPL	SET	
1007	REF	1			11,2057	22101 1		INITVEL3	UN CALCULATED IN LAMBERT	
1008	REF	2	LAST	696	11,2060	03465 0		NORMSW		
R1009			ROTATE	RC	INTO	YC	PLANE -	SET	UNIT	NORMAL TO YC
1010					11,2061	41575 0	VLOAD	PUSH		(PL 6D)
1011	REF	3	LAST	695	11,2062	02663 0		R2VEC	RC TO 6D (+29)	
1012					11,2063	63246 1	ABVAL	PDVL	RC TO MPAC, ABVAL(RC) (+29) TO OD	(PL 2D)
1013					11,2064	46206 1	PUSH	VPROJ		(PL 8D)
1014	REF	3	LAST	696	11,2065	02674 0		UN		
1015					11,2066	51352 1	VSL2	BVSU		
1016					11,2067	74256 0	UNIT	VXSC		(PL 0D)
1017					11,2070	77772 0	VSL1			
1018	REF	4	LAST	696	11,2071	02663 0	STORE	R2VEC		
1019					11,2072	67351 1	TLOAD	SLOAD		
1020	REF	2	LAST	36	11,2073	22275 1		ZEROVEC		
1021	REF	2	LAST	695	11,2074	03615 0		ITCTR		
1022					11,2075	77244 0	BPL	VLOAD		
1023	REF	2	LAST	696	11,2076	22101 1		INITVEL3		
1024	REF	5	LAST	696	11,2077	02663 0		R2VEC		
1025	REF	6	LAST	696	11,2100	03470 1	STORE	RTARG1		
1026					11,2101	63345 0	INITVEL3	DLOAD	PDVL	(PL 2D)
1027	REF	1			11,2102	26007 1		MUFARTH	POSITIVE VALUE	
1028	REF	6	LAST	696	11,2103	02663 0		R2VEC		
102802					11,2104	63256 0	UNIT	PDVL	2D = UNIT(R2VEC)	(PL 8D)
102804	REF	4	LAST	695	11,2105	02655 0		R1VEC		
102806					11,2106	41456 0	UNIT	PUSH	8D = UNIT(R1VEC)	(PL14D)
102808					11,2107	57435 1	VXV	VCOMP	-N = UNIT(R2VEC) X UNIT(R1VEC)	
10281					11,2110	00003 1		2D		
10282					11,2111	77606 1	PUSH			(PL20D)
10283					11,2112	71350 1	LXA,1	DLOAD		
10284	REF	6	LAST	671	11,2113	03375 0		RTX1		
10285					11,2114	00023 0		18D		
10286					11,2115	62040 1	BMN	INCR,1		
10287					11,2116	22120 1		+2		

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10288		11,2117	77767 1	DEC	-8	
10289		11,2120	67310 1	INCR,1	SLOAD	
1029		11,2121	00012 1		10D	
10291	REF 14 LAST 678	11,2122	00047 1		X1	
10292		11,2123	77230 0	BHIZ	VLOAD	(PL14D)
10293		11,2124	22126 1		+2	
10294		11,2125	41476 1	VCOMP	PUSH	(PL20D)
10295		11,2126	77775 1	VLOAD		(PL14D)
10296		11,2127	50235 0	VXV	DOT	(PL 2D)
1032		11,2130	71244 0	BPL	DLOAD	(PL 0D)
1033	REF 1	11,2131	22133 0		INITVEL4	
1034		11,2132	41476 1	DCOMP	PUSH	(PL 2D)
1035		11,2133	67154 0	INITVEL4 LXA,2	SXA,2	
1036		11,2134	00000 1		0D	
1037	REF 2 LAST 140	11,2135	02672 0		GEOMSGN	
R1038	SET INPUTS UP FOR LAMBERT					
10381		11,2136	43131 0	SSP	BOFF	
10382	REF 1	11,2137	00027 1		ITERCTR	
10383		11,2140	00024 1		20D	
10384	REF 2 LAST 243	11,2141	03752 1		AVEGFLAG	
10385		11,2142	22146 1		+4	
10386		11,2143	77731 1	SSP		
10387	REF 2 LAST 697	11,2144	00027 1		ITERCTR	
10388		11,2145	00005 1		5	
1039		11,2146	45150 1	LXA,1	CALL	
1040	REF 7 LAST 696	11,2147	03375 0		RTX1	
R1041	OPERATE THE LAMBERT CONIC ROUTINE (COASTFLT SUBROUTINE)					
1042	REF 1	11,2150	25223 0		LAMBERT	
R1043	DELETE THRU 4521					
R1044	ARRIVED AT SOLUTION IS GOOD ENOUGH ACCORDING TO SLIGHTLY WIDER BOUNDS.					
1045		11,2151	77214 0	CLEAR	VLOAD	
1046	REF 2 LAST 695	11,2152	00675 0		GUESSW	
1047	REF 7 LAST 671	11,2153	02744 1		VVEC	
R1048	STORE CALCULATED INITIAL VELOCITY REQUIRED IN VIPRIME					
R1049						
1050	REF 3 LAST 672	11,2154	16343 1	STODL	VIPRIME	INITIAL VELOCITY REQUIRED (+7)
R1051						
R1052	IF NUMIT IS ZERO, CONTINUE AT INITVELB, OTHERWISE					
R1053	SET UP INPUTS FOR ENCKE INTEGRATION (INTEGRVS).					
1054	REF 3 LAST 695	11,2155	02702 0		VTARGETAG	
1055		11,2156	45030 0	BHIZ	CALL	
1056	REF 1	11,2157	22234 1		INITVEL7	
1057	REF 19 LAST 686	11,2160	27412 0		INTSTALL	
1061		11,2161	43135 1	SLOAD	CLEAR	
1062	REF 7 LAST 695	11,2162	03377 1		RTX2	

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INCREMENT ITCTR

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IF SP(MPAC) EQ 0, CONTINUE AT INITVELC
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1106				11,2231	77775	1	INITVEL6	VLOAD	
1107	REF	9	LAST	698	11,2232	02663	0		R2VEC
1108	REF	8	LAST	698	11,2233	03470	1	STORE	RTARG1
1109				11,2234	52375	1	INITVEL7	VLOAD	VSU

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1110	REF	5	LAST	698	11,2235	02343	1		VIPRIME	
1111	REF	6	LAST	696	11,2236	02335	0		VINIT	
1112	REF	9	LAST	688	11,2237	27366	1	STOVL	DELVEET3	DELVEET3 = VIPRIME-VINIT (+7)
1113	REF	3	LAST	698	11,2240	02703	1		VTARGET	
1114	REF	2	LAST	672	11,2241	03564	0	STORE	VTPRIME	
1115					11,2242	46135	1	SLOAD	BHIZ	
1116	REF	8	LAST	697	11,2243	03377	1		RTX2	
1117	REF	1			11,2244	22261	1		INITVELX	
11171					11,2245	70575	1	VLOAD	VSR2	
11172	REF	3	LAST	699	11,2246	03564	0		VTPRIME	
1118	REF	4	LAST	699	11,2247	27564	0	STOVL	VTPRIME	
1119	REF	6	LAST	699	11,2250	02343	1		VIPRIME	
1120					11,2251	77742	0	VSR2		
1121	REF	7	LAST	699	11,2252	26343	1	STOVL	VIPRIME	
1122	REF	9	LAST	698	11,2253	03470	1		RTARG1	
1123					11,2254	77742	0	VSR2		
1124	REF	10	LAST	699	11,2255	27470	1	STOVL	RTARG1	
1125	REF	10	LAST	699	11,2256	03366	1		DELVEET3	
1126					11,2257	77742	0	VSR2		
1127	REF	11	LAST	699	11,2260	03366	1	STORE	DELVEET3	
1128					11,2261	77201	1	INITVELX SETPD	VLOAD	
1129					11,2262	00001	0		OD	
1130	REF	11	LAST	699	11,2263	03470	1		RTARG1	
1131	REF	7	LAST	695	11,2264	37442	1	STCALL	RTARG	
1134	REF	14	LAST	695	11,2265	03461	1		NORMEX	
R1135										
R1136									 END OF INITVEL ROUTINE

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P1137 MIDGIM

R1138 MOD NO. 0, BY WILLMAN, SUBROUTINE RENDGUID, LOG P34-P35, P74-P75
R1139 REVISION 03, 17 FEB 67

R1140 IF THE ACTIVE VEHICLE IS DOING THE COMPUTATION, MIDGIM COMPUTES
R1141 THE POSITIVE MIDDLE GIMBAL ANGLE OF THE ACTIVE VEHICLE TO THE INPUT
R1142 DELTA VELOCITY VECTOR (OD IN PUSH LIST), OTHERWISE
R1143 MIDGIM CONVERTS THE INPUT DELTA VELOCITY VECTOR FROM INERTIAL COORDIN-
R1144 ATES TO LOCAL VERTICAL COORDINATES OF THE ACTIVE VEHICLE.

R1145 .. INPUTS ..

R1146	NAME	MEANING	UNITS/SCALING/MODE
R1147	AVFLAG	INT FLAG - 0 IS CSM ACTIVE, 1 IS LEM ACTIVE	BIT
R1149	RINIT	ACTIVE VEHICLE RADIUS VECTOR	METERS/CSEC (+7) VT
R1150	VINIT	ACTIVE VEHICLE VELOCITY VECTOR	METERS/CSEC (+7) VT
R1151	OD (PL)	ACTIVE VEHICLE DELTA VELOCITY VECTOR	METERS/CSEC (+7) VT

R1152 .. OUTPUTS ..

R1153	NAME	MEANING	UNITS/SCALING/MODE
R1154	+MGA	+ MIDDLE GIMBAL ANGLE	REVOLUTIONS (+0) DP
R1155	DELVLVC	DELTA VELOCITY VECTOR IN LV COORD.	METERS/CSEC (+7) VT
R1156	MGLVFLAG	INT FLAG - 0 IS +MGA COMPUTED, 1 IS DELVLVC COMP. -	BIT

R1157 .. CALLING SEQUENCE ..

R1158 L CALL
R1159 L+1 MIDGIM
R1160 L+2 (RETURN - ALWAYS)

R1161 .. NO SUBROUTINES CALLED ..

R1162 .. DEBRIS - ERASEABLE TEMPORARY USAGE

R1163 A,Q,L, PUSH LIST, MPAC.

R1164 .. ALARMS - NONE ..

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P1165 MIDDLE GIMBAL ANGLE COMPUTATION.

1166	REF	1		10,2000		SETLOC	M100GIM		
1167				10,2000		BANK			
1168	REF	-1				COUNT*	\$/MIDG		
1169				10,2000	20000 0	HALFREV	20EC	1 B-1	
1169				10,2001	00000 1				
1170				10,2002	77614 1	M10GIM	BOFF		
1171	REF	3	LAST	639	10,2003	01352 1		AVFLAG	
1172	REF	2	LAST	663	10,2004	20021 0		GET.LVC	
1174	REF	2	LAST	689	10,2005		MIDGIM1 =	GET+MGA	
1176				10,2005	53575 0	GET+MGA	VLOAO	UNIT	(PL 0D) V (+7) TO MPAC, UNITIZE UV (+1)
11765				10,2006	77656 1		UNIT		
1177				10,2007	72441 0		OOT	SL1	OOT UV WITH Y(STABLE MEMBER) AND RESCALE
1178	REF	16	LAST	602	10,2010	01742 1		REFSMAT +6	FROM +2 TO +1 FOR ASIN ROUTINE
1179				10,2011	51136 1		ARCSIN	BPL	
1180	REF	1			10,2012	20016 1		SETMGA	
1181				10,2013	43215 0		DAD	DAD	CONVERT -MGA TO +MGA BY
1182	REF	1			10,2014	20001 1		HALFREV	ADDOING ONE REVOLUTION
1183	REF	2	LAST	701	10,2015	20001 1		HALFREV	
1184	REF	5	LAST	689	10,2016	02257 0	SETMGA	STORE +MGA	
1185				10,2017	43414 1		CLR	RVQ	CLEAR MGLVFLAG TO INOICATE +MGA CALC
1186	REF	1			10,2020	02675 1		MGLVFLAG	AND EXIT
1191				10,2021	53575 0	GET.LVC	VLOAD	UNIT	(PL 6D) R (+29) IN MPAC, UNITIZE UR
1192	REF	8	LAST	698	10,2022	02327 0		RINIT	
1193				10,2023	77676 0		VCOMP		U(-R)
1194				10,2024	00023 0		STORE	18D	U(-R) TO 180
1195				10,2025	53435 0		VXV	UNIT	U(-R)*V EQ V*U(R), U(V*R)
1196	REF	7	LAST	699	10,2026	02335 0		VINIT	
1197				10,2027	00015 0		STORE	12D	U(V*R) TO 12D
1198				10,2030	53435 0		VXV	UNIT	U(V*R)*U(-R), U((V*R)*(-R))
1199				10,2031	00023 0			180	
1200				10,2032	24007 0		STOVL	6D	TRANSFORMATION MATRIX IS IN 60 (+1)
1201				10,2033	00001 0			OD	DELTA V (+7) IN OD
1202				10,2034	76521 0		MXV	VSL1	CONVERT FROM INER COOR TO LV COOR (+8)
1203				10,2035	00007 0			60	AND SCALE +7 IN MPAC
1204	REF	19	LAST	687	10,2036	03432 1	STORE	OELVLVC	STORE IN DELVLVC (+7)
1205				10,2037	43414 1		SET	RVQ	SET MGLVFLAG TO INDICATE LVC CALC
1206	REF	2	LAST	701	10,2040	02475 0		MGLVFLAG	AND EXIT
R1207								 END OF MIDGIM ROUTINE

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P1208					10,2041	77160	0	SELFC	TMU	AXC,1	AXT,2
1209					10,2042	00002	0				2D
1210					10,2043	00000	1				0D
1211					10,2044	77614	1			BOFF	
1212					10,2045	04343	1				CMOONFLG
1213	REF	4	LAST	686	10,2046	20052	1				SETMUER
1214	REF	1			10,2047	77160	0			AXC,1	AXT,2
1215					10,2050	00012	1				10D
1216					10,2051	00002	0				2D
1217					10,2052	66143	1			SETMUER	DLOAD*
1218					10,2053	10011	0				SXA,1
1219	REF	1			10,2054	03375	0				MUTABLE +4,1
1220	REF	8	LAST	697	10,2055	22323	0				RTX1
1221	REF	4	LAST	645	10,2056	10003	0			STODL*	PTSR1/MU
1222	REF	2	LAST	702	10,2057	54214	1				MUTABLE -2,1
1223					10,2060	04343	1			BOFF	SR
1224	REF	5	LAST	702	10,2061	20063	0				CMOONFLG
1225	REF	1			10,2062	20607	1				RTRNMU
1226					10,2063	02325	1				6D
1227	REF	4	LAST	658	10,2064	43134	0			RTRNMU	STORF
1228					10,2065	03376	0			SXA,2	RTMU
1229	REF	9	LAST	699	10,2066	01271	1				CLEAR
1230	REF	7	LAST	690	10,2067	77650	1				RTX2
1231					10,2070	73542	0			GOTO	FINALFLG
1232											
1233											
1234											
1235	REF	6	LAST	675							VN1645

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P1236 PERIAPD

R1237 MCD NO -1 LOG SECTION - P34-P35, P74-P75
 R1238 MOD BY WHITE.P DATE 18JAN68

R1239 FUNCTIONAL DESCRIPTION

R1240 THIS SUBROUTINE COMPUTES THE TWO BODY APOCENTER AND PERICENTER
 R1241 ALTITUDES GIVEN THE POSITION AND VELOCITY VECTORS FOR A POINT ON
 R1242 THE TRAJECTORY AND THE PRIMARY BODY.

R1243 SETRAD IS CALLED TO DETERMINE THE RADIUS OF THE PRIMARY BODY.

R1244 APSIDES IS CALLED TO SOLVE FOR THE TWO BODY RADII OF APOCENTER AND
 R1245 PERICENTER AND THE ECCENTRICITY OF THE TRAJECTORY.

R1246 CALLING SEQUENCE

R1247 L CALL
 R1248 L+1 PERIAPD
 R1249 L+2 (RETURN - ALWAYS)

R1250 INPUT

R1251 (1) RVEC POSITION VECTOR IN METERS
 R1252 SCALE FACTOR - EARTH +29, MOON +27
 R1253 (2) VVEC VELOCITY VECTOR IN METERS/CENTISECOND
 R1254 SCALE FACTOR - EARTH +7, MOON +5
 R1255 (3) X1 PRIMARY BODY INDICATOR
 R1256 EARTH -2, MOON -10

R1257 OUTPUT

R1258 (1) 2D APOCENTER RADIUS IN METERS
 R1259 SCALE FACTOR - EARTH +29, MOON +27
 R1260 (2) 4D APOCENTER ALTITUDE IN METERS
 R1261 SCALE FACTOR - EARTH +29, MOON +27
 R1262 (3) 6D PERICENTER RADIUS IN METERS
 R1263 SCALE FACTOR - EARTH +29, MOON +27
 R1264 (4) 8D PERICENTER ALTITUDE IN METERS
 R1265 SCALE FACTOR - EARTH +29, MOON +27
 R1266 (5) ECC ECCENTRICITY OF CONIC TRAJECTORY
 R1267 SCALE FACTOR - +3
 R1268 (6) XXXALT RADIUS OF THE PRIMARY BODY IN METERS
 R1269 SCALE FACTOR - EARTH +29, MOON +27
 R1270 (7) PUSHLOC EQUALS 100

R1271 SUBROUTINES USED

R1272 SETRAD

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R1273 APSIDES

1274	REF	1		23,2000		SETLOC	APOPERI		
1275				23,2275		BANK			
1276	REF	1				COUNT*	\$\$/PERAP		
1277				23,2275	00302 0	R PAD	2DEC	6373338 B-29	STANDARD RADIUS OF PAD 37-B.
1277				23,2276	17755 0				
A1278									= 20 909 901.57 FT
1279				23,2277	53754 1	PERIAPO1	LXA,2	VSR*	
1280	REF	10	LAST 702	23,2300	03376 0			RTX2	
1281				23,2301	57176 0			0,2	
1282	REF	8	LAST 697	23,2302	26744 1			STOVL VVEC	
1283				23,2303	53750 0			LXA,1 VSR*	
1284	REF	9	LAST 702	23,2304	03375 0			RTX1	
1285				23,2305	57176 0			0,2	
1286	REF	6	LAST 671	23,2306	02655 0			STDRE RVEC	
1287				23,2307	45020 1	PERIAPO	STQ	CALL	
1288	REF	15	LAST 699	23,2310	03461 1			NORMEX	
1289	REF	1		23,2311	46325 1			SETRAD	
1290	REF	2	LAST 157	23,2312	37667 1			STCALL XXXALT	
1291	REF	1		23,2313	25675 1			APSIDES	
1292				23,2314	41401 1			SETPD PUSH	2D = APOCENTER RADIUS B29 OR B27
1293				23,2315	00003 1			2D	
1294				23,2316	65225 1			DSU PDDL	4D = APDGEE ALTITUDE B29 OR B27
1295	REF	3	LAST 704	23,2317	03667 0			XXXALT	
1296				23,2320	00001 0			OD	
1297				23,2321	45206 1			PUSH DSU	6D = PERICENTER RADIUS B29 OR B27
1298	REF	4	LAST 704	23,2322	03667 0			XXXALT	
1299				23,2323	52006 0			PUSH GOTD	8D = PERIGEE ALTITUDE B29 OR B27
1300	REF	16	LAST 704	23,2324	03461 1			NORMEX	

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P1301	SETRAD								
1302						23,2325	41545 0	SETRAD DLOAD PUSH	
1303	REF	1				23,2326	06276 1	RPAD	
1304						23,2327	63130 0	SXA,1 INCR,2	
1305	REF	10	LAST	698		23,2330	00047 1	X2	
1306						23,2331	00002 0	2D	
1307						23,2332	46135 1	SLOAD BHIZ	
1308	REF	11	LAST	705		23,2333	00050 1	X2	
1309	REF	1				23,2334	46340 1	SETRADX	
1310						23,2335	51575 1	VLOAD ABVAL	
1311	REF	2	LAST	215		23,2336	02023 1	RLS	
1312						23,2337	77725 1	PDDL	
1313						23,2340	43545 1	SETRADX DLOAD RVQ	

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P1314	PRECSET			23,2341	77620 0	PRECSET	STQ	
1315								NORMEX
1316	REF	17	LAST	704	23,2342 03461 1			STCALL TDFC2
1317	REF	1			23,2343 37572 0			LEMPREC
1318	REF	5	LAST	662	23,2344 27057 0			
1319					23,2345 77624 1		CALL	
1320	REF	1			23,2346 46357 1			LEMSTORE
1321					23,2347 77745 1		DLOAD	
1322	REF	2	LAST	706	23,2350 03572 1			TDEC2
1323	REF	29	LAST	698	23,2351 34041 0		STCALL	TDEC1
1324	REF	3	LAST	222	23,2352 27043 0			CSMPREC
1325					23,2353 77624 1		CALL	
1326	REF	1			23,2354 46367 1			CSMSTORE
1327					23,2355 77650 1		GOTO	
1328	REF	18	LAST	706	23,2356 03461 1			NORMEX
1329					23,2357 43175 0	LEMSTORE	VLOAD	BOFF
1330	REF	16	LAST	686	23,2360 00001 0			RATT
1331	REF	4	LAST	701	23,2361 01352 1			AVFLAG
1332	REF	4	LAST	679	23,2362 46373 1			PASSIVE
1333	REF	19	LAST	686	23,2363 27534 0	ACTIVE	STOVL	RACT3
1334	REF	11	LAST	682	23,2364 00007 0			VATT
1335	REF	12	LAST	684	23,2365 03542 1		STORE	VACT3
1336					23,2366 77616 0		RVQ	
1337					23,2367 43175 0	CSMSTORE	VLOAD	BOFF
1338	REF	17	LAST	706	23,2370 00001 0			RATT
1339	REF	5	LAST	706	23,2371 01352 1			AVFLAG
1340	REF	4	LAST	679	23,2372 46363 0			ACTIVE
1341	REF	11	LAST	682	23,2373 27550 1	PASSIVE	STOVL	RPASS3
1342	REF	12	LAST	706	23,2374 00007 0			VATT
1343	REF	8	LAST	682	23,2375 03556 1		STORE	VPASS3
1344					23,2376 77616 0		RVQ	

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P1345	VECSHIFT							
1346				23,2377	53754 1	VECSHIFT LXA,2	VSR*	
1347	REF 11 LAST 704			23,2400	03376 0		RTX2	
1348				23,2401	57176 0		0,2	
1349				23,2402	63350 1	LXA,1	PDVL	
1350	REF 10 LAST 704			23,2403	03375 0		PTX1	
1351				23,2404	63257 1	VSR*	PDVL	
1352				23,2405	57176 0		0,2	
1353				23,2406	77616 0	RVQ		

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P1354	SHIFTR1						
1355		23,2407	53754	1	SHIFTR1	LXA,2	SL*
1356	REF 12 LAST 707	23,2410	03376	0			RTX2
1357		23,2411	57576	1			0,2
1358		23,2412	77616	0		RVQ	

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R1359 PROGRAM DESCRIPTION
R1360 SUBROUTINE NAME R36 OUT-OF-PLANE RENDEZVOUS ROUTINE
R1361 MOD NO. 0 DATE 22 DECEMBER 67
R1362 MOD BY N.M.NEVILLE LOG SECTION EXTENDED VERBS
R1363 FUNCTIONAL DESCRIPTION

R1364 TO DISPLAY AT ASTRONAUT REQUEST LGC CALCULATED RENDEZVOUS
R1365 OUT-OF-PLANE PARAMETERS (Y , YDOT , PSI). (REQUESTED BY DSKY).

R1366 CALLING SEQUENCE

R1367 ASTRONAUT REQUEST THROUGH DSKY V 90 E

R1368 SUBROUTINES CALLED

R1369 EXCSPRET
R1370 GCMARKF
R1371 CSMPREC
R1372 LEMPREC
R1373 SGNAGREE
R1374 LCADTIME

R1375 NORMAL EXIT MODES

R1376 ASTRONAUT REQUEST THROUGH DSKY TO TERMINATE PROGRAM V 34 E

R1377 ALARM OR ABORT EXIT MODES

R1378 NCNE

R1379 OUTPUT

R1380 DECIMAL DISPLAY OF TIME , Y , YDOT AND PSI

R1381 DISPLAYED VALUES Y , YDOT , AND PSI , ARE STORED IN ERASABLE
R1382 REGISTERS RANGE , RRATE AND RTHETA RESPECTIVELY.

R1383 ERASABLE INITIALIZATION REQUIRED

R1384 CSM AND LEM STATE VECTORS

R1385 DEBRIS

R1386 CENTRALS A,Q,L

R1387 OTHER THOSE USED BY THE ABOVE LISTED SUBROUTINES

1388		20,2115	BANK 20
1389	REF 1	04,2000	SETLOC R35LM
1390		04,2613	BANK

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1391	REF	3	LAST	299	E4,1612		EBANK= RPASS36	
1392	REF	1					COUNT* \$\$/R36	
1393					04,2613	22 007 0	R36	ZL
1394	REF	128	LAST	660	04,2614	3 4755 1		CAF ZERO
1395	REF	6	LAST	320	04,2615	53'052 0		DXCH DSPTMX
1396	REF	1			04,2616	3 2746 0		CAF V06N16N
1397	REF	165	LAST	692	04,2617	0 4616 1		TC BANKCALL
1398	REF	9	LAST	293	04,2620	20212 1		CADR GOMAPKF
1399	REF	36	LAST	620	04,2621	1 5472 1		TCF ENDEXT
1400					04,2622	1 2624 1		TCF +2
1401					04,2623	1 2616 0		TCF -5
1402	REF	7	LAST	710	04,2624	53'052 0		DXCH DSPTMX
1403					04,2625	0 0006 1		EXTEND
1404	REF	1			04,2626	1 2735 0		BZF LREGCHK
1405	REF	272	LAST	695	04,2627	52 155 1	ASTROTIM	DXCH MPAC
1406	REF	78	LAST	690	04,2630	0 6036 1		TC INTPRET
1407					04,2631	77634 0		RTB
1408	REF	1			04,2632	21670 0		DPMODE
1409	REF	30	LAST	706	04,2633	34041 0	R36INT	STCALL TDEC1
1410	REF	2	LAST	665	04,2634	27043 0		OTHPREC
1411					04,2635	63375 0		VLOAD PDVL
1412	REF	13	LAST	706	04,2636	00007 0		VATT
1413	REF	18	LAST	706	04,2637	00001 0		RATT
1414	REF	4	LAST	710	04,2640	02213 0		STORE RPASS36
1415					04,2641	63256 0		UNIT PDVL
1416					04,2642	53435 0		VXV UNIT
1417					04,2643	77626 0		STADR
1418	REF	1			04,2644	61556 0		STDDL UNP36
1419	REF	8	LAST	666	04,2645	00015 0		TAT
1420	REF	31	LAST	710	04,2646	34041 0		STCALL TDEC1
1421	REF	2	LAST	665	04,2647	27057 0		THISPREC
1422					04,2650	63375 0		VLOAD PDVL
1423	REF	14	LAST	710	04,2651	00007 0		VATT
1424	REF	19	LAST	710	04,2652	00001 0		RATT
1425					04,2653	77725 1		PDDL
1426	REF	9	LAST	710	04,2654	00015 0		TAT
1427					04,2655	24037 0		STOVL 30D
1428					04,2656	41406 0		PUSH
1429					04,2657	63245 1		BVSU PDVL
1430	REF	5	LAST	710	04,2660	02213 0		RPASS36
1431					04,2661	72441 0		DOT SL1
1432	REF	2	LAST	710	04,2662	02221 1		UNP36
1433	REF	9	LAST	331	04,2663	26205 1		STOVL RANGE
1434					04,2664	00001 0		00D
1435					04,2665	72441 0		DOT SL1
1436	REF	3	LAST	710	04,2666	02221 1		UNP36
1437	REF	5	LAST	332	04,2667	26207 0		STOVL RRATF
1438					04,2670	00007 0		06D

SET TIME OF EVENT TO ZERO FOR FIRST DISPLAY

TERMINATE PROCEED RECYCLE FOR ASTRONAUT INPUT TIME

A-REG ZERO GOTO CHECK L-REG FOR ZERO
A-REG NON-ZERO, TIME = ASTRO INPUT TIME

VELOCITY VECTOR V A 00D

SAVE TIME IN LOCATION 30D FOR REDISPLAY

POSITION VECTOR R IN 06D AND 12D
A - -
LINE OF SIGHT VECTOR R - R 12D
P A

Y = U . R
A

Y = U . V
A -

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1439				04,2671	41456 0	UNIT	PUSH	U = UNIT(P)	180
1440				04,2672	47235 0	VXV	VXV	RA A	
1441				04,2673	00001 0		000	- - - -	
1442				04,2674	00023 0		180	(U XV)XU =U	
1443				04,2675	53552 0	VSL2	UNIT	RA A RA A	
144305				04,2676	77656 1	UNIT			
1444				04,2677	24001 0	STOVL	000	UNIT HORIZONTAL IN FORWARD DIR.	000
1445				04,2700	00023 0		180		
1446				04,2701	74241 0	DOT	VXSC	-	
1447				04,2702	00015 0		120	U	
1448				04,2703	77752 1	VSL2		L	
1449				04,2704	53445 1	BVSU	UNIT		
144905				04,2705	77656 1	UNIT			
1450				04,2706	50206 0	PUSH	DOT	LOS PROJECTED INTO HORIZONTAL	120
1451				04,2707	00001 0		000	PLANE	
1452				04,2710	65552 0	SL1	ARCCOS	- -	
1453	REF	4	LAST	332	04,2711	26211 1	STOVL	RTHETA	PSI= ARCCOS(U .U)
1454					04,2712	50235 0	VXV	DOT	A L
1455					04,2713	00001 0		000	
1456					04,2714	71244 0	BPL	OLDA0	
1457	REF	1			04,2715	10722 1		R36TAG2	
1458	REF	2	LAST	36	04,2716	22306 1		LODPMAX	
1459					04,2717	77625 0	DSU		
1460	REF	5	LAST	711	04,2720	02211 1		RTHETA	
1461	REF	6	LAST	711	04,2721	02211 1	STORE	RTHETA	
1462					04,2722	47145 1	R36TAG2	OLDA0	
1463					04,2723	00037 0		300	
1464	REF	2	LAST	389	04,2724	21516 0		SGNAGREE	
1465	REF	8	LAST	710	04,2725	01052 1	STORE	DSPTMX	
1466					04,2726	77776 1	EXIT		
1467	REF	1			04,2727	3 2747 1	CAF	V06N90N	DISPLAY Y , YDOT , AND PSI
1468	REF	166	LAST	710	04,2730	0 4616 1	TC	BANKCALL	
1469	REF	10	LAST	710	04,2731	20212 1	CADR	GOMARKF	
1470	REF	37	LAST	710	04,2732	1 5472 1	TCF	ENDEXT	TERMINATE
1471	REF	38	LAST	711	04,2733	1 5472 1	TCF	ENDEXT	PROCEED , END OF PROGRAM
1472	REF	2	LAST	299	04,2734	1 2616 0	TCF	R36 +3	REDISPLAY OUTPUT
1473	REF	93	LAST	687	04,2735	56 001 0	LREGCHK	XCH	L
1474					04,2736	0 0006 1		EXTEND	
1475	REF	1			04,2737	1 2742 0	BZF	ENTTIM2	L-REG ZERO ,SET TIME = PRESENT TIME
1476	REF	94	LAST	711	04,2740	56 001 0	XCH	L	L-REG NON ZERO, TIME = ASTRO INPUT TIME
1477	REF	1			04,2741	1 2627 1	TCF	ASTRCTIM	
1478	REF	79	LAST	710	04,2742	0 6036 1	ENTTIM2	TC	INTPRET
1479					04,2743	52034 1	RTB	GOTO	
1480	REF	13	LAST	675	04,2744	21462 1		LOADTIME	
1481	REF	1			04,2745	10633 0		R36INT	
1482					04,2746	01420 0	V06N16N	VN	00616
1483					04,2747	01532 1	V06N90N	VN	00690

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PO001	0002	0003	0004	REF	1	34,3271	37,2000	37,3113	BANK 34	SETLOC R31	BANK
0005	REF	1							COUNT*	\$/R31	
0006	REF	9	LAST	275	37,3113	3 5015 0	R31CALL	CAF	PRI03		
0007	REF	23	LAST	602	37,3114	0 5105 0		TC	FINDVAC		
0008	REF	23	LAST	689	F7,1466			EBANK=	SUBEXIT		
0009	REF	1			37,3115	03145 1		2CADR	V83CALL		
0009	REF	1			37,3116	76067 1					
0010	REF	10	LAST	572	37,3117	0 5221 0	DSPDELAY	TC	FIXDELAY		
0011					37,3120	00144 0		DEC	100		
0012	REF	8	LAST	500	37,3121	3 1044 0		CA	EXTVBACT		
0013	REF	35	LAST	608	37,3122	7 4740 1		MASK	BIT12		
0014					37,3123	0 0006 1		EXTEND			
0015	REF	1			37,3124	1 3117 1		BZF	DSPDELAY		
0016	REF	5	LAST	500	37,3125	3 5017 1		CAF	PRI05		
0017	REF	14	LAST	616	37,3126	0 5072 1		TC	NOVAC		
0018	REF	3	LAST	675	F7,1607			EBANK=	TSTRT		
0019	REF	1			37,3127	03132 1		2CADR	DISPN5X		
0019	REF	1			37,3130	76067 1					
0020	REF	29	LAST	616	37,3131	1 5261 0		TCF	TASKOVER		
0021	REF	1			37,3132	3 3240 1	DISPN5X	CAF	V16N54		
0022	REF	167	LAST	711	37,3133	0 4616 1		TC	BANKCALL		
0023	REF	11	LAST	711	37,3134	20212 1		CADR	GOMARKF		
0024	REF	6	LAST	501	37,3135	0 5563 1		TC	B50FF		
0025	REF	7	LAST	712	37,3136	0 5563 1		TC	B50FF		
0026	REF	2	LAST	712	37,3137	1 3132 0		TCF	DISPN5X		
0027	REF	80	LAST	711	37,3140	0 6036 1	V83	TC	INTPRET		
0028					37,3141	77624 1		CALL			
0029	REF	1			37,3142	77371 1			REDCEXTP		
0030					37,3143	77650 1		GOTO			
0031	REF	1			37,3144	77150 0			COMPDISP		
0032	REF	81	LAST	712	37,3145	0 6036 1	V83CALL	TC	INTPRET		
0033					37,3146	77624 1		CALL			
0034	REF	1			37,3147	77241 0			STATEXTP	EXTRAPOLATE STATE VECTORS	
0035					37,3150	52375 1	COMPDISP	VLOAD	VSU		
0036	REF	20	LAST	710	37,3151	00001 0			RATT		
0037	REF	7	LAST	352	37,3152	02213 0			RONE		
0038					37,3153	51406 1		PUSH	ABVAL	RATT-RONE TO 00	PD= 6
0039	REF	10	LAST	710	37,3154	02205 1		STORE	RANGE	METERS B-29	
0040					37,3155	77301 0		NORM	VLOAD		
0041	REF	15	LAST	697	37,3156	00047 1			X1	RATT-RONE	PD= 0
0042					37,3157	53457 1		VSL*	UNIT		
0043					37,3160	20201 0			0,1		

L	R31					USER'S PAGE NO.	2	E0 S3
0044				37,3161	52315 1	PDVL	VSU	UNIT(LOS) TO OD PD= 6
0045	REF 15	LAST	710	37,3162	00007 0		VATT	
0046	REF 1			37,3163	02221 1		VONE	
0047				37,3164	77641 1	DOT		(VATT-VONE).UNIT(LOS) PD= 0
0048				37,3165	77752 1	SL1		
0049	REF 6	LAST	710	37,3166	26207 0	STOVL	RRATE	RANGE RATE M/CS 8-7
0050	REF 8	LAST	712	37,3167	02213 0		RONE	
0051				37,3170	63256 0	UNIT	PDVL	UR TO OD PD=6
0052	REF 2	LAST	36	37,3171	06416 1		THISAXIS	UNITX FOR CM, UNITZ FOR LM
0053				37,3172	77624 1	CALL		
0054	REF 1			37,3173	47565 1		CDU*NBSM	
0055				37,3174	41505 1	VXM	PUSH	UXORZ TO 6D PD=12D
0056	REF 17	LAST	701	37,3175	01734 0		REFSMAT	
0057				37,3176	72431 1	VPROJ	VSL2	
0058				37,3177	00001 0		OD	
0059				37,3200	53445 1	BVSU	UNIT	
0060				37,3201	00007 0		6D	
0061				37,3202	47315 0	PDVL	VXV	UP/2 TO 12D PD=18D
0062	REF 9	LAST	713	37,3203	02213 0		RONE	
0063	REF 2	LAST	713	37,3204	02221 1		VONE	
0064				37,3205	47256 0	UNIT	VXV	
0065	REF 10	LAST	713	37,3206	02213 0		RONE	
0066				37,3207	63241 0	DOT	PDVL	SIGN TO 12D, UP/2 TO MPAC PD=18D
0067				37,3210	00015 0		12D	
0068				37,3211	50372 1	VSL1	DOT	UP.UXORZ
0069				37,3212	00007 0		6D	
0070				37,3213	72565 1	SIGN	SL1	
0071				37,3214	00015 0		12D	
0072				37,3215	77726 1	ACOS		
0073	REF 7	LAST	711	37,3216	26211 1	STOVL	RTHETA	
0074	REF 11	LAST	713	37,3217	02213 0		RONF	
0075				37,3220	51041 0	DOT	BPL	
0076				37,3221	00007 0		6D	
0077				37,3222	77227 0		+5	
0078				37,3223	44345 0	DLOAD	BDSU	IF UXORZ.R NEG, RTHETA = 1 - RTHETA
0079	REF 8	LAST	713	37,3224	02211 1		RTHETA	
0080	REF 8	LAST	684	37,3225	06432 1		DPOSMAX	
0081	REF 9	LAST	713	37,3226	02211 1	STORE	RTHETA	RTHETA BETWEEN 0 AND 1 REV.
0082				37,3227	77776 1	EXIT		
0083	REF 29	LAST	623	37,3230	3 4747 1	CAF	BIT5	HAVE WE BEEN ANSWERED
0084	REF 9	LAST	712	37,3231	7 1044 1	MASK	EXTVBACT	
0085				37,3232	0 0006 1	EXTEND		
0086	REF 39	LAST	711	37,3233	1 5472 1	BZF	ENEXT	YES, DIE
0087	REF 10	LAST	713	37,3234	4 1044 1	CS	EXTVBACT	
0088	REF 36	LAST	712	37,3235	7 4740 1	MASK	BIT12	
0089	REF 11	LAST	713	37,3236	27 044 1	ADS	FXTVBACT	
0090	REF 1			37,3237	1 3140 0	TCF	V83	
0091				37,3240	04066 0	VN	1654	

L R31

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P0092 THE STATEXP SUBROUTINE DOES A PRECISION EXTRAPOLATION OF BOTH VEHICLES
 R0093 STATE VECTORS TO PRESENT TIME AND SAVES THEM AS BASE VECTORS.
 R0094 IF SERVICER IS OFF ----

R0095 THIS VEHICLES BASE VECTOR IS CONIC EXTRAPOLATED TO
 R0096 PRESENT TIME AND SAVED AS RONE, VONE.
 R0097 THE OTHER VEHICLES BASE VECTOR IS CONIC EXTRAPOLATED
 R0098 TO THE SAME TIME, THE OUTPUT BEING LEFT IN RATT, VATT.
 R0099 IF SERVICER IS ON ----

R0100 RONE, VONE ARE SET EQUAL TO RN, VN AND THE OTHER
 R0101 VEHICLES STATE VECTOR IS PREC. EXTRAPOLATED TO PIPTIME.

0102				37,3241	47020 0	STATEXP STQ	RTB	
0103	REF	1		37,3242	02116 0		STATEXIT	
0104	REF	14	LAST	711	37,3243	21462 1	LOADTIME	
0105	REF	32	LAST	710	37,3244	34041 0	STCALL TDEC1	
0106	REF	3	LAST	710	37,3245	27043 0	OTHPREC	GET BASE VECTORS
0107				37,3246	77775 1	VLOAD		
0108	REF	5	LAST	698	37,3247	00017 1	RATT1	
0109	REF	1			37,3250	26140 0	STOVL BASECTP	OTHER POS.
0110	REF	8	LAST	698	37,3251	00025 0	VATT1	
0111	REF	1			37,3252	16120 0	STODL BASECTV	OTHER VEL.
0112	REF	10	LAST	710	37,3253	00015 0	TAT	
0113	REF	1			37,3254	02114 1	STORE BASETIME	
0114	REF	33	LAST	714	37,3255	34041 0	STCALL TDEC1	
0115	REF	3	LAST	710	37,3256	27057 0	THISPREC	
0116				37,3257	77775 1	VLOAD		
0117	REF	6	LAST	714	37,3260	00017 1	RATT1	
0118	REF	1			37,3261	26170 0	STOVL BASETHP	THIS POS.
0119	REF	9	LAST	714	37,3262	00025 0	VATT1	
0120	REF	1			37,3263	02105 1	STORE BASETHV	THIS VEL
0121				37,3264	47014 1	HAVEBASE BON	RTB	
0122	REF	3	LAST	697	37,3265	03712 0	AVEGFLAG	
0123	REF	1			37,3266	77346 0	GETRVN	IF AVG ON ,GET RN ETC.
0124	REF	15	LAST	714	37,3267	21462 1	LOADTIME	
01242				37,3270	52014 0	BON	GOTO	TEST FOR LM ON SURFACE.
01244	REF	12	LAST	620	37,3271	04307 1	SURFFLAG	
01246	REF	1			37,3272	77365 1	R31SURF	
01248				37,3273	77274 0		+1	
0125	REF	34	LAST	714	37,3274	34041 0	STCALL TDEC1	BEGIN SET UP FOR CONIC EXTRAP. FOR THIS.
0126	REF	20	LAST	697	37,3275	27412 0	INSTALL	
0127				37,3276	43175 0	VLOAD	CLEAR	
0128	REF	2	LAST	714	37,3277	02170 0	BASETHP	
0129	REF	5	LAST	698	37,3300	00263 0	MOONFLAG	
0130	REF	7	LAST	698	37,3301	25535 0	STOVL RCV	
0131	REF	2	LAST	714	37,3302	02105 1	BASETHV	
0132	REF	6	LAST	698	37,3303	15543 1	STODL VCV	
0133	REF	2	LAST	714	37,3304	02114 1	BASETIME	
0134				37,3305	43014 0	BOF	SET	GET APPROPRIATE MOONFLAG SETTING
0135	REF	2	LAST	312	37,3306	04344 0	MOONTHIS	
0136				37,3307	77311 1		+2	
0137	REF	6	LAST	714	37,3310	00063 1	MOONFLAG	

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0138				37,3311	77614 1	SET		
0139	REF	9	LAST	698	37,3312	01473 0	INTYPFLG	CONIC EXTRAP.
0140	REF	7	LAST	698	37,3313	35517 1	STCALL	TET
0141	REF	3	LAST	698	37,3314	27107 1	INTEGRVS	INTEGRATION --- AT LAST---
0142	*				37,3315	77775 1	OTHCONIC	VLOAD
0143	REF	21	LAST	712	37,3316	00001 0		PATT
0144	REF	12	LAST	713	37,3317	26213 0	STOVL	RONE
0145	REF	16	LAST	713	37,3320	00007 0		VATT
0146	REF	3	LAST	713	37,3321	36221 0	STCALL	VONE
0147	REF	21	LAST	714	37,3322	27412 0		INTSTALL
0148					37,3323	71214 0	SET	DLOAD
0149	REF	10	LAST	715	37,3324	01473 0		INTYPFLG
0150	REF	11	LAST	714	37,3325	00015 0		TAT
0151	REF	35	LAST	714	37,3326	00041 1	OTHINT	STORE
0152					37,3327	43175 0	VLOAD	TDEC1
0153	REF	2	LAST	714	37,3330	02140 0		CLEAR
0154	REF	7	LAST	714	37,3331	00263 0		BASEQTP
0155	REF	8	LAST	714	37,3332	25535 0	STOVL	MOONFLAG
0156	REF	2	LAST	714	37,3333	02120 0		RCV
0157	REF	7	LAST	714	37,3334	15543 1	STODL	BASEQTV
0158	REF	3	LAST	714	37,3335	02114 1		VCV
0159					37,3336	43014 0		BASETIME
0160	REF	3	LAST	714	37,3337	04344 0	BOF	SET
0161					37,3340	77342 1		MOONTHIS
0162	REF	8	LAST	715	37,3341	00063 1		+2
0163	REF	8	LAST	715	37,3342	35517 1		MOONFLAG
0164	REF	4	LAST	715	37,3343	27107 1	STCALL	TET
0165					37,3344	77650 1		INTEGRVS
0166	REF	2	LAST	714	37,3345	02116 0	GOTO	
							STATEXIT	THIS VEHICLES POS.,VEL. IN PUSHLIST.
0167					37,3346	52175 0	GETRVN	VLOAD
0168	REF	5	LAST	334	37,3347	01221 1		GOTO
0169					37,3350	77351 0		RN
0170	REF	13	LAST	715	37,3351	36213 1	STCALL	+1
0171					37,3352	77353 1		RONE
0172					37,3353	52175 0	VLOAD	+1
0173	REF	5	LAST	334	37,3354	01227 1		GCTO
0174					37,3355	77356 1		VN
0175	REF	4	LAST	715	37,3356	16221 1	STODL	+1
0176	REF	5	LAST	608	37,3357	01235 1		VONE
0177					37,3360	77624 1	GETRVN2	PIPTIME
0178	REF	22	LAST	715	37,3361	27412 0	CALL	INTSTALL
0179					37,3362	52014 0	CLEAR	GOTO
0180	REF	11	LAST	715	37,3363	01673 1		INTYPFLG
0181	REF	1			37,3364	77326 0		OTHINT
								PREC EXTRAP FOR OTHER
01811	REF	36	LAST	715	37,3365	34041 0	R31SURF	STCALL
01812	REF	6	LAST	706	37,3366	27057 0		TDEC1
01813	*				37,3367	77650 1		LEMPRFC
01814	*REF	1			37,3370	77315 0	GOTO	
							OTHCONIC	DO CSM CONIC

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0182				37,3371	52020 1	REDOEXTP STQ	GOTC
0183	REF	3	LAST 715	37,3372	02116 0		STATEXIT
0184	REF	1		37,3373	77264 1		HAVEBASE

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P5000 1) PROGRAM NAME - TARGET DELTA V PROGRAM (P76).
R5001 2) FUNCTIONAL DESCRIPTION - UPON ENTRY BY ASTRONAUT ACTION, P76 FLASHES DSKY REQUESTS TO THE ASTRONAUT
R5003 TO PROVIDE VIA DSKY (1) THE DELTA V TO BE APPLIED TO THE OTHER VEHICLE STATE VECTOR AND (2) THE
R5005 TIME (TIG) AT WHICH THE OTHER VEHICLE VELOCITY WAS CHANGED BY EXECUTION OF A THRUSTING MANEUVER. THE
R5007 OTHER VEHICLE STATE VECTOR IS INTEGRATED TO TIG AND UPDATED BY THE ADDITION OF DELTA V (DELTA V HAVING
R5009 BEEN TRANSFORMED FROM LV TO REF COSYS). USING INTEGRVS, THE PROGRAM THEN INTEGRATES THE OTHER
R5011 VEHICLE STATE VECTOR TO THE STATE VECTOR OF THIS VEHICLE, THUS INSURING THAT THE W-MATRIX AND BOTH VEHICLE
R5013 STATES CORRESPOND TO THE SAME TIME.
R5014 3) ERASABLE INITIALIZATION REQUIRED - NONE.
R5015 4) CALLING SEQUENCES AND EXIT MODES - CALLED BY ASTRONAUT REQUEST THRU DSKY V 37 E 76 E.
R5017 EXITS BY TCF ENDOFJOB.
R5018 5) OUTPUT - OTHER VEHICLE STATE VECTOR INTEGRATED TO TIG AND INCREMENTED BY DELTA V IN REF COSYS.
R5020 THE PUSHLIST CONTAINS THE MATRIX BY WHICH THE INPUT DELTA V MUST BE POST-MULTIPLIED TO CONVERT FROM LV
R5022 TO REF COSYS.
R5023 6) DEBRIS - OTHER VEHICLE STATE VECTOR.
R5024 7) SUBROUTINES CALLED - BANKCALL, GOXDSPE, CSMPREC (OR LEMPREC), ATOPCSM (OR ATOPLEM), INTSTALL, INTWAKE, PHASCHNG
R5026 INTERPRET, INTEGRVS, AND MINIRECT.

R5027 8) FLAG USE - MOONFLAG, CMOONFLAG, INTYPELG, RASFLAG, AND MARKCTR.

5028				30,2006				BANK	30	
5029	REF	1		13,2000				SETLOC	P76LOC	
5030				13,2207				BANK		
5031	REF	1						COUNT*	\$/P76	
5032	REF	19	LAST	684	E7,1437			EBANK	TIG	
5033	REF	36	LAST	690	13,2207	0 5504 0	P76	TC	JPFLAG	
5034	REF	6	LAST	639	13,2210	00031 0		ADRES	TRACKFLG	
50341	REF	82	LAST	712	13,2211	0 6036 1		TC	INTPRET	
50342					13,2212	77775 1		VLOAD		
50343	REF	20	LAST	701	13,2213	03432 1			DELVLVC	
50344	REF	4	LAST	331	13,2214	02227 1		STORE	DELVOV	
50345					13,2215	77776 1		EXIT		
5035	REF	1			13,2216	3 2336 0		CAF	V06N84	FLASH LAST DELTA V,
5040	REF	168	LAST	712	13,2217	0 4616 1		TC	BANKCALL	AND WAIT FOR KEYBOARD ACTION.
5041	REF	17	LAST	692	13,2220	20351 1		CADR	GOFLASH	
5042	REF	1			13,2221	1 2333 1		TCF	ENDP76	
5043					13,2222	0 2224 1		TC	+2	PROCEED
5044					13,2223	0 2216 0		TC	-5	STORE DATA AND REPEAT FLASHING
5045	REF	2	LAST	717	13,2224	3 2337 1		CAF	V06N84 +1	FLASH VFRB 06 NOUN 33, DISPLAY LAST TIG,
5046	REF	169	LAST	717	13,2225	0 4616 1		TC	BANKCALL	AND WAIT FOR KEYBOARD ACTION.
5047	REF	18	LAST	717	13,2226	20351 1		CADR	GOFLASH	
5048	REF	2	LAST	717	13,2227	1 2333 1		TCF	ENDP76	
5049					13,2230	0 2232 0		TC	+2	
5050					13,2231	0 2224 1		TC	-5	
5051	REF	83	LAST	717	13,2232	0 6036 1		TC	INTPRFT	RETURN TO INTERPRETIVE CODE

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5052				13,2233	77745 1	DLOAD		SET D(IMPAC)=TIG IN CSEC 828
5053	REF	20	LAST	717	13,2234	03440 1	TIG	
5054	REF	37	LAST	715	13,2235	34041 0	STCALL	IDEC1
5055	REF	4	LAST	714	13,2236	27043 0		SET IDEC1=TIG FOR ORBITAL INTEGRATION
5056					13,2237	53575 0	COMP MAT	VLOAD
5057	REF	22	LAST	715	13,2240	00001 0		UNIT
5058					13,2241	77676 0		RATT
5059					13,2242	00031 0	VCOMP	U(-R)
5060					13,2243	53435 0	STORE	U(-R) TO 240
5061	REF	17	LAST	715	13,2244	00007 0	VXV	U(-R)XV = U(VXR)
5062					13,2245	00023 0		
5063					13,2246	53435 0	STORE	180
5064					13,2247	00031 0	VXV	UNIT
5065					13,2250	24015 0		240
5066	REF	5	LAST	717	13,2251	02227 1	STOVL	120
5067					13,2252	76505 0		DELVCV
5068					13,2253	00015 0	VXM	VSL1
5069					13,2254	77655 1		120
5070	REF	18	LAST	718	13,2255	00007 0	VAD	
5071					13,2256	00007 0		VATT
5072					13,2257	77624 1	STORE	6
5073	REF	23	LAST	715	13,2260	27412 0	CALL	INTSTALL
5074					13,2261	77624 1		
5075	REF	1			13,2262	26340 1		P76SUB1
5076					13,2263	53775 1	VLOAD	VSR*
5077					13,2264	00007 0		6
5078					13,2265	57176 0		0,2
5079	REF	8	LAST	715	13,2266	25543 1	STOVL	VCV
5080	REF	23	LAST	718	13,2267	00001 0		RATT
5081					13,2270	77657 0	VSR*	
5082					13,2271	57176 0		0,2
5083	REF	9	LAST	715	13,2272	15535 0	STODL	RCV
5084	REF	21	LAST	718	13,2273	03440 1		TIG
5085	REF	9	LAST	715	13,2274	01517 0	STORE	TET
5086					13,2275	71214 0	CLEAR	DLOAD
5087	REF	12	LAST	715	13,2276	01673 1		INTYPFLG
5088	REF	1			13,2277	01643 1		TETTHIS
5089	REF	38	LAST	718	13,2300	34041 0	INTOTHIS	STCALL
5090	REF	5	LAST	715	13,2301	27107 1		IDEC1
5091					13,2302	77624 1		INTEGRVS
5093	REF	24	LAST	718	13,2303	27412 0	CALL	INTSTALL
5094					13,2304	77775 1	VLOAD	
5095	REF	7	LAST	714	13,2305	00017 1		RATT1
5096	REF	3	LAST	507	13,2306	01503 0	STORE	RPECT
5097	REF	10	LAST	718	13,2307	15535 0	STODL	RCV
5098	REF	12	LAST	715	13,2310	00015 0		TAT
5099	REF	10	LAST	718	13,2311	25517 0	STOVL	TET
5100	RFF	10	LAST	714	13,2312	00025 0		VATT1
5101					13,2313	77624 1	CALL	
5102	REF	2	LAST	507	13,2314	23361 1		MINIRECT

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5103				13,2315	77776 1	EXIT		
5104	REF	27	LAST	690	13,2316 0 5353 1	TC	PHASCHNG	
5105					13,2317 04024 0	DCT	04024	
5106	REF	37	LAST	717	13,2320 0 5504 0	TC	UPFLAG	
5107	REF	1			13,2321 00236 0	ADRES	REINTFLG	
5109	REF	84	LAST	717	13,2322 0 6036 1	TC	INTPRET	
5110					13,2323 77624 1	CALL		
5111	REF	1			13,2324 26661 1		ATOPOTH	
5116					13,2325 77531 0	SSP	EXIT	
5117	REF	3	LAST	621	13,2326 00053 1		QPRET	
5118	REF	1			13,2327 26332 1		OUT	
5119	REF	170	LAST	717	13,2330 0 4616 1	TC	BANKCALL	PERMIT USE OF ORBITAL INTEGRATION
5120	REF	1			13,2331 27447 0	CADR	INTWAKE1	
5121					13,2332 77776 1	OUT	EXIT	
5125	REF	129	LAST	710	13,2333 3 4755 1	ENDP76	CAF	
5126	REF	5	LAST	595	13,2334 55*460 0		IS	CLEAR RR TRACKING MARK COUNTER
5129	REF	21	LAST	692	13,2335 1 6001 1		TCF	GOTOPOOH
5130					13,2336 01524 0	V06N84	NV	0684
5131					13,2337 01441 1		NV	0633
5132					13,2340 43174 1	P76SUB1	AXT,2	SET
5133					13,2341 00002 0			2
5134	REF	9	LAST	715	13,2342 00063 1		MOONFLAG	SET MEANS MOON IS SPHERE OF INFLUENCE.
5135					13,2343 77014 1	BON	AXT,2	
5136	REF	6	LAST	702	13,2344 04303 0		CMOONELG	SET MEANS PERM CM STATE IN LUNAR SPHERE.
5137	REF	4	LAST	719	13,2345 00052 0		QPRET	
5138					13,2346 00000 1		0	
5139					13,2347 43414 1	CLEAR	RVQ	
5140	REF	10	LAST	719	13,2350 00263 0		MOONFLAG	

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P0001 SUBROUTINE NAME: V82CALL
 R0002 MCD NO: 0
 R0004 MOD BY: RR BAIRNSFATHER
 R0006 MCD NC: 1 MOD BY: RR BAIRNSFATHER DATE: 11 APR 67
 R0008 MCD NO: 2 MOD BY: ALONSO DATE: 11 DEC 67
 R0010 MCD NC: 3 MOD BY: ALONSO DATE: 26 MAR 68
 R0012 NEW FUNCTIONAL DESCRIPTION: CALLED BY VERB 82 ENTER. PRIORITY 10
 R0013 USED THROUGHOUT. CALCULATE AND DISPLAY ORBITAL PARAMETERS

DATE: 16 FEB 67
 LOG SECTION: R30
 SR30.1 CHANGED TO ALLOW MONITOR OPERN
 VB82 PROGRAM REWRITTEN
 PROG MOD TO HANDLE DIF EARTH/MOON SCALE

R0014 1. IF AVERAGE G IS OFF:
 R0015 FLASH DISPLAY V04N06. R2 INDICATES WHICH SHIP'S STATE VECTOR IS
 R0016 TO BE UPDATED. INITIAL CHOICE IS THIS SHIP (R2=1). ASTRONAUT
 R0017 CAN CHANGE TO OTHER SHIP BY V22EXE, WHERE X NOT EQ 1.
 R0018 SELECTED STATE VECTOR UPDATED BY THISPREC (OTHPREC).
 R0019 CALLS SR30.1 (WHICH CALLS TFFCONMU + TFFRP/RA) TO CALCULATE
 R0020 RPER (PERIGEE RADIUS), RAPO (APOGEE RADIUS), HPER (PERIGEE
 R0021 HEIGHT ABOVE LAUNCH PAD OR LUNAR LANDING SITE), HAPO (APOGEE
 R0022 HEIGHT AS ABOVE), TPER (TIME TO PERIGEE), TFF (TIME TO
 R0023 INTERSECT 300 KFT ABOVE PAD OR 35KFT ABOVE LANDING SITE).
 R0024 FLASH MONITOR V16N44 (HAPO, HPER, TFF). TFF IS -59M59S IF IT WAS
 R0025 NOT COMPUTABLE, OTHERWISE IT INCREMENTS ONCE PER SECOND.
 R0026 ASTRONAUT HAS OPTION TO MONITOR TPER BY KEYING IN N 32 E.
 R0027 DISPLAY IS IN HMS, IS NEGATIVE (AS WAS TFF), AND INCREMENTS
 R0028 ONCE PER SECOND ONLY IF TFF DISPLAY WAS -59M59S.

R0029 2. IF AVERAGE G IS ON:
 R0030 CALLS SR30.1 APPROX EVERY TWO SECS. STATE VECTOR IS ALWAYS
 R0031 FOR THIS VEHICLE. V82 DOES NOT DISTURB STATE VECTOR. RESULTS
 R0032 CF SR30.1 ARE RAPO, RPER, HAPO, HPER, TPER, TFF.
 R0033 FLASH MONITOR V16N44 (HAPO, HPER, TFF).
 R0036 ADDENDUM: HAPO AND HPER SHOULD BE CHANGED TO READ HAPOX AND HPERX IN THE
 R0037 ABOVE REMARKS.

R0038 CALLING SEQUENCE: VERB 82 ENTER.

R0039 SUBROUTINES CALLED: SR30.1, GOXDSPF
 R0040 MAYBE - THISPREC, OTHPREC, LOADTIME, DELRSPL
 R0041 NCRMAL EXIT-MODES: TC ENDEXT

R0042 ALARMS: NONE

R0043 OUTPUT: HAPOX (-29) M
 R0044 HPERX (-29) M
 R0045 RAPO (-29) M EARTH
 R0046 (-27) M MOON
 R0047 RPER (-29) M EARTH
 R0048 (-27) M MOON
 R0049 TFF (-28) CS CONTAINS NEGATIVE QUANTITY
 R0050 -TPER (-28) CS CONTAINS NEGATIVE QUANTITY

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R0051
R0052 ERASABLE INITIALIZATION REQUIRED: STATE VECTOR.

R0053 DEBRIS: QPRET, RONE, VONE, TFF/RTMU, HPERMIN, RPADTEM, V82FMFLG.
R0054 MAYBE: TSTART82, V82FLAGS, TDEC1.

0055	REF	3	LAST	329	E4,1517		EBANK=	HAPDX		
0056					31,2172		BANK	31		
0057	REF	2	LAST	59	22,2000		SETLOC	R30LOC		
0058					22,3242		BANK			
0059	REF	2	LAST	59 TO	59:	4	COUNT*	\$\$/R30	4*	
0060	REF	85	LAST	719	22,3242	0 6036 1	V82CALL	TC	INTPPET	
0061					22,3243	52014 0	BON	GOTO		
0062	REF	4	LAST	714	22,3244	03712 0		AVEGFLAG		
0063	REF	1			22,3245	45465 1		V82GON	IF AVERAGE G ON	
0064	REF	1			22,3246	45247 1		V82GOFF	IF AVERAGE G OFF	
0065					22,3247	77776 1	V82GOFF	EXIT	ALLOW ASTRONAUT TO SELECT VEHICLE	
0066	REF	37	LAST	574	22,3250	3 4752 0	CAF	TWO	DESIRED FOR ORBITAL PARAMETERS	
0067	REF	11	LAST	352	22,3251	55'051 0	TS	OPTIONX	CALCULATION AND DISPLAY.	
0068	REF	81	LAST	665	22,3252	3 4753 1	CAF	DNE		
0069	REF	12	LAST	721	22,3253	55'052 0	TS	OPTIONX +1		
0070	REF	1			22,3254	3 3316 0	CAF	OPTIONVN	V 04 N 06	
0071	REF	171	LAST	719	22,3255	0 4616 1	TC	BANKCALL		
0072	REF	7	LAST	305	22,3256	20212 1	CADR	GCXDSPF		
0073	REF	40	LAST	713	22,3257	0 5472 0	TC	ENDEXT	TERMINATE	
0074					22,3260	0 3262 1	TC	+2	PROCEED	
0075					22,3261	0 3254 1	TC	-5	DATA IN. OPTION1+1 = 1 FOR THIS VEHICLE.	
A0076									UNEQ 1 FOR OTHER VEHICLE.	
0077	REF	29	LAST	615	22,3262	3 4750 1	CAF	BIT4	80 MS	
0078	REF	30	LAST	660	22,3263	0 5203 0	TC	WAITLIST		
0079	REF	3	LAST	329	E4,1540		EBANK=	TFF		
0080	REF	1			22,3264	03430 0	2CADR	TICKTEST		
0080	REF	1			22,3265	44064 0				
0081					22,3266	0 0003 1	RELINT			
0082	REF	1			22,3267	3 3320 0	V82GOFLP	CAF	TFFBANK	MAJOR RECYCLE LOOP ENTRY
0083	REF	17	LAST	687	22,3270	54 003 0	TS	FBANK		
0084	REF	130	LAST	719	22,3271	3 4755 1	CAF	ZERO		
0085	REF	2	LAST	131	22,3272	55'537 0	TS	V82FLAGS	ZERO FLAGS FOR TICKTEST. INHIBITS	
A0086									DECREMENTING OF TFF AND -TPER.	
0087	REF	6	LAST	307	22,3273	3 5021 1	CAF	PRI07		
0088	REF	24	LAST	712	22,3274	0 5105 0	TC	FINDVAC	V82GOFF1 WILL EXECUTE STATE VECTOR	
0089	REF	4	LAST	721	E4,1540		EBANK=	TFF	UPDATE AND ORBIT CALCULATIONS FOR	
0090	REF	1			22,3275	03321 1	2CADR	V82GOFF1	SELECTED VEHICLE ABOUT PROPER BODY.	
0090	REF	1			22,3276	44064 0				
0091					22,3277	0 0003 1	RELINT			
0092	REF	21	LAST	619	22,3300	3 6244 0	V82STALL	CAF	THREE	STALL IN THIS LOOP AND WITHOLD V 16 N 44

L	R3C	USER'S PAGE NO. 3 E4 S3									
0093	REF 3	LAST 721	22,3301	7 1537 0	MASK	V82FLAGS	UNTIL STATE VECTOR UPDATE SFTS ONE OF				
0094	REF 218	LAST 687	22,3302	10 000 0	CCS	A	OUR FLAG BITS.				
0095	REF 1		22,3303	0 3310 0	TC	FLAGGON	EXIT FROM STALL LOOP.				
0096	REF 7	LAST 689	22,3304	3 4777 1	CAF	1SEC					
0097	REF 172	LAST 721	22,3305	0 4616 1	TC	BANKCALL					
0098	REF 11	LAST 689	22,3306	01735 1	CADR	DELAYJOB					
0099	REF 1		22,3307	0 3300 1	TC	V82STALL					
0100	REF 1		22,3310	3 3317 1	FLAGGON	CAF	V16N44	MONITOR HAPO,HPER,IFF.			
0101	REF 173	LAST 722	22,3311	0 4616 1	TC	BANKCALL					
0102	REF 8	LAST 721	22,3312	20212 1	CADR	GOXDSPF					
0103	REF 8	LAST 712	22,3313	0 5563 1	TC	B5OFF	TERM THIS TELLS TICKTEST TO KILL ITSELF				
0104	REF 9	LAST 722	22,3314	0 5563 1	TC	B5OFF	PROCEED DITTO				
0105	REF 1		22,3315	0 3267 1	TC	V82GOFLP	RECYCLE RECOMPUTE STATE VECT + DISPLAY				
0106			22,3316	01014 0	OPTIONVN	VN	412				
0107			22,3317	04054 1	V16N44	VN	1644				
0108	REF 5	LAST 721	22,3320	02140 0	IFFBANK	ECADR	IFF				
0109	REF 86	LAST 721	22,3321	0 6036 1	V82GOFF1	TC	INTPRET				
0110			22,3322	77634 0		RTB					
0111	REF 16	LAST 714	22,3323	21462 1		LOADTIME					
0112	REF 39	LAST 718	22,3324	00041 1	STORE	TDEC1	TIME FOR STATE VECTOR UPDATE.				
0113	REF 3	LAST 352	22,3325	02211 1	STORE	TSTART82	TIME FOR INTERNAL USE.				
0114			22,3326	77776 1	EXIT						
0115	REF 13	LAST 721	22,3327	4 1052 0	CS	OPTIONX +1	1 FOR THIS VEHICLE, NOT 1 FOR OTHER.				
0116	REF 82	LAST 721	22,3330	6 4753 1	AD	ONE					
0117			22,3331	0 0006 1	EXTEND						
0118	REF 1		22,3332	1 3356 0	BZF	THISSHIP					
0119	REF 87	LAST 722	22,3333	0 6036 1	OTHSHIP	TC	INTPRET				
0120			22,3334	77624 1	CALL	CALL STATE VECTOR UPDATE FOR OTHER SHIP.					
0121	REF 5	LAST 718	22,3335	27043 0		OTHPREC					
0122			22,3336	77775 1	BOTHSHIP	VLOAD	MOVE RESULTS INTO TFFCONIC STORAGE AREAS				
0123	REF 24	LAST 718	22,3337	00001 0		RATT	TO BE CALLED BY SR30.1.				
0124	REF 14	LAST 715	22,3340	26213 0	STOVL	RONE	RATT AT (-29)M FOR EARTH OR MOON				
0125	REF 19	LAST 718	22,3341	00007 0		VATT					
0126	REF 5	LAST 715	22,3342	02221 1	STORE	VONE	VATT AT (-7)M/CS FOR EARTH OR MOON				
0127			22,3343	77743 1	DLOAD*						
0128	REF 1		22,3344	73774 1		1/RTMUE,2	X2 IS 0 FOR EARTH CENTERED STATE VEC				
0129	REF 1		22,3345	00037 0	STORE	TFF/RTMU	X2 IS 2 FOR MOON				
0130			22,3346	77743 1	DLOAD*	AS LEFT BY THISPREC OR OTHPREC.					
0131	REF 1		22,3347	72411 0		MINPERE,2					
0132	REF 2	LAST 131	22,3350	02205 1	STORE	HPERMIN	TFFRTMU, HPERMIN AND RPADTEM ARE ALL				
0133			22,3351	46135 1	SLOAD	BHIZ	EARTH/MOON PARAMETERS AS SET HERE.				
0134	REF 12	LAST 705	22,3352	00050 1		X2					
0135	REF 1		22,3353	45367 1		EARTH PAD					
0136			22,3354	77650 1	GOTO						
0137	REF 1		22,3355	45373 1		MOON PAD					

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0138	REF	88	LAST	722	22,3356	0 6036 1	THISSHIP TC	INTPRFT		
0139					22,3357	77624 1	CALL		CALL STATE VECTOR UPDATE FOR THIS SHIP.	
0140	REF	4	LAST	714	22,3360	27057 0		THISPREC		
0141					22,3361	77650 1	GOTO			
0142	REF	1			22,3362	45336 0		BOTHSHIP		
R0143 THE FOLLOWING CONSTANTS ARE PAIRWISE INDEXED. DO NOT SEPARATE PAIRS.										
0146					22,3363	00001 0	MINPERM	2DEC	10668 8-27	35 KFT MIN PERIGEE HEIGHT FOR MOON(-27)M
0146					22,3364	11530 1				
0147					22,3365	00002 0	MINPERE	2DEC	91440 8-29	300 KFT (-29)M FOR EARTH
0147					22,3366	31230 1				
0148					22,3367	43145 0	EARTHPAD	DLOAD	CIRGO	PAD 37-8 RADIUS. SCALED AT (-29)M.
0149	REF	2	LAST	705	22,3370	06276 1			RPAD	
0150	REF	1			22,3371	03635 1			V82EMFLG	INDICATE EARTH SCALING FOR SR30.1
0151	REF	1			22,3372	45377 0			BOTHPAD	
0152					22,3373	51575 1	MOONPAD	VLOAD	A8VAL	COMPUTE MOON PAD RADIUS FROM RLS VECTOR.
0153	REF	3	LAST	705	22,3374	02023 1			RLS	SCALED AT (-27)M.
0154					22,3375	77614 1		SET		
0155	REF	2	LAST	723	22,3376	03475 1			V82EMFLG	INDICATE MOON SCALING FOR SR30.1
0156	REF	2	LAST	131	22,3377	36207 1	BOTHPAD	STCALL	RPADTEM	
0157	REF	1			22,3400	45551 1			SR30.1	CALCULATE ORBITAL PARAMETERS
0158					22,3401	45234 0		RTB	DSU	
0159	REF	17	LAST	722	22,3402	21462 1			LOADTIME	
0160	REF	4	LAST	722	22,3403	02211 1			TSTART82	PRESENT TIME - TIME V82GOFF1 BEGAN
0161	REF	5	LAST	723	22,3404	02211 1		STORE	TSTART82	SAVE IT
0162					22,3405	53145 1		DLOAD	BZE	SR30.1 SETS -TPER=0 IF HPER L/
0163	REF	2	LAST	321	22,3406	02143 0			-TPER	HPERMIN (300 OR 35) KFT.
0164	REF	1			22,3407	45420 0			TICKTFF	(-TPER = 0)
0165					22,3410	43345 1	TICKTPER	DLOAD	DAD	(-TPER NON ZERO) TFF WAS NOT COMPUTED,
0166	REF	3	LAST	723	22,3411	02143 0			-TPER	BUT WAS SET TO 59M59S.DONT TICK TFF, DO
0167	REF	6	LAST	723	22,3412	02211 1			TSTART82	TICK -TPER. DISPLAY BOTH.
0168	REF	4	LAST	723	22,3413	02143 0		STORF	-TPER	-TPER CORRECTED FOR TIME SINCE V82GOFF1
0169					22,3414	77776 1		EXIT		BEGAN.
0170	REF	37	LAST	691	22,3415	3 4753 1	CAF	BIT1		
0171	REF	4	LAST	722	22,3416	551537 0	TS	V82FLAGS		INFORMS TICKTEST TO INCREMENT ONLY -TPER
0172	REF	102	LAST	691	22,3417	0 5155 0	TC	ENDOFJOB		
0173					22,3420	43345 1	TICKTFF	DLOAD	DAD	(-TPER=0) TFF WAS COMPUTED.TICK TFF.
0174	REF	6	LAST	722	22,3421	02141 1			TFF	DO NOT TICK -TPER.DISPLAY TFF, BUT NOT
0175	REF	7	LAST	723	22,3422	02211 1			TSTART82	-TPER.
0176	REF	7	LAST	723	22,3423	02141 1		STORE	TFF	TFF CORRECTED FOR TIME SINCE V82GOFF1
0177					22,3424	77776 1		EXIT		BEGAN.
0178	REF	42	LAST	665	22,3425	3 4752 0	CAF	BIT2		
0179	REF	5	LAST	723	22,3426	551537 0	TS	V82FLAGS		INFORMS TICKTEST TO INCREMENT ONLY TFF.
0180	REF	103	LAST	723	22,3427	0 5155 0	TC	ENDOFJOB		

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0181	REF	30	LAST	713	22,3430	3 4747 1	TICKTEST	CAF	BIT5	THIS WAITLIST PROGRAM PERPETUATES ITSELF ONCE A SEC UNTIL BIT 5 OF EXTVBACT =0.
0182	REF	12	LAST	713	22,3431	7 1044 1		MASK	EXTVBACT	
0183	REF	219	LAST	722	22,3432	10 000 0		CCS	A	
0184	REF	1			22,3433	0 3441 0		TC	DOTICK	
0185	REF	3	LAST	602	22,3434	3 7712 1		CAF	PRIO25	
0186	REF	15	LAST	712	22,3435	0 5072 1		TC	NOVAC	TERMINATE V 82.CANT CALL ENDEXT IN RUPT.
0187	REF	13	LAST	724	1044			EBANK=	EXTVBACT	
0188	REF	41	LAST	721	22,3436	05472 0		2CADR	ENDEXT	
0188					22,3437	04062 1				
0189	REF	30	LAST	712	22,3440	0 5261 1		TC	TASKOVER	
0190	REF	8	LAST	722	22,3441	3 4777 1	DOTICK	CAF	1SEC	RE-REQUEST TICKTEST.
0191	REF	31	LAST	721	22,3442	0 5203 0		TC	WAITLIST	
0192	REF	8	LAST	723	F4,1540			EBANK=	TFF	
0193	REF	2	LAST	721	22,3443	03430 0		2CADR	TICKTFST	
0193					22,3444	44064 0				
0194	REF	22	LAST	721	22,3445	3 6244 0		CAF	THREE	
0195	REF	6	LAST	723	22,3446	7 1537 0		MASK	V82FLAGS	
0196	REF	220	LAST	724	22,3447	50 000 1		INDEX	A	
0197					22,3450	0 3451 1		TC	+1	
0198	REF	31	LAST	724	22,3451	0 5261 1		TC	TASKOVER	IF NO FLAGBITS SET DONT CHANGE TFF OR -TPER, BUT CONTINUE LOOP.
A0199										ONLY BIT 1 SET. INCR -TPER BY 1 SEC.
0200	REF	1			22,3452	0 3460 0		TC	TPERTICK	ONLY BIT 2 SET. INCR TFF BY 1 SEC.
0201	REF	9	LAST	724	22,3453	3 4777 1	TFFTICK	CAF	1SEC	
0202	REF	95	LAST	711	22,3454	54 001 1		TS	L	
0203	REF	121	LAST	721	22,3455	3 4755 1		CAF	ZERO	
0204	REF	9	LAST	724	22,3456	21'541 1		DAS	TFF	
0205	REF	32	LAST	724	22,3457	0 5261 1		TC	TASKOVER	
0206	REF	10	LAST	724	22,3460	3 4777 1	TPERTICK	CAF	1SEC	
0207	REF	96	LAST	724	22,3461	54 001 1		TS	L	
0208	REF	132	LAST	724	22,3462	3 4755 1		CAF	ZERO	
0209	REF	5	LAST	723	22,3463	21'543 0		DAS	-TPER	
0210	REF	33	LAST	724	22,3464	0 5261 1		TC	TASKOVER	

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0211				22,3465	77776	1	V82GON	EXIT		AVERAGE G ON. USE CURRENT STATE VECTOR FOR ORBITAL PARAMETER CALCULATIONS.
A0212										LESS THAN LAMBERT
0213	REF	7	LAST	721	22,3466	3 5021	1	CAF	PRI07	V82GON1 WILL PERFORM ORBIT CALCULATIONS
0214	REF	25	LAST	721	22,3467	0 5105	0	TC	FINDVAC	ABOUT PROPER BODY APPROX ONCE PER SEC.
0215	REF	10	LAST	724	E4,1540			EBANK=	TFE	
0216	REF	1			22,3470	03503	1	2CADR	V82GON1	
0216	REF	1			22,3471	44064	0			
0217					22,3472	0 0003	1	RELINT		
0218	REF	4	LAST	563	22,3473	10 067	1	CCS	NEWJOB	WITHOLD V16 N44 UNTIL FIRST ORBIT CALC
0219	REF	3	LAST	563	22,3474	0 5122	0	TC	CHANG1	IS DONE. NOTE: V82GON1 (PRI07, FINDVAC
A0220										JOB) IS COMPLETED BEFORE V82GON (PRI07,
A0221										NOVAC JOB).
0222	REF	2	LAST	722	22,3475	3 3317	1	V82REDSP	CAF	MONITOR HAP0, HPER, TFE
0223	REF	174	LAST	722	22,3476	0 4616	1	TC	BANKCALL	
0224	REF	9	LAST	722	22,3477	20212	1	CADR	GOXDSPF	
0225	REF	10	LAST	722	22,3500	0 5563	1	TC	B5OFF	TERM THIS TELLS V82GON1 TO KILL ITSELF.
0226	REF	11	LAST	725	22,3501	0 5563	1	TC	B5OFF	PROC DITTO.
0227	REF	1			22,3502	0 3475	1	TC	V82REDSP	RECYCLE
0228	REF	89	LAST	723	22,3503	0 6036	1	V82GON1	TC	INTPRET
A0229										THIS EXEC PROGRAM PERPETUATES ITSELF
0230					22,3504	52175	0	VLOAD	GOTO	ONCE A SEC UNTIL BIT 5 OF EXTVBACT =0.
0231	REF	6	LAST	715	22,3505	01221	1		RN	HOLDS OFF CCS NEWJOB BETWEEN RN AND
0232	REF	1			22,3506	45507	1		NEXTLINE	VN FETCH SO RN , VN ARE FROM SAME
0233	REF	15	LAST	722	22,3507	26213	0	NEXTLINE	STOVL	STATE VECTOR UPDATE.
0234	REF	6	LAST	715	22,3510	01227	1		VN	RN AT (-29)M FOR EARTH OR MOON
0235	REF	6	LAST	722	22,3511	02221	1	STORE	VONE	VN AT (-7)M/CS FOR EARTH OR MOON
0236					22,3512	52014	0	BON	GOTO	
0237	REF	4	LAST	715	22,3513	04304	1		MOONTHIS	FLAG INDICATES BODY ABOUT WHICH ORBITAL
0238	REF	1			22,3514	45516	1		MOONGON	CALCULATIONS ARE TO BE PERFORMED.
0239	REF	1			22,3515	45527	0		EARTHGON	IF SET - MOON , IF RESET - EARTH.
0240					22,3516	71214	0	MOONGON	SET	
0241	REF	3	LAST	723	22,3517	03475	1		DLOAD	INDICATE MOON SCALING FOR SR30.1
0242	REF	1			22,3520	04001	1		V82FMFLG	LUNAR PARAMETERS LOADED HERE FOR SR30.1
0243	REF	2	LAST	722	22,3521	14037	0	STOVL	TFE/RTMU	
0244	REF	1			22,3522	05364	0		MINPERM	
0245	REF	3	LAST	722	22,3523	26205	1	STOVL	HPERMIN	
0246	REF	4	LAST	723	22,3524	02023	1		RLS	SCALED AT (-27)M.
0247					22,3525	52046	1	ABVAL	GOTO	
0248	REF	1			22,3526	45536	0		V82GON2	
0249					22,3527	71214	0	EARTHGON	CLEAR	
0250	REF	4	LAST	725	22,3530	03675	0		V82FMFLG	INDICATE EARTH SCALING FOR SR30.1
0251	REF	2	LAST	722	22,3531	04003	0		1/PTMUE	EARTH PARAMETERS LOADED HERE FOR SR30.1
0252	REF	3	LAST	725	22,3532	14037	0	STOVL	TFE/RTMU	
0253	REF	2	LAST	722	22,3533	05366	1		MINPERE	
0254	REF	4	LAST	725	22,3534	16205	1	STOVL	HPERMIN	
0255	REF	3	LAST	723	22,3535	06276	1		RPAD	
0256	REF	3	LAST	723	22,3536	36207	1	V82GON2	STCALL	COMMON CODE FOR EARTH & MOON.
0257	REF	2	LAST	723	22,3537	45551	1		SR30.1	

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0258				22,3540	77776 1	EXIT		
0259	REF	31	LAST	724	22,3541 3 4747 1	CAF	BIT5	
0260	REF	14	LAST	724	22,3542 7 1044 1	MASK	EXTVBACT	SEE IF ASTRONAUT HAS SIGNALLED TERMINATE
0261				22,3543	0 0006 1	EXTEND		
0262	REF	42	LAST	724	22,3544 1 5472 1	BZF	ENDEXT	YES, TERMINATE V8 82 LOOP
0263	REF	11	LAST	724	22,3545 3 4777 1	CAF	1SEC	
0264	REF	175	LAST	725	22,3546 0 4616 1	TC	BANKCALL	WAIT ONE SECOND BEFORE REPEATING
0265	REF	12	LAST	722	22,3547 01735 1	CADR	DELAYJOB	ORBITAL PARAMETER COMPUTATION.
0266	REF	2	LAST	725	22,3550 0 3503 1	TC	V82GON1	
0267	REF	1		22,3541		SPLRET	=	V82GON3

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R0268 SUBROUTINE NAME: SR30.1

R0269 MCD NC: 0

R0271 MOD BY: RR BAIRNSFATHER

R0273 MCD NC: 1

MOD BY: RR BAIRNSFATHER

DATE: 11 APR 67

R0275 MOD NO: 2

MOD BY: RR BAIRNSFATHER

DATE: 14 APR 67

R0277 MCD NC: 3

MOD BY ALONSO

DATE: 11 DEC 67

R0279 MOD NC: 4

MOD BY ALONSO

DATE: 26 MAR 68

R0281 MCD NC: 5

MOD BY: RR BAIRNSFATHER

DATE: 6 AUG 68

R0283

DATE: 16 FEB 67

LOG SECTION: R32

SR30.1 CHANGED TO ALLOW MONITOR OPERN

ADD OVFL CK FOR RAPO

SUBROUTINE REWRITTEN

PROG MOD TO HANDLE DIF EARTH/MOON SCALE

OVFL CK FOR HAPO & HPER. VOIDS MOD #2.

R0284 NEW FUNCTIONAL DESCRIPTION: ORBITAL PARAMETERS DISPLAY FOR NOUNS 32 AND 44.

R0286 SR30.1 CALLS TFFCONMU AND TFFRP/RA TO CALCULATE RPER (PERIGEE RADIUS),

R0287 RAPO (APOGEE RADIUS), HPER (PERIGEE HEIGHT ABOVE LAUNCH PAD OR LUNAR

R0288 LANDING SITE), HAPO (APOGEE HEIGHT AS ABOVE), TPER (TIME TO PERIGEE),

R0289 TFF (TIME TO INTERSECT 300 KFT ABOVE PAD OR 35KFT ABOVE LANDING SITE).

R0290 IF HPER IS GREATER THAN OR EQUAL TO HPERMIN, CALCULATES TPER AND STORES

R0291 NEGATIVE IN -TPER. OTHERWISE STORES +0 IN -TPER. WHENEVER TPER IS

R0292 CALCULATED, TFF IS NOT COMPUTABLE AND DEFAULTS TO -59MIN 59SEC. IF HAPO

R0293 WOULD EXCEED 9999.9 NM, IT IS LIMITED TO THAT VALUE FOR DISPLAY.

R0294 ADDENDUM: HAPO AND HPER SHOULD BE CHANGED TO READ HAPOX AND HPERX IN THE

R0295 ABOVE REMARKS.

R0296 CALLING SEQUENCE: CALL

R0297 SR30.1

R0298 SUBROUTINES CALLED: TFFCONMU, TFFRP/RA, CALCTPER, CALCTFF

R0299 NORMAL EXIT MODE: CALLING LINE +1 (STILL IN INTERPRETIVE MODE)

R0300 ALARMS: NONE

R0301 OUTPUT: RAPO (-29) M EARTH APOGEE RADIUS EARTH CENTERED COORD.

R0302 (-27) M MOON MOON CENTERED COORD.

R0303 RPER (-29) M EARTH PERIGEE RADIUS EARTH CENTERED COORD.

R0304 (-27) M MOON MOON CENTERED COORD.

R0305 HAPOX (-29) M APOGEE ALTITUDE ABOVE PAD OR LAND. SITE MAX VALUE LIMITED TO 9999.9 NM.

R0307 HPERX (-29) M PERIGEE ALT. ABOVE PAD OR LAND. SITE MAX VALUE LIMITED TO 9999.9 NM.

R0309 TFF (-28) CS TIME TO 300KFT OR 35KFT ALTITUDE

R0310 -TPER (-28) CS TIME TO PERIGEE

R0311 ERASABLE INITIALIZATION REQUIRED-

R0312 TFF/RTMU (+17) EARTH RECIPROCAL OF PROPER GRAV CONSTANT FOR

R0313 (-14) MOON EARTH OR MOON = 1/SQRT(MU).

R0314 RCNE (-29) M STATE VECTOR

R0315 VCNE (-7) M/CS STATE VECTOR

R0316 RPAOTEM (-29) M EARTH RADIUS OF LAUNCH PAD OR LUNAR LANDING

R0317 (-27) M MOON SITE.

R0318 HPERMIN (-29) M EARTH (300 OR 35)KFT MINIMUM PERIGEE ALTITUDE

R0319 (-27) M MOON ABOVE LAUNCH PAD OR LUNAR LANDING SITE.

R0320 V82EMFLG (INT SW BIT) RESET FOR EARTH, SET FOR MOON.

R0321 DEBRIS: QPRET, PDL, S2

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0322 REF 1 COUNT* \$\$/SP30S

0323 22,3551 44001 0 SR30.1 SETPD ST0
 0324 22,3552 00001 0
 0325 REF 7 LAST 621 22,3553 00051 0 S2

INITIALIZE PUSHDOWN LIST.

A0326 SR30.1 INPUT: RONE AT (-29)M EARTH/MOON
 A0327 VONE AT (-7)M/CS
 A0328 TFFCONMU,TFFRP/RA,CALCTPER AND CALCTFF
 A0329 CALLS REQUIRE :
 A0330 EARTH CENTERED (NO RESCALING REQUIRED)
 A0331 RONE SCALED TO B-29 M
 A0332 VONE SCALED TO B-7 M/CS
 A0333 MOON CENTERED (RESCALING REQUIRED)
 A0334 RONE SCALED TO B-27 M
 A0335 VONE SCALED TO B-5 M/CS

0336 22,3554 77214 0 BOFF VLOAD
 0337 REF 5 LAST 725 22,3555 03755 0 V82EMFLG
 0338 REF 1 22,3556 45565 0 TFFCALLS
 0339 REF 16 LAST 725 22,3557 02213 0 RONE
 0340 22,3560 77752 1 VSL2
 0341 REF 17 LAST 728 22,3561 26213 0 STOVL RONE
 0342 REF 7 LAST 725 22,3562 02221 1 VONE
 0343 22,3563 77752 1 VSL2
 0344 REF 8 LAST 728 22,3564 02221 1 STORE VONE
 0345 22,3565 77624 1 TFFCALLS CALL
 0346 REF 1 22,3566 57333 0 TFFCONMU
 0347 22,3567 77624 1 CALL
 0348 REF 1 22,3570 57401 0 TFFRP/RA

OFF FOR EARTH , ON FOR MOON.

A0349
 0350 22,3571 77625 0 DSU
 0351 REF 4 LAST 725 22,3572 02207 0 RPADTEM
 0352 22,3573 64414 1 BOFF SR2P

NEED HAP0 AT (-29)M FOR DISPLAY.

A0353
 A0354 0355 REF 6 LAST 728 22,3574 03755 0 V82EMFLG
 0356 22,3575 45576 1 +1
 0357 22,3576 77624 1 CALL
 0358 REF 5 LAST 663 22,3577 45636 0 MAXCHK
 0359 REF 4 LAST 721 22,3600 16120 0 STORHAPO STODL
 0360 REF 1 22,3601 00017 1 HAP0X
 0361 22,3602 77625 0 RPER
 0362 REF 5 LAST 728 22,3603 02207 0 DSU
 0363 REF 273 LAST 710 22,3604 00161 1 RPADTEM
 0364 22,3605 64414 1 STORE MPAC +4
 BOFF SR2R

IF MOON CENTERED, RESCALE FROM (-27)M.
 IF EARTH CENTERED ALREADY AT (-29)M.
 OFF FOR EARTH , ON FOR MOON.

IF HAP0 > MAXNM, SET HAP0 =9999.9 NM.
 OTHERWISE STOPE (RAP0-RPADTEM) IN HAP0.

A0365
 A0366 0367 REF 7 LAST 728 22,3606 03755 0 V82EMFLG
 0368 22,3607 45610 1 +1
 0369 22,3610 77624 1 CALL
 0370 REF 6 LAST 728 22,3611 45636 0 MAXCHK

GIVES HPER AT (-29)M EARTH, (-27)M MOON.
 SAVE THIS FOR COMPARISON TO HPERMIN.
 NEED HPER AT (-29)M FOR DISPLAY.
 IF MOON CENTERED, RESCALE FROM (-27)M.
 IF EARTH CENTERED ALREADY AT (-29)M.
 OFF FOR EARTH , ON FOR MOON.

IF HPER > MAXNM, SET HPER = 9999.9 NM.

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0371	REF	2	LAST	329	22,3612	16122	1	STORHPER	STODL	HPERX	STORE (RPER - RPADEM) INTO HPERX.
0372	REF	274	LAST	728	22,3613	00161	1			MPAC +4	
0373					22,3614	51025	1		DSU	BPL	HPERMIN AT (-29)M FOR EARTH, (-27)M MOON
0374	REF	5	LAST	725	22,3615	02205	1			HPERMIN	IF HPER L/ HPERMIN (300 OR 35)KFT,
0375	REF	1			22,3616	45622	0			DOTPER	THEN ZERO INTO -TPER.
0376					22,3617	52145	0		DLOAD	GOTO	OTHERWISE CALCULATE TPER.
0377	REF	4	LAST	604	22,3620	06424	0			HI6ZEROS	
0378	REF	1			22,3621	45626	1			SKIPTPER	
0379					22,3622	45145	0	DOTPER	DLOAD	CALL	
0380	REF	2	LAST	728	22,3623	00017	1			RPER	
0381	REF	1			22,3624	57437	0			CALCTPER	
0382					22,3625	77676	0		DCOMP		TPER IS PUT NEG INTO -TPER.
0383	REF	6	LAST	724	22,3626	16143	0	SKIPTPER	STODL	-TPER	
0384	REF	6	LAST	729	22,3627	02205	1			HPERMIN	HPERMIN AT (-29)M FOR EARTH, (-27)M MOON
0385					22,3630	45015	1		DAD	CALL	
0386	REF	6	LAST	728	22,3631	02207	0			RPADEM	RPADEM AT (-29)M FOR EARTH, (-27)M MOON
0387	REF	1			22,3632	57442	1			CALCTFF	GIVES 59M59S FOR TFF IF RPER G/
0388					22,3633	77676	0		DCOMP		HPERMIN + RPADEM. (TPER WAS NON ZERO)
0389	REF	11	LAST	725	22,3634	36141	0		STCALL	TFF	OTHERWISE COMPUTES TFF. (GOTO)
0390	REF	8	LAST	728	22,3635	00051	0			S2	
0391					22,3636	51025	1	MAXCHK	DSU	BPL	IF C(MPAC) > 9999.9 NM, MPAC = 9999.9 NM
0392	REF	1			22,3637	05646	0			MAXNM	
0393					22,3640	45643	1			+3	OTHERWISE C(MPAC) = B(MPAC).
0394					22,3641	43415	0		DAD	RVQ	
0395	REF	2	LAST	729	22,3642	05646	0			MAXNM	
0396					22,3643	43545	1	+3	DLOAD	RVQ	(USED BY P30 - P37 ALSO)
0397	REF	3	LAST	729	22,3644	05646	0			MAXNM	
0398					22,3645	01065	0	MAXNM	20CT	01065	05603
0398					22,3646	05603	1				

GAP: ASSEMBLE REVISION 069 OF AGC PROGRAM LUMINARY BY NASA 2021112-011

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L R30

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L STABLE ORBIT - P38-P39

USER'S PAGE NO. 1 EO S3

R0001 STABLE ORBIT RENDEZVOUS PROGRAMS (P38 AND P78)

R0002 MCD NC -1 LOG SECTION - STABLE ORBIT - P38-P39
R0003 MOD BY RUDNICKI.S DATE 25JAN68

R0004 FUNCTIONAL DESCRIPTION

R0005 P38 AND P78 CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL
R0006 CONDITIONS REQUIRED BY THE AGC TO (1) PUT THE ACTIVE VEHICLE
R0007 ON A TRANSFER TRAJECTORY THAT INTERCEPTS THE PASSIVE VEHICLE
R0008 ORBIT A GIVEN DISTANCE, DELTA R, EITHER AHEAD OF OR BEHIND THE
R0009 PASSIVE VEHICLE AND (2) ACTUALLY PLACE THE ACTIVE VEHICLE IN THE
R0010 PASSIVE VEHICLE ORBIT WITH A DELTA R SEPARATION BETWEEN THE TWO
R0011 VEHICLES

R0012 CALLING SEQUENCE

R0013 ASTRONAUT REQUEST THRU DSKY

R0014 V37E3BE IF THIS VEHICLE IS ACTIVE VEHICLE
R0015 V37E78E IF OTHER VEHICLE IS ACTIVE VEHICLE

R0016 INPUT

R0017 (1) SOI MANEUVER

R0018 (A) TIG TIME OF SOI MANEUVER
R0019 (B) CENTANG ORBITAL CENTRAL ANGLE OF THE PASSIVE VEHICLE
R0020 DURING TRANSFER FROM TIG TO TIME OF INTERCEPT
R0021 (C) DELTAR THE DESIRED SEPARATION OF THE TWO VEHICLES
R0022 SPECIFIED AS A DISTANCE ALONG THE PASSIVE VEHICLE
R0023 ORBIT
R0024 (D) OPTION EQUALS 1 FOR SOI

R0025 (2) SOR MANEUVER

R0026 (A) TIG TIME OF SOR MANEUVER
R0027 (B) CENTANG AN OPTIONAL RESPECIFICATION OF 1 (B) ABOVE
R0028 (C) OPTION EQUALS 2 FOR SOR
R0029 (D) DELTTIME THE TIME REQUIRED TO TRAVERSE DELTA R WHEN
R0030 TRAVELING AT A VELOCITY EQUAL TO THE HORIZONTAL
R0031 VELOCITY OF THE PASSIVE VEHICLE - SAVED FROM
R0032 SOI PHASE
R0033 (E) TINT TIME OF INTERCEPT (SOI) - SAVED FROM SOI PHASE

R0034 OUTPUT

R0035 (1) TRKMKCNT NUMBER OF MARKS
R0036 (2) TTOGO TIME TO GO
R0037 (3) +MGA MIDDLE GIMBAL ANGLE

L STABLE ORBIT - P38-P39

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R0038 (4) DSPTM1 TIME OF INTERCEPT OF PASSIVE VEHICLE ORBIT
 R0039 (FOR SOI ONLY)
 R0040 (5) POSTTPI PERIGEE ALTITUDE OF ACTIVE VEHICLE ORBIT AFTER
 R0041 THE SOI (SOR) MANEUVER
 R0042 (6) DELVTPI MAGNITUDE OF DELTA V AT SOI (SOR) TIME
 R0043 (7) DELVTPF MAGNITUDE OF DELTA V AT INTERCEPT TIME
 R0044 (8) DELVLVC DELTA VELOCITY AT SOI (AND SOR) - LOCAL VERTICAL
 R0045 COORDINATES

R0046 SUBROUTINES USED

R0047 AVFLAGA
 R0048 AVFLAGP
 R0049 VNDSPLY
 R0050 BANKCALL
 R00502 GOFLASHR
 R00504 GOTOPOOH
 R00506 BLANKET
 R00508 ENDOFJOB
 R0051 PREC/TT
 R0052 SELECTMU
 R0053 INTRPVP
 R0054 MAINRTNE

0055 04,2750
 0056 REF 1 34,2000
 0057 34,3271

BANK 04
 SETLOC STBLEORB
 BANK

0058 REF 24 LAST 712 E7,1466
 0059 REF 1

EBANK= SUBEXIT
 COUNT* \$\$/P3879

0060 REF 176 LAST 726 34,3271 0 4616 1 P38
 0061 REF 5 LAST 675 34,3272 72313 0
 0062 34,3273 0 3276 1
 0063 REF 177 LAST 732 34,3274 0 4616 1 P78
 0064 REF 5 LAST 675 34,3275 72320 0
 00645 REF 178 LAST 732 34,3276 0 4616 1
 00646 REF 6 LAST 675 34,3277 72325 0
 0065 REF 1 34,3300 3 3630 1
 0066 REF 1 34,3301 0 3617 1
 0067 REF 1 34,3302 3 3631 0
 0068 REF 179 LAST 732 34,3303 0 4616 1
 0069 REF 2 LAST 691 34,3304 20510 1
 00694 REF 22 LAST 719 34,3305 1 6001 1
 00696 34,3306 1 3313 1
 00698 34,3307 1 3302 1
 0070 REF 23 LAST 724 34,3310 3 6244 0
 00702 REF 11 LAST 691 34,3311 0 5464 1
 00704 REF 104 LAST 723 34,3312 1 5155 1
 0071 REF 14 LAST 687 34,3313 3 4756 1

TC BANKCALL
 CADR AVFLAGA THIS VEHICLE ACTIVE
 TC +3
 TC BANKCALL
 CADR AVFLAGP OTHER VEHICLE ACTIVE
 TC BANKCALL
 CADR P20FLGON SET UPDATFLG, TRACKFLG
 CAF V06N33SR DISPLAY TIG
 TC VNDSPLY
 CAF V06N55SR DISPLAY CENTANG
 TCR BANKCALL
 CADR GOFLASHR
 TCF GOTOPOOH TERMINATE
 TCF +5 PROCEED
 TCF -5 RECYCLE
 CAF THREF IMMEDIATE RETURN - BLANK R1, R2
 TCR BLANKET
 TCF ENDOFJOB
 CAF FIVE

L STABLE ORBIT - P38-P39

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0072	RFF	2	LAST	320	34,3314	55'144 0	TS	OPTION1	
0073	REF	83	LAST	722	34,3315	3 4753 1	CAF	ONE	
0074	RFF	5	LAST	665	34,3316	55'145 1	TS	OPTION2	OPTION CODE IS SET TO 1
00742	RFF	1			34,3317	3 3632 0	CAF	V04N06SR	DISPLAY OPTION CODE - 1 = SOI, 2 = SOR
00744	RFF	180	LAST	732	34,3320	0 4616 1	TCR	BANKCALL	
00746	REF	3	LAST	732	34,3321	20510 1	CADR	GOF LASHR	
00748	RFF	23	LAST	732	34,3322	1 6001 1	TCF	GOTOPOOH	TERMINATE
0075					34,3323	1 3330 0	TCF	+5	PROCEED
00752					34,3324	1 3317 0	TCF	-5	RECYCLE
0076	REF	33	LAST	623	34,3325	3 4751 0	CAF	BIT3	IMMEDIATE RETURN - BLANK R3
0077	REF	12	LAST	732	34,3326	0 5464 1	TCR	BLANKET	
0078	REF	105	LAST	732	34,3327	1 5155 1	TCF	ENDOFJOB	
0079	REF	90	LAST	725	34,3330	0 6036 1	TC	INTPRFT	
0080					34,3331	70535 0	SLOAD	SRI	
0081	REF	6	LAST	733	34,3332	01146 0		OPTION2	
0082					34,3333	71230 0	BHIZ	DLOAD	
0083	REF	1			34,3334	71342 1		OPTN1	
0084	REF	1			34,3335	03627 1		TINT	
0085	REF	1			34,3336	02307 1	STORE	TINTSOI	STORE FOR SOR PHASE
0086					34,3337	77614 1	CLRGO		
0087	REF	1			34,3340	01230 1		OPTNSW	OPTNSW; ON = SOI, OFF = SOR
0088	RFF	1			34,3341	71373 0		JUNCTN1	
0089					34,3342	43014 0	OPTN1 SET	CLEAR	SOI
0090	REF	2	LAST	733	34,3343	01070 1		OPTNSW	
00901	REF	12	LAST	690	34,3344	00670 0		UPDATFLG	
00902					34,3345	77624 1	CALL		
0091	REF	1			34,3346	71552 0		PREC/TT	
0092					34,3347	43015 1	DAD	SET	
0093	REF	22	LAST	718	34,3350	03440 1		TIG	
00931	REF	13	LAST	733	34,3351	00470 1		UPDATFLC	
0094	RFF	2	LAST	733	34,3352	03627 1	STORF	TINT	TI = TIG + TF
0096					34,3353	77776 1	EXIT		
00962	REF	1			34,3354	3 3633 1	CAF	V06N57SR	DISPLAY DELTA R
00964	RFF	181	LAST	733	34,3355	0 4616 1	TCR	BANKCALL	
00966	REF	4	LAST	733	34,3356	20510 1	CADR	GOF LASHR	
00968	REF	24	LAST	733	34,3357	1 6001 1	TCF	GOTOPOOH	TERMINATE
0097					34,3360	1 3365 0	TCF	+5	PROCEED
00972					34,3361	1 3354 1	TCF	-5	RECYCLE
0098	REF	15	LAST	602	34,3362	3 6241 0	CAF	SIX	IMMEDIATE RETURN - BLANK R2, R3
0099	REF	13	LAST	733	34,3363	0 5464 1	TCR	BLANKET	
0100	REF	106	LAST	733	34,3364	1 5155 1	TCF	ENDOFJOB	
01001					34,3365	0 0006 1	+5	EXTEND	
01002	REF	3	LAST	733	34,3366	3 1627 0	DCA	TINT	
01003	REF	25	LAST	666	34,3367	53'046 0	DXCH	DSPTM1	FOR DISPLAY
0101	REF	1			34,3370	3 3634 0	CAF	V06N34SR	DISPLAY TIME OF INTERCEPT
0102	REF	2	LAST	732	34,3371	0 3617 1	TC	VNDSPLY	
0103	REF	91	LAST	733	34,3372	0 6036 1	TC	INTPRET	
0104					34,3373	45014 0	JUNCTN1	CLEAR	
0105	REF	1			34,3374	04266 1		P39/79SW	
0106	REF	5	LAST	675	34,3375	20041 0		SELECTMU	SELECT MU, CLEAR FINALFLG, GO TO VN1645

L STABLE ORBIT - P38-P39

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0107				34,3376	77624 1	RECYCLE	CALL		
0108	REF	2	LAST	733 34,3377	71552 0			PREC/TT	
0109				34,3400	71214 0		BOFF	DLOAD	
0110	REF	3	LAST	733 34,3401	01350 0			OPTNSW	
0111	REF	1		34,3402	71422 0			OPTN2	
0112	REF	4	LAST	733 34,3403	03627 1			TINT	
0113	REF	40	LAST	722 34,3404	34041 0		STCALL	TDEC1	PRECISION UPDATE PASSIVE VEHICLE TO
0114	REF	1		34,3405	71603 1			INTRPVP	INTERCEPT TIME
0115				34,3406	53575 0			VLOAD	UNIT
0116	REF	25	LAST	722 34,3407	00001 0			RATT	RP/(RP)
0117				34,3410	47315 0			PDL	VXV
0118	REF	20	LAST	722 34,3411	00007 0			VATT	
0119				34,3412	60246 1		ABVAL	NORM	(VP X RP/(RP))
0120	REF	16	LAST	712 34,3413	00047 1			X1	
0121				34,3414	56325 0			PDDL	DDV
0122	REF	5	LAST	330 34,3415	02307 1			DELTAR	
0123				34,3416	77657 0		SL*		DELTA R / (VP X RP/RP)
0124				34,3417	20172 1			0 -7,1	
0125	REF	2	LAST	133 34,3420	36311 1		STCALL	DELTIME	DELTA T = (RP) DELTA R / (VP X RP)
0126	REF	1		34,3421	71426 1			JUNCTN2	
0127				34,3422	43345 1		OPTN2	DLOAD	DAD
0128	REF	2	LAST	733 34,3423	02307 1			TINTSOI	
0129	REF	3	LAST	672 34,3424	00037 0			T	
0130	REF	5	LAST	734 34,3425	03627 1		STORE	TINT	TI = TI + TF
0131				34,3426	45345 1		JUNCTN2	DLOAD	DSU
0132	REF	6	LAST	734 34,3427	03627 1			TINT	
0133	REF	3	LAST	734 34,3430	02311 0			DELTIME	
0134	REF	1		34,3431	02313 1		STORE	TARGETIME	TT = TI - DELTA T
R0135	.... MAINRTNE								
R0136	SUBROUTINES USED								
R0137	S3435.25								
R0138	PERIAP01								
R0139	SHIFTR1								
R0140	VNDSPLY								
R0141	BANKCALL								
R0142	COFLASH								
R0143	GOTOP00H								
R0145	VN1645								
0146	REF	41	LAST	734 34,3432	34041 0	MAINRTNE	STCALL	TDEC1	PRECISION UPDATE PASSIVE VEHICLE TO
0147	REF	2	LAST	734 34,3433	71603 1			INTRPVP	TARGET TIME
0148				34,3434	77745 1			DLOAD	
0149	REF	23	LAST	733 34,3435	03440 1			TIG	
0150	REF	6	LAST	698 34,3436	03606 1		STORE	INTIME	
0151				34,3437	77331 0			VLOAD	
0152	REF	25	LAST	732 34,3440	03467 1		SSP	SUBEXIT	
0153	REF	1		34,3441	71445 1			TEST3979	
0154	REF	26	LAST	734 34,3442	00001 0			RATT	
0155				34,3443	77624 1		CALL		

L STABLE ORBIT - P38-P39

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0156	REF	1		34,3444	73263 1		S3435.25	
0157				34,3445	43014 0	TEST3979 80FF	80N	
0158	REF	2	LAST	733	34,3446	04346 1	P39/79SW	
0159	REF	1			34,3447	71456 0	MAINRTN1	
0160	REF	8	LAST	702	34,3450	01311 0	FINALFLG	
0161	REF	1			34,3451	71454 1	P39P79	
0162					34,3452	77614 1	SET	
0163	REF	14	LAST	733	34,3453	00470 1	UPDATFLG	
0164					34,3454	77776 1	P39P79 EXIT	
01645	REF	1			34,3455	0 3503 1	TC	DSPLY81 FOR P39 AND P79
0165					34,3456	51575 1	MAINRTN1 VLOAD	A8VAL
0166	REF	12	LAST	699	34,3457	03366 1	DELVEET3	
0167	REF	7	LAST	672	34,3460	27574 1	STOVL	DELVTPI DELTA V
0168	REF	3	LAST	682	34,3461	03504 0	VPASS4	
0169					34,3462	51451 0	VSU	ABVAL
0170	REF	5	LAST	699	34,3463	03564 0	VTPRIME	
0171	REF	4	LAST	672	34,3464	26354 1	STOVL	DELVTPI DELTA V (FINAL) = V'T - VT
0172	REF	20	LAST	706	34,3465	03534 0	RACT3	
0173					34,3466	45115 0	PDVL	CALL
0174	REF	8	LAST	699	34,3467	02343 1	VIPRIME	
0175	REF	5	LAST	672	34,3470	46277 1	PERIAPOL	GET PERIGEE ALTITUDE
0176					34,3471	77624 1	CALL	
0177	REF	11	LAST	672	34,3472	46407 0	SHIFT1	
0178	REF	5	LAST	672	34,3473	03604 0	STORE	POSTTPI
0179					34,3474	43014 0	BON	SET
0180	REF	9	LAST	735	34,3475	01311 0	FINALFLG	
0181	REF	1			34,3476	71500 1	DSPLY58	
0182	REF	15	LAST	735	34,3477	00470 1	UPDATFLG	
0183					34,3500	77776 1	DSPLY58 EXIT	
0184	REF	1			34,3501	3 3635 1	CAF	V06N58SR DISPLAY HP, DELTA V, DELTA V (FINAL)
0185	REF	3	LAST	733	34,3502	0 3617 1	TC	VNDSPLY
0186	REF	1			34,3503	3 3636 1	DSPLY81 CAF	V06N81SR DISPLAY DELTA V (LV)
0187	REF	4	LAST	735	34,3504	0 3617 1	TC	VNDSPLY
0188	REF	92	LAST	733	34,3505	0 6036 1	TC	INTPRET
0189					34,3506	77214 0	CLEAR	VLOAD
0204	REF	5	LAST	688	34,3507	01267 0		XDELVFLG
0205	REF	13	LAST	735	34,3510	03366 1		DELVEET3
0206	REF	11	LAST	689	34,3511	37654 1	STCALL	DELVSIN
0207	REF	7	LAST	702	34,3512	73542 0		VN1645 DISPLAY TRKMKCNT, TTOGO, +MGA
0208					34,3513	52014 0	BON	GOTO
0209	REF	3	LAST	735	34,3514	04306 0		P39/79SW
0210	REF	1			34,3515	71537 0		P39/P79B
0211	REF	1			34,3516	71376 0		RECYCLE
RO212	STABLE ORBIT MIDCOURSE PROGRAM (P39 AND P79)							

RO213 MCD NC -1 LOG SECTION - STABLE ORBIT - P38-P39

RO214 MCD 8Y RUDNICK1.S DATE 25JAN68

RO215 FUNCTIONAL DESCRIPTION

L STABLE ORBIT - P38-P39

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R0216 P39 AND P79 CALCULATE THE REQUIRED DELTA V AND OTHER INITIAL
 R0217 CONDITIONS REQUIRED BY THE AGC TO MAKE A MIDCOURSE CORRECTION
 R0218 MANEUVER AFTER COMPLETING THE SOI MANEUVER BUT BEFORE MAKING
 R0219 THE SOR MANEUVER

R0220 CALLING SEQUENCE

R0221 ASTRONAUT REQUEST THRU DSKY

R0222 V37E39E IF THIS VEHICLE IS ACTIVE VEHICLE
 R0223 V37E79E IF OTHER VEHICLE IS ACTIVE VEHICLE

R0224 INPUT

R0225 (1) TPASS4 TIME OF INTERCEPT - SAVED FROM P38/P78
 R0226 (2) TARGTIME TIME THAT PASSIVE VEHICLE IS AT INTERCEPT POINT -
 R0227 SAVED FROM P38/P78

R0228 OUTPUT

R0229 (1) TRMKCNT NUMBER OF MARKS
 R0230 (2) TTOGO TIME TO GO
 R0231 (3) +MGA MIDDLE GIMBAL ANGLE
 R0232 (4) DELVLVC DELTA VELOCITY AT MID - LOCAL VERTICAL COORDINATES

R0233 SUBROUTINES USED

R0234 AVFLAGA
 R0235 AVFLAGP
 R0236 LOADTIME
 R0237 SELECTMU
 R0238 PRECSET
 R0239 S34/35.1
 R0240 MAINRTNE

0241	REF 182	LAST 733	34,3517	0 4616 1	P39	TC	BANKCALL	
0242	REF 6	LAST 732	34,3520	72313 0		CADR	AVFLAGA	THIS VEHICLE ACTIVE
0243			34,3521	0 0006 1		EXTEND		
0244	REF 4	LAST 675	34,3522	3 1401 0		DCA	ATIGINC	
0245	REF 1		34,3523	0 3530 1		TC	P39/P79A	
0246	REF 183	LAST 736	34,3524	0 4616 1	P79	TC	BANKCALL	
0247	REF 6	LAST 732	34,3525	72320 0		CADR	AVFLAGP	OTHER VEHICLE ACTIVE
0248			34,3526	0 0006 1		EXTEND		
0249	REF 2	LAST 675	34,3527	3 1403 1		DCA	PTIGINC	
0250	REF 4	LAST 675	34,3530	531574 1	P39/P79A	DXCH	KT	TIME TO PREPARE FOR BURN
02505	REF 184	LAST 736	34,3531	0 4616 1		TC	BANKCALL	
02506	REF 7	LAST 732	34,3532	72325 0		CADR	P20FLGON	SET UPDATFLG, TRACKFLG
0251	REF 93	LAST 735	34,3533	0 6036 1		TC	INTPRET	
0255			34,3534	45014 0		SET	CALL	
02555	REF 4	LAST 735	34,3535	04066 0			P39/79SW	

L STABLE ORBIT - P38-P39

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0256	REF	6	LAST	733	34,3536	20041 0	SELECTMU	SELECT MU, CLEAR FINALFLG, GO TO VN1645
0257					34,3537	43234 0	DAD	
0258	REF	18	LAST	723	34,3540	21462 1	LOADTIME	
0259	REF	5	LAST	736	34,3541	03574 1	KT	
02595	REF	24	LAST	734	34,3542	03440 1	STORE TIG	TIG = T (PRESENT) + PREPARATION TIME
0260	REF	42	LAST	734	34,3543	34041 0	STCALL TDEC1	PRECISION UPDATE ACTIVE AND PASSIVE
0261	REF	4	LAST	675	34,3544	46341 0	PRECSET	VEHICLES TO TIG
0262					34,3545	77624 1	CALL	
0263	REF	3	LAST	676	34,3546	73236 1	S34/35.1	GET UNIT NORMAL
0264					34,3547	52145 0	DLOAD	GOTO
0265	REF	2	LAST	734	34,3550	02313 1	TARGETIME	
0266	REF	1			34,3551	71432 1	MAINRTINE	CALCULATE DELTA V AND DELTA V (LV)

R0272 PREC/TT
R0273 SUBROUTINES USED

R0274 PRECSET
R0275 TIMEHET
R0276 S34/35.1

0277					34,3552	71220 1	PREC/TT STQ	DLOAD	
0278	REF	8	LAST	692	34,3553	03463 0		RTRN	
0279	REF	25	LAST	737	34,3554	03440 1		TIG	
0280	REF	43	LAST	737	34,3555	34041 0	STCALL TDEC1	PRECISION UPDATE ACTIVE AND PASSIVE	
0281	REF	5	LAST	737	34,3556	46341 0		PRECSET	VEHICLES TO TIG
0282					34,3557	53775 1	VLOAD	VSR*	
0283	REF	12	LAST	706	34,3560	03550 1		RPASS3	
0284					34,3561	57176 0		0,2	
0285	REF	7	LAST	704	34,3562	16655 0	STOOL	RVEC	
0286	REF	7	LAST	671	34,3563	03617 1		CENTANG	
0287					34,3564	71406 0	PUSH	COS	
0288	REF	5	LAST	671	34,3565	16732 0	STOOL	CSTH	
0289					34,3566	43156 1	SIN	SFT	
0290	REF	6	LAST	671	34,3567	03466 0		RVSX	
0291	REF	7	LAST	671	34,3570	26730 1	STOVL	SNTH	
0292	REF	9	LAST	706	34,3571	03556 1		VPASS3	
0293					34,3572	77657 0	VSR*		
0294					34,3573	57176 0		0,2	
0295	REF	9	LAST	704	34,3574	36744 0	STCALL	VVEC	GET TRANSFER TIME BASED ON CENTANG OF
0296	REF	6	LAST	671	34,3575	24745 1		TIMEHET	PASSIVE VEHICLE
0297					34,3576	77624 1	CALL		
0298	REF	4	LAST	737	34,3577	73236 1		S34/35.1	GET UNIT NORMAL
0299					34,3600	52145 0	DLOAD	GOTO	
0300	REF	4	LAST	734	34,3601	00037 0		T	
0301	REF	9	LAST	737	34,3602	03463 0		RTRN	

R0302 INTRPVP
R0303 SUBROUTINES USED

R0304 CSMPREC
R0305 LEMPREC

L STABLE ORBIT - P38-P39

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0306					34,3603	43020 1	INTRPVP	STQ	BOFF	PRECISION UPDATE PASSIVE VEHICLE TO
0307	REF	10	LAST	737	34,3604	03463 0			RTRN	TDEC1
0308	REF	6	LAST	706	34,3605	01352 1			AVFLAG	
0309	REF	1			34,3606	71613 0			OTHERV	
0310					34,3607	77624 1		CALL		
0311	REF	4	LAST	706	34,3610	27043 0			CSPMPREC	
0312					34,3611	77650 1		GOTO		
0313	REF	11	LAST	738	34,3612	03463 0			RTRN	
0314					34,3613	77624 1	OTHERV	CALL		
0315	REF	7	LAST	715	34,3614	27057 0			LEMPREC	
0316					34,3615	77650 1		GOTO		
0317	REF	12	LAST	738	34,3616	03463 0			RTRN	

R0318 VNDSPLY
R0319 SUBROUTINES USED

R0320 BANKCALL
R0321 GOFLASH
R0322 GOTOPOOH

0323					34,3617	0 0006 1	VNDSPLY	EXTEND		FLASH DISPLAY
0324	REF	13	LAST	738	34,3620	23'463 1		QXCH	RTRN	
0325	REF	5	LAST	692	34,3621	55'613 0		TS	VERBNOUN	
0326	REF	6	LAST	738	34,3622	3 1613 1		CA	VERBNOUN	
0327	REF	185	LAST	736	34,3623	0 4616 1		ICR	BANKCALL	
0328	REF	19	LAST	717	34,3624	20351 1		CADR	GOFLASH	
0329	REF	25	LAST	733	34,3625	1 6001 1		TCF	GOTOPOOH	TERMINATE
0330	REF	14	LAST	738	34,3626	0 1463 1		TC	RTRN	PROCEED
0331					34,3627	1 3622 0		TCF	-5	RECYCLE
0351					34,3630	01441 1	V06N33SR	VN	0633	
0352					34,3631	01467 0	V06N55SR	VN	0655	
0353					34,3632	01006 0	V04N06SR	VN	0406	
0354					34,3633	01471 1	V06N57SR	VN	0657	
0355					34,3634	01442 1	V06N34SR	VN	0634	
0356					34,3635	01472 1	V06N58SR	VN	0658	
0357					34,3636	01521 0	V06N81SR	VN	0681	

*** END OF KISSING .040 ***

L BURN, BABY, BURN -- MASTER IGNITION ROUTINE

USER'S PAGE NO. 1 EO S3

0001 36,2022 BANK 36
 0002 REF 3 LAST 55 36,2000 SETLOC P40S
 0003 36,2022 BANK
 0004 REF 3 LAST 660 E7,1453 EBANK= WHICH
 0005 REF 3 LAST 55 TO 55: 2 18* COUNT* \$\$/P40
 R0006 THE MASTER IGNITION ROUTINE IS DESIGNED FOR USE BY THE FOLLOWING LEM PROGRAMS: P12, P40, P42, P61, P63.
 R0008 IT PERFORMS ALL FUNCTIONS IMMEDIATELY ASSOCIATED WITH APS OR DPS IGNITION: IN PARTICULAR, EVERYTHING LYING
 R0010 BETWEEN THE PRE-IGNITION TIME CHECK -- ARE WE WITHIN 45 SECONDS OF TIG? -- AND TIG + 26 SECONDS, WHEN DPS
 R0012 PROGRAMS THROTTLE UP.

R0013 VARIATIONS AMONG PROGRAMS ARE ACCOMODATED BY MEANS OF TABLES CONTAINING CONSTANTS (FOR AVEGEXIT, FOR
 R0015 WAITLIST, FOR PINBALL) AND TCF INSTRUCTIONS. USERS PLACE THE ADRES OF THE HEAD OF THE APPROPRIATE TABLE
 R0017 (OF P61TABLE FOR P61LM, FOR EXAMPLE) IN ERASABLE REGISTER 'WHICH' (E4). THE IGNITION ROUTINE THEN INDEXES BY
 R0019 WHICH TO OBTAIN OR EXECUTE THE PROPER TABLE ENTRY. THE IGNITION ROUTINE IS INITIATED BY A TCF BURNBABY,
 R0021 THROUGH BANKJUMP IF NECESSARY. THERE IS NO RETURN.

R0022 THE MASTER IGNITION ROUTINE WAS CONCEIVED AND EXECUTED, AND (NOTA BENE) IS MAINTAINED BY ADLER AND EYLES.

R0024 HONI SOIT QUI MAL Y PENSE

R0025 *****
 R0026 TABLES FOR THE IGNITION ROUTINE
 R0027 *****

R0028 NOLI SE TANGERE

0029				36,2022	01512 0	P12TABLE VN	0674	(0)	
0030				36,2023	01512 0	VN	0674	(1)	
0031	REF	1		36,2024	1 2615 0	TCF	COMFAIL3	(2)	
0032	REF	1		36,2025	1 3072 0	TCF	GOCUTOFF	(3)	
0033	REF	34	LAST 724	36,2026	1 5261 0	TCF	TASKOVER	(4)	
0034	REF	1		36,2027	1 2144 0	TCF	P12SPOT	(5)	
0035				36,2030	00000 1	DEC	0	(6)	NO ULLAGE
0036	REF	4	LAST 739	E7,1453		EBANK= WHICH			
0037	REF	1		36,2031	03525 0	2CADR	SERVEXIT	(7)	
0037	REF	1		36,2032	76067 1				
0038	REF	1		36,2033	1 2364 0	TCF	DISPCHNG	(11)	
0039	REF	1		36,2034	1 2541 1	TCF	WAITABIT	(12)	
0040	REF	1		36,2035	1 2506 1	TCF	P12IGN	(13)	

R0043

0044				36,2036	01450 1	P40TABLE VN	0640	(0)	
0045				36,2037	01450 1	VN	0640	(1)	
0046	REF	1		36,2040	1 2617 1	TCF	COMFAIL4	(2)	
0047	REF	1		36,2041	1 3057 1	TCF	SOPOST	(3)	
0048	REF	1		36,2042	1 2564 0	TCF	P40ZOOM	(4)	
0049	REF	1		36,2043	1 2144 0	TCF	P40SPOT	(5)	

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0050				36,2044	04300 0	DEC	2240	(6)
0051	REF	1		F6,1420		EBANK=	OMEGAQ	
0052	REF	1		36,2045	03641 1	2CADR	STEERING	(7)
0052	REF	1		36,2046	74066 1			
0053	REF	1		36,2047	1 2360 1	TCF	P40S JUNK	(11)
0054	REF	2	LAST	36,2050	1 2541 1	TCF	WAITABIT	(12)
0055	REF	1		36,2051	1 2467 1	TCF	P40IGN	(13)

R0058

0060	REF	1		36,2052	1 2147 0	P41TABLE	TCF	P41SPOT	(5)
0061				36,2053	77776 1	DEC	-1	(6)	
0062	REF	2	LAST	E6,1420		EBANK=	OMEGAQ		
0063	RFF	1		36,2054	03376 0	2CADR	CALCN85	(7)	
0063	REF	1		36,2055	74066 1				
0064	RFF	35	LAST	36,2056	1 5261 0	TCF	TASKOVER	(11)	
0065	REF	1		36,2057	1 2545 0	TCF	TIGTASK	(12)	

R0066

0067				36,2060	01450 1	P42TABLE	VN	0640	(0)
0068				36,2061	01450 1		VN	0640	(1)
0069	REF	2	LAST	36,2062	1 2617 1	TCF	COMF AIL4	(2)	
0070	REF	2	LAST	36,2063	1 3057 1	TCF	GCPOST	(3)	
0071	REF	36	LAST	36,2064	1 5261 0	TCF	TASKOVER	(4)	
0072	REF	1		36,2065	1 2144 0	TCF	P42SPOT	(5)	
0073				36,2066	05120 1	DEC	2640	(6)	
0074	REF	3	LAST	E6,1420		FBANK=	OMEGAQ		
0075	REF	2	LAST	36,2067	03641 1	2CADR	STEERING	(7)	
0075				36,2070	74066 1				
0076	RFF	2	LAST	36,2071	1 2360 1	TCF	P40S JUNK	(11)	
0077	RFF	3	LAST	36,2072	1 2541 1	TCF	WAITABIT	(12)	
0078	REF	1		36,2073	1 2516 0	TCF	P42IGN	(13)	

R0081

0082				36,2074	01476 0	P63TABLE	VN	0662	(0)
0083				36,2075	01475 0		VN	0661	(1)
0084	REF	2	LAST	36,2076	1 2615 0	TCF	COMF AIL3	(2)	
0085	REF	1		36,2077	1 3006 0	TCF	V99R ECYC	(3)	
0086	RFF	1		36,2100	1 2556 1	TCF	P63ZCOM	(4)	
0087	RFF	1		36,2101	1 2147 0	TCF	P63SPOT	(5)	
0088				36,2102	04300 0	DEC	2240	(6)	
0089	REF	5	LAST	F7,1453		FBANK=	WHICH		
0090	REF	2	LAST	36,2103	03525 0	2CADR	SERVEXIT	(7)	
0090				36,2104	76067 1				
0091	REF	2	LAST	36,2105	1 2364 0	TCF	DISPCHNG	(11)	
0092	REF	4	LAST	36,2106	1 2541 1	TCF	WAITABIT	(12)	
0093	RFF	1		36,2107	1 2440 1	TCF	P63IGN	(13)	

R0096

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0112				36,2110	01477 1	ABRTABLE	VN	0663	(0)
0113				36,2111	12 112 0		NOOP		(1)
0114	REF	3	LAST	740	36,2112	1 2615 0	TCF	COMFAIL3	(2)
0115	REF	2	LAST	739	36,2113	1 3072 0	TCF	GOCUTOFF	(3)
0116	REF	37	LAST	740	36,2114	1 5261 0	TCF	TASKOVER	(4)
0117				36,2115	12 116 1		NOOP		(5)
0118				36,2116	12 117 0		NOOP		(6)
0119				36,2117	12 120 1		NOOP		(7)
0120				36,2120	12 121 0		NOOP		
0121	REF	3	LAST	740	36,2121	1 2364 0	TCF	DISPCHNG	(11)
0122	REF	5	LAST	740	36,2122	1 2541 1	TCF	WAITABIT	(12)
0123	REF	1			36,2123	1 2503 1	TCF	ABRTIGN	(13)

R0126

R0127

R0128

R0129

 GENERAL PURPOSE IGNITION ROUTINES

0130	REF	28	LAST	719	36,2124	0 5353 1	BURNBABY	TC	PHASCHNG	GROUP 4 RESTARTS HERE
0131					36,2125	04024 0		OCT	04024	
0132	REF	133	LAST	724	36,2126	3 4755 1		CAF	ZFRO	EXTIRPATE JUNK LEFT IN DVTOTAL
0133	REF	4	LAST	330	36,2127	55*505 1		TS	DVTOTAL	
0134	REF	5	LAST	741	36,2130	55*506 1		TS	DVTOTAL +1	
0135	REF	186	LAST	738	36,2131	0 4616 1		TC	BANKCALL	P40AUTO MUST BE BANKCALLED EVEN FROM ITS
0136	REF	1			36,2132	73707 0		CADR	P40AUTO	OWN BANK TO SET UP RETURN PROPERLY
0141					36,2133	0 0006 1	B*RN8*B*	EXTEND		
0142	REF	26	LAST	737	36,2134	3 1440 0		DCA	TIG	STORE NOMINAL TIG FOR DBLATNESS COMP.
0143	REF	2	LAST	162	36,2135	53*510 0		DXCH	GOBLTIME	AND FOR P70 OR P71.
0173					36,2136	0 0004 0		INHINT		
0174	REF	22	LAST	530	36,2137	0 4674 0		TC	IBNKCALL	
0175	REF	1			36,2140	75564 1		CADR	ENGINEOF3	
0176					36,2141	0 0003 1		RELINT		
0179	REF	6	LAST	740	36,2142	51*453 1		INDEX	WHICH	
0180					36,2143	1 0005 0		TCF	5	
0183	REF	2	LAST	739	36,2144		P12SPOT	=	P40SPOT	(5)
0184	REF	3	LAST	741	36,2144		P42SPOT	=	P40SPOT	(5)
0185	REF	2	LAST	740	36,2147		P63SPOT	=	P41SPOT	(5)
0186	REF	1			36,2144	4 4747 0	P40SPOT	CS	OCT20	(5)
0186.1	REF	187	LAST	741	36,2145	0 4616 1		TC	BANKCALL	MUST BE BANKCALLED FOR GENFRALIZED
0186.2	REF	1			36,2146	74667 0		CADR	STCLOCK2	RETURN
0187	REF	54	LAST	736	36,2147	0 6036 1	P41SPOT	TC	INTPRET	(5)
0187.1					36,2150	45345 1		DLOAD	DSU	

IN P63 CLOKTASK ALREADY GOING

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0188	REF	27	LAST	741	36,2151	03440	1		TIG		
0189	REF	1			36,2152	35143	1		D29.9SEC		
01891	REF	44	LAST	737	36,2153	34041	0	STCALL	TDEC1		
01892	REF	1			36,2154	61055	0		INITCDUW		
0190					36,2155	45014	0	BOFF	CALL		
0191	REF	1			36,2156	03347	1		MUNFLAG		
0192	REF	1			36,2157	74176	1		GOMIDAV		
0193	REF	5	LAST	738	36,2160	27043	0		CSMPREC		
0194					36,2161	64375	1	VLOAD	MXV		
0195	REF	11	LAST	718	36,2162	00025	0		VATT1		
0196	REF	18	LAST	713	36,2163	01734	0		REFSMAT		
0197					36,2164	77762	1	VSR1			
0198	REF	2	LAST	609	36,2165	25726	0	STOVL	V(CSM)	CSM VELOCITY - M/CS*2(17)	
0199	REF	8	LAST	718	36,2166	00017	1		RATT1		
0200					36,2167	64312	0	VSL4	MXV		
0201	REF	19	LAST	742	36,2170	01734	0		REFSMAT		
0202	REF	2	LAST	609	36,2171	35720	1	STCALL	R(CSM)	CSM POSITION - M*2(24)	
0203	REF	1			36,2172	67162	0		MUNGRAV		
0204	REF	2	LAST	136	36,2173	16323	1	STODL	G(CSM)	CSM GRAVITY VEC. - M/CS*2(17)	
02042	REF	13	LAST	718	36,2174	00015	0		TAT		
02044	REF	45	LAST	742	36,2175	00041	1	STORE	TDEC1	RELOAD TDEC1 FOR MIDTOAV.	
0205					36,2176	77624	1	GOMIDAV	CALRB		
0206	REF	1			36,2177	27603	1		MIDTOAV1		
0207	REF	1			36,2200	1 2207	1	TCF	CALLT-35	MADE IT IN TIME.	
0208					36,2201	0 0006	1	EXTEND			
0209	REF	3	LAST	210	36,2202	3 1557	1	DCA	PIPTIME1	TIG WAS SLIPPED, SO RESET TIG TO 29.9	
0210	REF	28	LAST	742	36,2203	53'440	1	DXCH	TIG	SECONDS AFTER THE TIME TO WHICH WE DID	
0211					36,2204	0 0006	1	EXTEND		INTEGRATE.	
0212	REF	2	LAST	742	36,2205	3 3143	1	DCA	D29.9SEC		
0213	REF	29	LAST	742	36,2206	21'440	1	DAS	TIG		
0214	REF	275	LAST	729	36,2207	52 155	1	CALLT-35	DXCH MPAC		
0215	REF	5	LAST	256	36,2210	53'476	1	DXCH	SAVET-30	DELTA-T UNTIL TIG-30	
0216					36,2211	0 0006	1	EXTEND			
0217	REF	1			36,2212	4 3741	1	DCS	5SECDP		
0218	REF	6	LAST	742	36,2213	21'476	1	DAS	SAVFT-30	DELTA-T UNTIL TIG-35	
0219					36,2214	0 0006	1	EXTEND			
0220	REF	7	LAST	742	36,2215	3 1476	0	DCA	SAVET-30		
0221	REF	2	LAST	387	36,2216	0 5277	0	TC	LONGCALL		
0222	REF	14	LAST	331	E7,1451			EBANK=	TTOGC		
0223	REF	3	LAST	256	36,2217	02236	1	2CADR	TIG-35		
0223					36,2220	74067	0				
0224	REF	29	LAST	741	36,2221	0 5353	1	TC	PHASCHNG		
0225					36,2222	20254	0	DCT	20254	4.25SPOT FOR TIG-35 RESTART.	
0226	REF	2	LAST	287	36,2223	0 5321	1	TC	CHECKMM		
0227					36,2224	00077	1	DEC	63		
0228	REF	107	LAST	733	36,2225	1 5155	1	TCF	ENDOFJOB	NOT P63	
0229	REF	1			36,2226	4 4747	0	CS	CNTDINDEX	P63 CAN START DISPLAYING NOW.	

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0230	REF	4	LAST	690	36,2227	55'163 0	TS	DISPDEX	
0231	REF	95	LAST	741	36,2230	0 6036 1	TC	INTPRET	
0232					36,2231	51575 1	VLOAD	ABVAL	
0233	REF	2	LAST	162	36,2232	03551 0	VN1		
0234	REF	4	LAST	330	36,2233	03470 1	STORE	ABVFL	INITIALIZE ABVEL FOR P63 DISPLAY
0235					36,2234	77776 1	EXIT		
0236	REF	108	LAST	742	36,2235	1 5155 1	TCF	ENDOFJOB	

R0237 *****

0238	REF	1			36,2236	3 3741 0	TIG-35	CAF	5SEC	
0239	REF	9	LAST	530	36,2237	0 5173 1		TC	TW100LF	
0240	REF	2	LAST	256	36,2240	02274 1		AORES	TIG-30	
0241	REF	30	LAST	742	36,2241	0 5353 1		TC	PHASCHNG	
0242					36,2242	40154 0		OCT	40154	4.15SPOT FOR TIG-30 RESTART
0243	REF	1			36,2243	4 4752 1		CS	BLANKDEX	BLANK DSKY FOR 5 SECONDS
0244	REF	5	LAST	743	36,2244	55'163 0		TS	OISPDEX	
0245	REF	7	LAST	741	36,2245	51'453 1		INDEX	WHICH	
0246					36,2246	4 0006 0		CS	6	CHECK ULLAGE TIME.
0247					36,2247	0 0006 1		EXTENO		
0248	REF	38	LAST	741	36,2250	6 5261 1		BZMF	TASKOVER	
0249	REF	1			36,2251	3 3145 1		CAF	4.9SEC	SET UP TASK TO RESTORE DISPLAY AT TIG-30
0250	REF	10	LAST	743	36,2252	0 5173 1		TC	TWIDDLE	
0251	REF	1			36,2253	02264 0		AORFS	TIG-30.1	
0252	REF	1			36,2254	3 5027 1		CAF	PRI017	A NEGATIVE ULLAGE TIME INDICATES P41, IN
0253	REF	16	LAST	724	36,2255	0 5072 1		TC	NOVAC	WHICH CASE WE HAVE TO SET UP A JOB TO
0254	REF	15	LAST	742	E7,1451			EBANK=	TTOGO	BLANK THE DSKY FOR FIVE SECONDS, SINCE
0255	REF	1			36,2256	02261 0		2CADR	P41BLANK	CLOCKJOB IS NOT RUNNING DURING P41.
0255	REF	1			36,2257	74067 0				
0256	REF	39	LAST	743	36,2260	1 5261 0		TCF	TASKOVER	
0257	REF	188	LAST	741	36,2261	0 4616 1	P41BLANK	TC	BANKCALL	BLANK DSKY.
0258	REF	1			36,2262	20334 1		CADR	CLEANOSP	
0259	REF	109	LAST	743	36,2263	1 5155 1		TCF	ENDOFJOB	
0260	REF	2	LAST	743	36,2264	3 5027 1	TIG-30.1	CAF	PRI017	SET UP JOB TO RESTORE DISPLAY AT TIG-30
0261	REF	17	LAST	743	36,2265	0 5072 1		TC	NOVAC	
0262	REF	16	LAST	743	E7,1451			EBANK=	TTOGO	
0263	REF	1			36,2266	02271 1		2CADR	TIG-30A	
0263	REF	1			36,2267	74067 0				
0264	REF	40	LAST	743	36,2270	1 5261 0		TCF	TASKOVER	
0265	REF	1			36,2271	3 3744 0	TIG-30A	CAF	V16N85B	
0266	REF	189	LAST	743	36,2272	0 4616 1		TC	BANKCALL	RESTORE DISPLAY.
0267	REF	1			36,2273	20343 1		CADR	REGODSP	REGODSP ODES A TCF ENDOFJOB

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R0268 *****

0269	REF	1		36,2274	3 3144 0	TIG-30	CAF	S24.9SEC	
0270	REF	11	LAST	743	36,2275	0 5173 1	TC	TWIDDLE	
0271	REF	3	LAST	256	36,2276	02343 1	ADRES	TIG-5	
0272	REF	2	LAST	742	36,2277	4 4747 0	CS	CNTDNDEX	START UP CLOKTASK AGAIN
0273	REF	6	LAST	743	36,2300	55'163 0	TS	DISPDEX	
0274	REF	8	LAST	743	36,2301	51'453 1	INDEX	WHICH	PICK UP APPROPRIATE ULLAGE-ON TIME
0275					36,2302	3 0006 1	CAF	6	
0276					36,2303	0 0006 1	EXTEND		
0277	REF	1			36,2304	6 2316 1	BZMF	ULLGNOT	DON'T SET UP ULLAGE IF DT IS NEG OR ZERO
0278	REF	8	LAST	742	36,2305	55'475 1	TS	SAVET-30	SAVE DELTA-T FOR RESTART
0279	REF	12	LAST	744	36,2306	0 5173 1	TC	TWIDDLE	
0280	REF	2	LAST	254	36,2307	02337 1	ADRES	ULLGTASK	
0281	REF	24	LAST	732	36,2310	3 6244 0	CA	THREE	RESTART PROTECT ULLGTASK (1.3SPOT)
0282	REF	97	LAST	724	36,2311	54 001 1	TS	L	
0283	REF	25	LAST	744	36,2312	4 6244 1	CS	THREE	
0284	REF	3	LAST	231	36,2313	52 753 1	DXCH	-PHASE1	
0285	REF	5	LAST	380	36,2314	4 0025 1	CS	TIME1	
0286	REF	1			36,2315	55'053 1	TS	TBASE1	
0287					36,2316	0 0006 1	ULLGNOT	EXTEND	
0288	REF	9	LAST	744	36,2317	5 1453 1	INDEX	WHICH	
0289					36,2320	3 0010 0	DCA	7	
0290	REF	3	LAST	121	36,2321	53'253 0	DXCH	AVEGEXIT	LOAD AVEGEXIT WITH APPROPRIATE 2CADR
0291	REF	38	LAST	721	36,2322	3 4752 0	CAF	TWO	4.2SPOT RESTARTS IMMEDIATELY AT RED04.2
0292	REF	58	LAST	744	36,2323	54 001 1	TS	L	
0293	REF	39	LAST	744	36,2324	4 4752 1	CS	TWO	AND ALSO AT TIG-5 AT THE CORRECT TIME.
0294	REF	3	LAST	239	36,2325	52 761 0	DXCH	-PHASE4	
0295	REF	6	LAST	744	36,2326	4 0025 1	CS	TIME1	
0296	REF	2	LAST	247	36,2327	55'061 0	TS	TBASE4	SET TBASE4 FOR TIG-5 RESTART
02961					36,2330	0 0006 1	RED02.17	EXTEND	
02962	REF	10	LAST	547	36,2331	3 4755 1	DCA	NEGO	CLEAR OUT GROUP 2 SO LAMBERT CAN START
02963	REF	4	LAST	246	36,2332	52 755 1	DXCH	-PHASE2	IF NEEDED.
0297	REF	1			36,2333	10 763 1	RED04.2	CCS	IS SERVICER GOING?
0298	REF	41	LAST	743	36,2334	1 5261 0	TCF	TASKOVER	YES, DON'T START IT UP AGAIN.
0299	REF	39	LAST	621	36,2335	0 4635 0	TC	POSTJUMP	
0300	REF	1			36,2336	77374 1	CADR	PRERFAD	PREREAD ENDS THIS TASK

R0301 *****

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0302	RFF	1		36,2337	0 2662	1	ULLGTASK	TC	ONULLAGE	THIS COMES AT TIG-7.5 OR TIG-3.5
0303	RFF	31	LAST	743	36,2340	0 5353	1	TC	PHASCHNG	
0304					36,2341	00001	0	OCT	1	
0305	RFF	42	LAST	744	36,2342	1 5261	0	TCF	TASKOVFR	

R0306

0307	RFF	2	LAST	743	36,2343	3 3741	0	TIG-5	CAF	5SEC	
0308	RFF	13	LAST	744	36,2344	0 5173	1		TC	TWIDDLF	
0309	RFF	2	LAST	256	36,2345	02367	1		ADRES	TIG-0	
0310	REF	51	LAST	639	36,2346	0 5516	0		TC	DOWNFLAG	RESET IGNFLAG AND ASTNFLAG
0311	REF	1			36,2347	00153	0		ADRES	IGNFLAG	FOR LIGHT-UP LOGIC
0312	RFF	52	LAST	745	36,2350	0 5516	0		TC	DOWNFLAG	
0313	REF	1			36,2351	00154	1		ADRES	ASTNFLAG	
0314	REF	4	LAST	660	36,2352	0 5327	1		TC	2PHS CHNG	
0315					36,2353	40074	0		OCT	40074	RESTART TIG-0 (4.7SPOT)
0316					36,2354	05013	0		OCT	05013	RESTART HERE (FOR S40.13 IF NEEDED)
0317					36,2355	77777	0		OCT	77777	
0318	RFF	10	LAST	744	36,2356	51'453	1		INDEX	WHICH	
0319					36,2357	1 0011	0		TCF	11	
0320	RFF	4	LAST	397	36,2360	3 4736	1	P40SJUNK	CAF	PRI020	(11) P40 AND P42 COME HEFP
0321	RFF	26	LAST	725	36,2361	0 5105	0		TC	FINDVAC	
0322	REF	17	LAST	743	F7,1451				FBANK=	TTDC0	
0323	REF	1			36,2362	02574	0		2CADR	S40.13	
0323	RFF	1			36,2363	56067	0				
0324	RFF	1			36,2364	4 5742	1	DISPCHNG	CS	VB99DEX	(11)
0325	REF	7	LAST	744	36,2365	55'163	0		TS	DISPDEX	
0326	REF	43	LAST	745	36,2366	1 5261	0		TCF	TASKOVFR	

R0327

0328	RFF	4	LAST	295	36,2367	4 0103	1	TIG-0	CS	FLAGWRD7	SET IGNFLAG SINCE TIG HAS ARRIVED
0329	REF	1			36,2370	7 4737	1		MASK	IGNFLBIT	
0330	RFF	5	LAST	745	36,2371	26 103	1		ADS	FLAGWRD7	
0331	REF	3	LAST	742	36,2372	0 5321	1		TC	CHECKMM	IN P63 CASE, THROTTLE-UP IS ZOOMTIME
0332					36,2373	00077	1		DEC	63	AFTER NOMINAL IGNITION, NOT ACTUAL
0333	REF	1			36,2374	1 2404	1		TCF	IGNYFT?	
0334	REF	2	LAST	255	36,2375	3 1424	1		CA	ZOOMTIME	
0335	REF	14	LAST	745	36,2376	0 5173	1		TC	TWIDDLE	
0336	REF	2	LAST	255	36,2377	02554	1		ADRES	ZOOM	

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0337	REF	5	LAST	745	36,2400	0 5327 1	TC	2PHSCHNG	
0338					36,2401	40033 0	OCT	40033	
0339					36,2402	05014 1	DCT	05014	
0340					36,2403	77777 0	OCT	77777	
0341	REF	1			36,2404	3 4740 0	IGNYET?	CAF	ASTNBIT
0342	REF	6	LAST	745	36,2405	7 0103 1	MASK	FLAGWRD7	CHECK ASTNFLAG: HAS ASTRONAUT RESPONDED
0343					36,2406	0 0006 1	EXTEND		TO OUR ENGINE ENABLE REQUEST?
0344	REF	11	LAST	745	36,2407	5 1453 1	INDEX	WHICH	
0345					36,2410	1 0012 0	BZF	12	BRANCH IF HE HAS NOT RESPONDED YET
0346	REF	17	LAST	617	36,2411	4 0101 0	IGNITION	CS	FLAGWRD5
03461	REF	3	LAST	231	36,2412	7 4745 1	MASK	ENGONBIT	INSURE ENGONFLG IS SET.
03462	REF	18	LAST	746	36,2413	26 101 0	ADS	FLAGWRD5	
03463	REF	6	LAST	272	36,2414	4 4355 1	CS	PRID30	TURN ON THE ENGINE.
0347					36,2415	0 0006 1	EXTEND		
0348	REF	22	LAST	483	36,2416	02 011 0	RAND	DSALMOUT	
0349	REF	31	LAST	573	36,2417	6 4737 0	AD	B1113	
0350					36,2420	0 0006 1	EXTEND		
0351	REF	23	LAST	746	36,2421	01 011 0	WRITE	DSALMOUT	
0352					36,2422	0 0006 1	EXTEND		SET TEVENT FOR DOWNLINK
0353	REF	17	LAST	608	36,2423	3 0025 0	DCA	TIME2	
0354	REF	4	LAST	215	36,2424	53'345 0	DXCH	TEVENT	
0355					36,2425	0 0006 1	EXTEND		UPDATE TIG USING TGO FROM S40.13
0356	REF	4	LAST	256	36,2426	3 1515 1	DCA	TGO	
0357	REF	30	LAST	742	36,2427	53'440 1	DXCH	TIG	
0358					36,2430	0 0006 1	EXTEND		
0359	REF	18	LAST	746	36,2431	3 0025 0	DCA	TIME2	
0360	REF	31	LAST	746	36,2432	21'440 1	DAS	TIG	
03601	REF	1			36,2433	4 4742 0	CS	FLUNDBIT	PERMIT GUIDANCE LOOP DISPLAYS
03602	REF	7	LAST	550	36,2434	7 0104 0	MASK	FLAGWRD8	
03603	REF	8	LAST	746	36,2435	54 104 0	TS	FLAGWRD8	
0361	REF	12	LAST	746	36,2436	51'453 1	INDEX	WHICH	
0362					36,2437	1 0013 1	TCF	13	
0363					36,2440	0 0006 1	P63IGN	EXTEND	(13) INITIATE BURN DISPLAYS
0364	REF	1			36,2441	3 3135 0	DCA	DSP2CADR	
0366	REF	1			36,2442	53'253 0	DXCH	AVGEXIT	
03661	REF	15	LAST	690	36,2443	3 0005 1	CA	Z	ASSASSINATE CLOKTASK
03662	REF	8	LAST	745	36,2444	55'163 0	TS	DISPDEX	
0370	REF	1			36,2445	4 0105 1	CS	FLAGWRD9	SET FLAG FOR P70-P71
0371	REF	1			36,2446	7 4743 1	MASK	LEIABBIT	
0372	REF	2	LAST	746	36,2447	26 105 1	ADS	FLAGWRD9	

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0373	REF	7	LAST	746	36,2450	4 0103 1	CS	FLAGWRD7	SET SWANDISP TO ENABLE R10.
0374	REF	1			36,2451	7 4741 0	MASK	SWANDBIT	
0375	REF	B	LAST	747	36,2452	26 103 1	ADS	FLAGWRD7	
03751	REF	3	LAST	300	36,2453	4 4735 0	CS	PULSFS	MAKE SURE DAP IS NOT IN MINIMUM-IMPULSE
03752	REF	16	LAST	309	36,2454	7 0111 1	MASK	DAPBCOLS	MODE, IN CASE OF SWITCH TO P66
03753	REF	17	LAST	747	36,2455	54 111 1	TS	DAPBCOLS	
03754					36,2456	0 0006 1	EXTEND		INITIALIZE TIG FOR P70 AND P71.
03755	REF	19	LAST	746	36,2457	3 0025 0	DCA	TIME2	
03756	REF	32	LAST	746	36,2460	53'440 1	DXCH	TIG	
0376	REF	134	LAST	741	36,2461	3 4755 1	CAF	ZERO	INITIALIZE WCHPHASE AND FLPASSO
0377	REF	2	LAST	165	36,2462	55'620 0	TS	WCHPHASE	
03771	REF	2	LAST	165	36,2463	55'617 1	TS	WCHPHOLD	ALSO WCHPHOLD
0378	REF	40	LAST	744	36,2464	3 4752 0	CA	TWO	
0379	REF	2	LAST	165	36,2465	55'621 1	TS	FLPASSO	
0380	REF	2	LAST	740	36,2466	1 2516 0	TCF	P42IGN	
0381	REF	19	LAST	746	36,2467	4 0101 0	CS	FLAGWRD5	(13)
0382	REF	1			36,2470	7 4740 1	MASK	NOTHRBIT	
0383					36,2471	0 0006 1	EXTEND		
0384	REF	3	LAST	747	36,2472	1 2516 0	BZF	P42IGN	
0385	REF	3	LAST	745	36,2473	3 1424 1	CA	ZOOMTIME	WAITLIST FOR ZOOM (FLATOUT, ETC.)
0386	REF	15	LAST	745	36,2474	0 5173 1	TC	TWIDDLF	
0387	REF	3	LAST	745	36,2475	02554 1	ADRES	ZOOM	
0388	REF	6	LAST	746	36,2476	0 5327 1	TC	2PHSCHNG	
0389					36,2477	40033 0	OCT	40033	3.3SPOT FOR ZOOM RESTART.
0390					36,2500	05014 1	OCT	05014	TYPE C RESTARTS HERE IMMEDIATELY
0391					36,2501	77777 0	OCT	77777	
0392	REF	4	LAST	747	36,2502	1 2516 0	TCF	P42IGN	
03972	REF	4	LAST	745	36,2503	0 5321 1	TC	CHCKMM	(13) BRANCH TO APPROPRIATE ABORT
03974					36,2504	00107 1	DEC	71	ENGINE-ON SEQUENCE.
0398	REF	5	LAST	747	36,2505	1 2516 0	TCF	P42IGN	CONTINUE ENGINE-ON SEQUENCE
0399	REF	16	LAST	746	36,2506	3 0005 1	CA	Z	(13) KILL CLOKTASK
0400	REF	9	LAST	746	36,2507	55'163 0	TS	DISPDEX	
04001					36,2510	0 0006 1	EXTEND		CONNECT ASCENT GUIDANCE TO SERVICER.
04002	REF	1			36,2511	3 3141 0	DCA	ATMAGADR	
04003	REF	2	LAST	746	36,2512	53'253 0	DXCH	AVGXIT	
0401	REF	9	LAST	747	36,2513	4 0103 1	CS	FLAGWRD7	ENABLE R10.
0402	REF	2	LAST	747	36,2514	7 4741 0	MASK	SWANDBIT	
0403	REF	10	LAST	747	36,2515	26 103 1	ADS	FLAGWRD7	
0405	REF	1			36,2516	4 4744 0	CS	DRIFTBIT	ENSURE THAT POWERED-FLIGHT SWITCHING
0408	REF	2	LAST	747	36,2517	4 4744 0	CS	DRIFTBIT	ENSURE THAT POWERED-FLIGHT SWITCHING
0409	REF	18	LAST	747	36,2520	7 0111 1	MASK	DAPBCOLS	CURVES ARE USED.

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0410	REF	19	LAST	747	36,2521	54 111 1	TS	DAPBOOLS	
0411	REF	1			36,2522	3 4743 0	CAF	IMPULBIT	EXAMINE IMPULSE SWITCH
0412	REF	17	LAST	690	36,2523	7 0076 1	MASK	FLAGWRD2	
0413	REF	221	LAST	724	36,2524	10 000 0	CCS	A	
0414	REF	1			36,2525	1 3522 0	TCF	IMPLBURN	

0415	REF	53	LAST	745	36,2526	0 5516 0	DVMONCON	TC	DOWNFLAG	
0416	REF	2	LAST	745	36,2527	00153 0		ADRES	IGNFLAG	CONNECT DVMON
0417	REF	54	LAST	748	36,2530	0 5516 0		TC	DOWNFLAG	
0418	REF	2	LAST	745	36,2531	00154 1		ADRES	ASTNFLAG	
0419	REF	55	LAST	748	36,2532	0 5516 0		TC	DOWNFLAG	
0420	REF	1			36,2533	00161 1		ADRES	IDLEFLAG	

0421	REF	32	LAST	745	36,2534	0 5353 1	TC	PHASCHNG	
0422					36,2535	40054 1	OCT	40054	

0423	REF	11	LAST	712	36,2536	0 5221 0	TC	FIXDELAY	TURN ULLAGE OFF HALF A SECOND AFTER
0424					36,2537	00062 0	DEC	50	LIGHT UP.

0425	REF	1			36,2540	0 2656 0	ULLAGOFF	TC	NOULLAGE
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0426					36,2541	0 0006 1	WAITABIT	EXTEND	KILL GROUP 4
0427	REF	11	LAST	744	36,2542	3 4755 1	DCA	NEGO	
0428	REF	4	LAST	744	36,2543	52 761 0	DXCH	-PHASE4	

0429	REF	44	LAST	745	36,2544	1 5261 0	TCF	TASKOVER	
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R0430 *****

0431	REF	6	LAST	483	36,2545	3 5026 0	TIGTASK	CAF	PRIO16	TIGNOW MUST BE A JOB.
0432	REF	18	LAST	743	36,2546	0 5072 1		TC	NOVAC	
0433	REF	6	LAST	617	E7,1460			EBANK=	IRKMKCNT	
0434	REF	1			36,2547	03241 0		2CADR	TIGNOW	
0434	REF	1			36,2550	74067 0				
0435	REF	33	LAST	748	36,2551	0 5353 1	TC	PHASCHNG		
0436					36,2552	00006 1	OCT	6	KILL GROUP 6.	

0437	REF	45	LAST	748	36,2553	1 5261 0	TCF	TASKOVER	
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R043B *****

0439	REF	13	LAST	746	36,2554	51*453 1	ZOOM	INDEX	WHICH	
0440					36,2555	1 0004 1		TCF	4	

0441					36,2556	0 0006 1	P63ZOOM	EXTEND	(4) SET UP GUIDANCE.
0442	REF	1			36,2557	3 3137 1		DCA	LUNLANAD
0443	REF	4	LAST	744	36,2560	53*253 0		DXCH	AVEGFXIT

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0445	REF	23	LAST	741	36,2561	0 4674 0	TC	I8NKCALL
0446	REF	1			36,2562	62415 0	CADR	FLATOUT
04462	REF	1			36,2563	1 2571 1	TCF	P40ZOOMA

04463	REF	32	LAST	746	36,2564	3 4737 0	P40ZOOM	CAF	BIT13	(4) THROTTLE THE DPS TO MAXIMUM THRUST.
04464	REF	2	LAST	226	36,2565	54 055 0		TS	THRUST	
04465	REF	30	LAST	721	36,2566	3 4750 1		CAF	BIT4	

04466					36,2567	0 0006 1		EXTEND	
04467	REF	8	LAST	547	36,2570	05 014 1		WOR	CHAN14

0447	REF	34	LAST	748	36,2571	0 5353 1	P40ZOOMA	TC	PHASCHNG
0448					36,2572	00003 1		OCT	3
0449	REF	46	LAST	748	36,2573	1 5261 0		TCF	TASKOVER

R0450

0451	REF	38	LAST	719	36,2574	0 5504 0	COMFAIL	TC	JPFLAG	(15)
0452	REF	2	LAST	748	36,2575	00161 1		ADRES	IDLEFLAG	
0453	REF	39	LAST	749	36,2576	0 5504 0		TC	JPFLAG	SET FLAG TO SUPPRESS CONFLICTING DISPLAY
0454	REF	1			36,2577	00175 1		ADRES	FLUNDISP	
0455	REF	10	LAST	456	36,2600	3 4751 0		CAF	FOUR	RESET DVMON
0456	REF	21	LAST	257	36,2601	55 513 0		TS	DVCNTR	
0457	REF	1			36,2602	10 765 1		CCS	PHASF6	CLOCKTASK ACTIVE?
0458					36,2603	1 2606 1		TCF	+3	YES
0460	REF	190	LAST	743	36,2604	0 4616 1		TC	BANKCALL	OTHERWISE, START IT UP
0461	REF	1			36,2605	74666 1		CADR	STCLOCK1	
0462	REF	1			36,2606	4 4242 0	+3	CS	VB97DEX	
0463	REF	10	LAST	747	36,2607	55 163 0		TS	DISPDEX	
0464	REF	35	LAST	749	36,2610	0 5353 1		TC	PHASCHNG	TURN OFF GROUP 4.
0465					36,2611	00004 0		OCT	00004	
04655	REF	110	LAST	743	36,2612	1 5155 1		TCF	ENDOFJOB	

0466	REF	14	LAST	748	36,2613	51 453 1	COMFAIL1	INDEX	WHICH
0467					36,2614	1 0002 1		TCF	2

0468	REF	17	LAST	747	36,2615	3 0005 1	COMFAIL3	CA	Z	(15)	KILL CLOKTASK USING Z
0469					36,2616	1 2620 0		TCF	+2		

0470	REF	3	LAST	744	36,2617	4 4747 0	COMFAIL4	CS	CNTDNDEX
0471	REF	11	LAST	749	36,2620	55 163 0		TS	DISPDEX

0472	REF	56	LAST	748	36,2621	0 5516 0		TC	DOWNFLAG	RECONNECT DV MONITOR
0473	REF	3	LAST	749	36,2622	00161 1		ADRES	IDLEFLAG	
0474	REF	57	LAST	749	36,2623	0 5516 0		TC	DOWNFLAG	PERMIT GUIDANCE LOOP DISPLAYS
0475	REF	2	LAST	749	36,2624	00175 1		ADRES	FLUNDISP	
0476	REF	111	LAST	749	36,2625	1 5155 1		TCF	ENDOFJOB	

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0477	REF	36	LAST	749	36,2626	0 5353	1	COMFAIL2	TC	PHASCHNG	KILL ZOOM RESTART PROTECTION
0478					36,2627	00003	1		OCT	00003	
0479					36,2630	0 0004	0		INHINT		
0480	REF	8	LAST	603	36,2631	0 6027	1		TC	KILLTASK	KILL ZOOM, IN CASE IT'S STILL TO COME
0481	REF	4	LAST	747	36,2632	74554	0		CADR	ZOOM	
0482	REF	24	LAST	749	36,2633	0 4674	0		TC	IBNKCALL	COMMAND ENGINE OFF
0483	REF	1			36,2634	75561	1		CADR	ENGINEOF4	
04832	REF	40	LAST	749	36,2635	0 5504	0		TC	UPFLAG	SET THE DRIFT BIT FOR THE DAP.
04834	REF	1			36,2636	00312	1		ADRFS	DRIFTDFL	
0484	REF	1			36,2637	0 2650	0		TC	INVFLAG	USE OTHER RCS SYSTEM
0485	REF	1			36,2640	00310	0		ADRES	ACRBTFLG	
0486	REF	41	LAST	750	36,2641	0 5504	0		TC	UPFLAG	TURN ON ULLAGE
0487	REF	2	LAST	239	36,2642	00314	1		ADRFS	ULLAGFLG	
0488	REF	38	LAST	723	36,2643	3 4753	1		CAF	BIT1	
0489					36,2644	0 0004	0		INHINT		
0490	REF	16	LAST	747	36,2645	0 5173	1		TC	TWIDDLF	
0491	REF	4	LAST	744	36,2646	02343	1		ADRES	TIG-5	
0492	REF	112	LAST	749	36,2647	1 5155	1		TCF	ENDOFJOB	

R0493 *****
 R0494 SUBROUTINES OF THE IGNITION ROUTINE
 R0495 *****

0496	REF	186	LAST	692	36,2650	3 0002	0	INVFLAG	CA	Q	
0497	REF	1			36,2651	0 5522	1		TC	DEBIT	
0498					36,2652	4 0000	0		COM		
0499					36,2653	0 0006	1		EXTEND		
0500	REF	14	LAST	569	36,2654	06 001	0		RXOR	LCHAN	
0501	REF	1			36,2655	1 5511	0		TCF	COMFLAG	

R0502 *****

0503	RFF	1			36,2656	4 4746	1	NOULLAGE	CS	ULLAGER	MUST BE CALLED IN A TASK OR UNDER INHINT
0504	REF	20	LAST	748	36,2657	7 0111	1		MASK	DAPBCOLS	
0505	REF	21	LAST	750	36,2660	54 111	1		TS	DAPBCOLS	
0506	REF	187	LAST	750	36,2661	0 0002	0		TC	Q	

R0507 *****

0508	REF	22	LAST	750	36,2662	4 0111	1	ONULLAGE	CS	DAPBCOLS	TURN ON ULLAGE. MUST BE CALLED IN
0509	REF	2	LAST	750	36,2663	7 4746	1		MASK	JLLAGER	A TASK OR WHILE INHINTED.
0510	REF	23	LAST	750	36,2664	26 111	1		ADS	DAPBCOLS	
0511	RFF	188	LAST	750	36,2665	0 0002	0		TC	Q	

R0512 *****

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0513	RFF	135	LAST	747	36,2666	3 4755 1	STCLOK1	CA	ZFPO	THIS ROUTINE STARTS THE COUNT-DOWN (CLOKTASK AND CLOKJOB). SETTING SETTING DISPDIX POSITIVE KILLS IT. RETURN SAVE (NOT FOR RESTARTS)
0514	RFF	12	LAST	749	36,2667	55'163 0	STCLOK2	TS	DISPDIX	
0515	REF	9	LAST	583	36,2670	0 4645 1	STCLOK3	TC	MAKECADR	
0516	RFF	3	LAST	744	36,2671	55'061 0		TS	TBASE4	
0517					36,2672	0 0006 1			EXTEND	
0518	RFF	33	LAST	747	36,2673	3 1440 0		DCA	TIG	
0519	RFF	276	LAST	742	36,2674	52 155 1		DXCH	MPAC	
0520					36,2675	0 0006 1			EXTEND	
0521	REF	20	LAST	747	36,2676	4 0025 1		DCS	TIME2	
0522	REF	277	LAST	751	36,2677	20 155 1		DAS	MPAC	HAVE TIG - TIME2, UNDOUBTEDLY A + NUMBER POSITIVE, SINCE WE PASSED THE 45 SECOND CHECK
0523	RFF	7	LAST	448	36,2700	0 7256 1		TC	TPAGREE	
0524	RFF	12	LAST	726	36,2701	3 4777 1		CAF	1SEC	
0525	RFF	189	LAST	750	36,2702	54 002 1		TS	Q	
0526	RFF	278	LAST	751	36,2703	52 155 1		DXCH	MPAC	
0527	RFF	8	LAST	457	36,2704	7 4346 0		MASK	LOW5	RESTRICT MAGNITUDE OF NUMBER IN A
0528					36,2705	0 0006 1			EXTEND	
0529	REF	190	LAST	751	36,2706	10 002 1		DV	Q	
0530	RFF	99	LAST	744	36,2707	3 0001 0		CA	L	GET REMAINDER
0531	REF	41	LAST	747	36,2710	6 4752 0		AD	TWO	
0532					36,2711	0 0004 0			INHINT	
0533	RFF	17	LAST	750	36,2712	0 5173 1		TC	TWIDDLE	
0534	RFF	3	LAST	660	36,2713	0 2722 1		ADRES	CLOKTASK	
0535	REF	7	LAST	747	36,2714	0 5327 1		TC	2PHSCHNG	
0536					36,2715	40036 0		OCT	40036	6.3SPOT FOR CLOKTASK
0537					36,2716	05024 1		OCT	05024	
0538					36,2717	13000 0		OCT	13000	
0539	REF	4	LAST	751	36,2720	3 1061 1		CA	TBASE4	
0540	REF	12	LAST	584	36,2721	0 4640 1		TC	BANK JUMP	
0541	REF	7	LAST	744	36,2722	4 0025 1	CLOKTASK	CS	TIME1	SET TBASE6 FOR GROUP 6 RESTART
0542	RFF	1			36,2723	55'065 1		TS	TBASE6	
0543	REF	13	LAST	751	36,2724	11'163 0		CCS	DISPDIX	
0544	REF	1			36,2725	1 2736 0		TCF	KILLCLOK	
0545					36,2726	12 727 0		NOOP		
0546	REF	3	LAST	518	36,2727	3 7714 1		CAF	PRIO27	
0547	REF	19	LAST	748	36,2730	0 5072 1		TC	NOVAC	
0548	REF	18	LAST	745	F7,1451			EBANK=	TTOGC	
0549	REF	1			36,2731	0 2742 1		2CADR	CLOK JOB	
0549	REF	1			36,2732	74067 0				
0550	REF	12	LAST	748	36,2733	0 5221 0		TC	FIXDELAY	WAIT A SECOND BEFORE STARTING OVER
0551					36,2734	0 0144 0		DEC	100	
0552	REF	4	LAST	751	36,2735	1 2722 0		TCF	CLOKTASK	

0553 36,2736 0 0006 1 KILLCLOK EXTEND

KILL RESTART

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0554	REE	12	LAST	748	36,2737	3 4755	1	DCA	NEGO
0555	REE	2	LAST	279	36,2740	52 765	1	DXCH	-PHASF6
0556	REF	47	LAST	749	36,2741	1 5261	0	TCF	TASKOVER

0557					36,2742	0 0006	1	CLOCKJOB	EXTEND
0558	REE	34	LAST	751	36,2743	4 1440	1	DCS	TIG
0559	REE	19	LAST	751	36,2744	53'452	1	DXCH	TTOGO
0560					36,2745	0 0006	1	EXTEND	
0561	REF	21	LAST	751	36,2746	3 0025	0	DCA	TIME2
0562	REF	20	LAST	752	36,2747	21'452	1	DAS	TTOGO
0563					36,2750	0 0004	0	INHINT	
0564	REF	14	LAST	751	36,2751	11'163	0	CCS	DISPDEX
0565	REF	113	LAST	750	36,2752	1 5155	1	TCF	ENDOFJOB
0566	REF	114	LAST	752	36,2753	1 5155	1	TCF	ENDOEJOB
0567					36,2754	4 0000	0	COM	
0568					36,2755	0 0003	1	RELINT	
0569	REF	222	LAST	748	36,2756	50 000	1	INDEX	A
0570	REE	1			36,2757	1 3021	0	TCF	DISPNOT -1

IF DISPDEX HAS BEEN SET POSITIVE BY A TASK OR A HIGHER PRIORITY JOB SINCE THE LAST CLOKTASK, AVOID USING IT AS AN INDEX.

***** DISPDEX MUST NEVER BE -0 *****

(-1 DUE TO EFFECT OF CCS)

0571	REF	3	LAST	468	4242			VB97DEX	=	34DEC
------	-----	---	------	-----	------	--	--	---------	---	-------

0572	REE	1			36,2760	3 0371	1	-42	CA	NVWORD +2
0573	REF	191	LAST	749	36,2761	0 4616	1	TC	BANKCALL	
0574	REE	5	LAST	733	36,2762	20510	1	CADR	GOFLASHR	
0575	REF	1			36,2763	1 3023	1	TCF	STOPCLOCK	
0576	REF	1			36,2764	1 2613	0	TCF	COMFAIL1	
0577	REE	1			36,2765	1 2626	0	TCF	COMFAIL2	
0578	REF	136	LAST	751	36,2766	4 4755	0	CS	ZERO	
0579	REF	1			36,2767	55'067	0	V97ORV99	TS	NVWORD1
0580	REF	1			36,2770	3 3146	1	CAF	VB99CON	
0581	REF	2	LAST	487	36,2771	0 5464	1	TC	LINUS	
0582	REE	115	LAST	752	36,2772	1 5155	1	TCF	ENDOEJOB	

NVWORD+2 CONTAINS V06 & APPROPRIATE NOUN

TERMINATE CLOKTASK ON THE WAY TO POOH

0583	REF	15	LAST	749	36,2773	51'453	1	-27	INDEX	WHICH
0584					36,2774	3 0001	0	CAF	1	
0585	REE	192	LAST	752	36,2775	0 4616	1	TC	BANKCALL	
0586	REE	1			36,2776	20335	0	CADR	REFLASH	
0587	REF	2	LAST	752	36,2777	1 3023	1	TCF	STOPCLOCK	
0588	REE	1			36,3000	1 3040	1	TCF	ASTNRETN	
0589					36,3001	1 2773	1	TCF	-6	

THIS DISPLAY IS CALLED VIA ASTNCLOCK. IT IS PRIMARILY USED BY THE ASTRONAUT TO RESET HIS EVENT TIMER TO AGREE WITH TIG.

0590	REE	2	LAST	741	4747			CNTNDX	=	0CT20
0591	REF	16	LAST	752	36,3002	51'453	1	-20	INDEX	WHICH
0592					36,3003	3 0000	1	CAF	0	
0593	REF	193	LAST	752	36,3004	0 4616	1	TC	BANKCALL	
0594	REF	2	LAST	743	36,3005	20343	1	CADR	REGODSP	

NEGATIVE OF THIS IS PROPER FOR DISPDEX

THIS DISPLAY COMES UP AT ONE SECOND INTERVALS. IT IS NORMALLY OPERATED BETWEEN TIG-30 SECONDS AND TIG-5 SECONDS. REGODSP DOES ITS OWN TCF ENDOFJOB

0595	REE	2	LAST	196	5742			VB99DEX	=	0CT14
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NEGATIVE OF THIS IS PROPER FOR DISPDEX

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05955

36,3006

V99RECYC EQUALS

0596	REF	17	LAST	752	36,3006	51'453	1	-14	INDEX	WHICH	
0597					36,3007	3 0000	1		CAF	0	
0598	REF	194	LAST	752	36,3010	0 4616	1		TC	BANKCALL	
0599	REF	6	LAST	752	36,3011	20510	1		CADR	G0FLASHR	
0600	REF	3	LAST	752	36,3012	1 3023	1		TCF	STOPCLOCK	
0601	REF	1			36,3013	1 3051	1		TCF	*PROCEED	
0602	REF	1			36,3014	1 3054	1		TCF	*ENTER	
0603	REF	21	LAST	568	36,3015	4 4743	1		CS	BIT9	
0604	REF	1			36,3016	1 2767	1		TCF	V97ORV99	

THIS IS THE "PLEASE ENABLE ENGINE"
 DISPLAY; IT IS INITIATED AT TIG-5 SEC.
 THE DISPLAY IS A V99NXX, WHERE XX IS THE
 NOUN THAT HAD PREVIOUSLY BEEN DISPLAYED
 TERMINATE GOTOPPOH TURNS OFF ULLAGE.

0605					36,3017	13 020	1		NOOP		
0606	REF	42	LAST	751	4752				BLANKDEX	=	TWD
0607	REF	195	LAST	753	36,3020	0 4616	1	-2	TC	BANKCALL	
0608	REF	2	LAST	743	36,3021	20334	1		CADR	CLEANDSP	
0609	REF	116	LAST	752	36,3022	1 5155	1		DISPNOT	TCF	ENDOFJOB

NEGATIVE OF THIS IS PROPER FOR DISPDEX

BLANK DSKY. THE DSKY IS BLANKED FOR
 5 SECONDS AT TIG-35 TO INDICATE THAT
 AVERAGE G IS STARTING.

0610	REF	1			36,3023	0 3025	0		STOPCLOCK	TC	NULLCLOCK
0611	REF	26	LAST	738	36,3024	1 6001	1		TCF	TCF	GOTOPPOH
0612					36,3025	0 0004	0		NULLCLOCK	INHINT	
0613					36,3026	0 0006	1			EXTEND	
0614	REF	1			36,3027	23'142	1		QXCH	P40/RET	
0615	REF	2	LAST	748	36,3030	0 2656	0		TC	NOULLAGE	
0616	REF	9	LAST	750	36,3031	0 6027	1		TC	KILLTASK	
0617	REF	3	LAST	744	36,3032	74337	0		CADR	ULLGTASK	
0618	REF	37	LAST	750	36,3033	0 5353	1		TC	PHASCHNG	
0619					36,3034	00001	0		OCT	1	
0620	REF	18	LAST	749	36,3035	3 0005	1		CA	Z	
0621	REF	15	LAST	752	36,3036	55'163	0		TS	DISPDEX	
0622	REF	2	LAST	753	36,3037	0 1142	1		TC	P40/RET	

STOP CLOKTASK & TURN OFF ULLAGE ON THE
 WAY TO P00 (GOTOPPOH RELINTS)

TURN OFF ULLAGE...
 DON'T LET IT COME ON, EITHER...
 NOT EVEN IF THERE'S A RESTART.

KILL CLOKTASK

06222	REF	38	LAST	753	36,3040	0 5353	1		ASTNRETN	TC	PHASCHNG
06224					36,3041	04024	0		OCT	04024	
0623	REF	137	LAST	752	36,3042	3 4755	1		CAF	ZFRO	
06231	REF	16	LAST	753	36,3043	55'163	0		TS	DISPDEX	
06232	REF	1			36,3044	3 5023	0		CAF	PRIO13	
0625	REF	27	LAST	745	36,3045	0 5105	0		TC	FINDVAC	
0626	REF	2	LAST	139	E5,1757				EBANK=	STARIND	
0627	REF	1			36,3046	03203	0		2CADR	ASTNRET	
0627	REF	1			36,3047	64065	0				
0628	REF	117	LAST	753	36,3050	1 5155	1		TCF	ENDOFJOB	

STOP DISPLAYING BUT KEEP RUNNING.

0629	REF	42	LAST	750	36,3051	0 5504	0		*PROCEED	TC	UPFLAG
0630	REF	3	LAST	748	36,3052	00154	1		ADRES	ADRES	ASTNFLAG

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0631	REF	1		36,3053	1 3112 1	TCF	IGNITE
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0632				36,3054	0 0004 0	*ENTER	INHINT
0633	REF	1B	LAST	753	36,3055	51'453 1	INDEX WHICH
0634				36,3056	1 0003 0	TCF	3

0635	REF	2	LAST	226	36,3057	3 4644 0	GOPOST	CAF	PRI012	(3) MUST BE LOWER PRIORITY THAN CLOKJOB
0636	REF	2B	LAST	753	36,3060	0 5105 0		TC	FINDVAC	
0637	REF	21	LAST	752	E7,1451			EBANK=	TTOGC	
0638	REF	2	LAST	256	36,3061	03223 1		2CADR	POSTBURN	
0638					36,3062	74067 0				
06382					36,3063	0 0004 0		INHINT		SET UP THE DAP FOR COASTING FLIGHT.
06383	REF	25	LAST	750	36,3064	0 4674 0		TC	IBNKCALL	
06384	REF	2	LAST	244	36,3065	40204 0		CADR	ALLCCAST	
0639	REF	2	LAST	753	36,3066	0 3025 0		TC	NULLCLOK	
0640	REF	39	LAST	753	36,3067	0 5353 1		TC	PHASCHNG	4.13 RESTART FOR POSTBURN
0641					36,3070	00134 1		OCT	00134	

0642	REF	118	LAST	753	36,3071	1 5155 1	TCF	ENDOFJOB
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0643	REF	3	LAST	743	36,3072	3 5027 1	GOCUTOFF	CAF	PRI017	(3)
0644	REF	29	LAST	754	36,3073	0 5105 0		TC	FINDVAC	
0645	REF	5	LAST	746	E7,1514			EBANK=	TGO	
0646	REF	1			36,3074	03261 1		2CADR	CUTOFF	
0646	REF	1			36,3075	56067 0				
0649	REF	5B	LAST	749	36,3076	0 5516 0		TC	DOWNFLAG	
0650	REF	3	LAST	749	36,3077	00175 1		ADRES	FLUNDISP	

06502					36,3100	0 0004 0		INHINT		SET UP THE DAP FOR COASTING FLIGHT.
06504	REF	26	LAST	754	36,3101	0 4674 0		TC	IBNKCALL	
06506	REF	3	LAST	754	36,3102	40204 0		CADR	ALLCCAST	
0651	REF	3	LAST	754	36,3103	0 3025 0		TC	NULLCLOK	
0652	REF	40	LAST	754	36,3104	0 5353 1		TC	PHASCHNG	
0653					36,3105	07024 0		OCT	07024	
0654					36,3106	17000 1		OCT	17000	
0655	REF	6	LAST	754	E7,1514			EBANK=	TGO	
0656	REF	2	LAST	754	36,3107	03261 1		2CADR	CUTOFF	
0656					36,3110	56067 0				
0657	REF	119	LAST	754	36,3111	1 5155 1	TCF	ENDOFJOB		

0658	REF	11	LAST	747	36,3112	4 0103 1	IGNITE	CS	FLAGWRD7	(2)
0659	REF	2	LAST	745	36,3113	7 4737 1		MASK	IGNFLRIT	
0660	REF	223	LAST	752	36,3114	10 000 0		CCS	A	
0661	REF	1			36,3115	1 3126 0		TCF	IGNITE1	
0662	REF	39	LAST	750	36,3116	3 4753 1		CAF	BIT1	
0663					36,3117	0 0004 0		INHINT		

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0664	REF	18	LAST	751	36,3120	0 5173 1	TC	TWIDDLE	
0665	RFF	2	LAST	256	36,3121	02411 1	ADRES	IGNITION	
0666	REF	1			36,3122	3 4360 0	CAF	OCT23	IMMEDIATE RESTART AT IGNITION.
0667	REF	100	LAST	751	36,3123	54 001 1	TS	L	
0668					36,3124	4 0000 0	COM		
0669	REF	5	LAST	748	36,3125	52 761 0	DXCH	-PHASE4	
0670	REF	4	LAST	749	36,3126	4 4747 0	IGNITE1	CS	CNIDNDEX
0671	REF	17	LAST	753	36,3127	55'163 0	TS	DISPDEX	RESTORE OLD DISPLAY.
0672	REF	120	LAST	754	36,3130	1 5155 1	TCF	ENDOFJOB	

R0673

0674					31,2172		BANK	31	
0675	REF	1			35,2000		SETLOC	P40S2	
0676					35,3707		BANK		
0677	REF	1					COUNT*	\$\$/P40	
0688	REF	10	LAST	751	35,3707	0 4645 1	P40AUTD	TC	MAKFCADR
0689	RFF	4	LAST	487	35,3710	55'164 1		TS	TEMPR60
0690	REF	196	LAST	753	35,3711	0 4616 1	P40A/P	TC	BANKCALL
0691	REF	2	LAST	487	35,3712	54233 1		CADR	G+N,AUTO
0692	REF	224	LAST	754	35,3713	10 000 0		CCS	A
0693	REF	1			35,3714	1 3726 0		TCF	TURNITON
0694	REF	7	LAST	310	35,3715	3 4737 0		CAF	APSFLEBIT
0695	REF	11	LAST	310	35,3716	7 0106 1		MASK	FLGWRD10
0696	REF	225	LAST	755	35,3717	10 000 0		CCS	A
0697	REF	1			35,3720	1 3733 1		TCF	GOBACK
0698	REF	32	LAST	726	35,3721	3 4747 1		CAF	RIT5
0699					35,3722	0 0006 1		EXTEND	
0700	REF	5	LAST	529	35,3723	02 030 0		RAND	CHAN30
0701					35,3724	0 0006 1		EXTEND	
0702	REF	2	LAST	755	35,3725	1 3733 1		BZF	GOBACK
0703	REF	1			35,3726	3 3735 0	TURNITON	CAF	P40A/PMD
0704	REF	197	LAST	755	35,3727	0 4616 1		TC	BANKCALL
0705	REF	3	LAST	523	35,3730	20476 0		CADR	GOPERF1
0706	REF	27	LAST	753	35,3731	1 6001 1		TCF	GCTDPOOH
0707	REF	1			35,3732	1 3711 1		TCF	P40A/P
0710	REF	5	LAST	755	35,3733	3 1164 0	GOBACK	CA	TEMPR60
0711	REF	13	LAST	751	35,3734	0 4640 1		TC	BANKJUMP
0712					35,3735	00203 0	P40A/PMD	DCT	00203
0714					36,3131		BANK	36	
0715	REF	4	LAST	739	36,2000		SETLOC	P40S	

HELLO THERE.
 FOR GENERALIZED RETURN TO OTHER BANKS.
 SUBROUTINE TO CHECK PGNC'S CONTROL
 AND AUTO STABILIZATION MODES
 +0 INDICATES IN PGNC'S, IN AUTO
 + INDICATES NOT IN PGNC'S AND/OR AUTO
 ARE WE ON THE DESCENT STAGE?

RETURN
 YES, CHECK FOR AUTOTHROTTLE MODE

IN AUTOTHROTTLE MODE -- RETURN
 DISPLAY V50N25 R1=203 PLEASE PERFORM
 CHECKLIST 203 TURN ON PGNC'S ETC.

V34E TERMINATE
 RECYCLE

GOODBYE. COME AGAIN SOON.

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0716 36,3131

BANK

0717 REF 4 LAST 739 TO 755: 583 601* COUNT* \$\$/P40

R0718 *****
 R0719 CONSTANTS FOR THE IGNITION ROUTINE
 R0720 *****

0721 REF 1 36,2103 SERVCADR = P63TABLE +7

0722 REF 1 36,3131 02036 0 P40ADRES ADRES P40TABLE

0723 REF 1 36,3132 02045 1 P41ADRES ADRES P41TABLE -5

0724 REF 1 36,3133 02060 0 P42ADRES ADRES P42TABLE

0725 REF 3 LAST 747 E7,1620 EBANK= WCHPHASE

0726 REF 1 36,3134 03437 1 DSP2CADR 2CADR P63DISPS -2

0726 REF 1 36,3135 62067 1

0727 REF 4 LAST 756 E7,1620 EBANK= WCHPHASE

0728 REF 1 36,3136 02522 0 LUNLANAD 2CADR LUNLAND

0728 REF 1 36,3137 62067 1

07282 REF 22 LAST 749 E7,1513 EBANK= DVCNTR

07284 REF 1 36,3140 03637 0 ATMAGADR 2CADR ATMAG

07284 REF 1 36,3141 70067 1

0730 REF 28 LAST 755 6001 ? = GOTOPOOH

0731 36,3142 00000 1 D29.9SEC 2DEC 2990

0731 36,3143 05656 1

0732 36,3144 04672 0 S24.9SEC DEC 2490

0733 36,3145 00752 1 4.9SEC DEC 490

0734 REF 33 LAST 755 4747 OCT20 = BIT5

0735 36,3146 24020 0 VB99CON OCT 24020

BITS 5, 12, AND 14

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P0737 KILLTASK
 R0738 MOD NC: NEW PROGRAM
 R0739 MOD BY: COVELLI

R0740 FUNCTIONAL DESCRIPTION:

R0741 KILLTASK IS USED TO REMOVE A TASK FROM THE WAITLIST BY SUBSTITUTING ANULL TASK CALLED 'NULLTASK' (OF COURSE),
 R0743 WHICH MERELY DOES A TC TASKOVER. IF THE SAME TASK IS SCHEDULED MORE THAN ONCE, ONLY THE ONE WHICH WILL OCCUR
 R0745 FIRST IS REMOVED. IF THE TASK IS NOT SCHEDULED, KILLTASK TAKES NO ACTION AND RETURNS WITH NO ALARM. KILLTASK
 R0747 MUST BE CALLED IN INTERRUPT OR WITH INTERRUPT INHIBITED.

R0748 CALLING SEQUENCE:

A0749	L-1	(INHINT)	
A0750	L	TC	KILLTASK
A0751	L+1	CADR	????????
A0752	L+2	(RELINT)	

IN FIXED-FIXED
 CADR (NOT 2CADR) OF TASK TO BE REMOVED.
 RETURN

R0753 EXIT PCDE: AT L+2 OF CALLING SEQUENCE.

R0754 ERASABLE INITIALIZATION= NONE.

R0755 OUTPUT: 2CADR OF NULLTASK IN LST2

R0756 DEBRIS: ITEMPL - ITEMPL4, A,L,Q.

0757	REF	19	LAST	236	E3,1410		EBANK= LST2	
0758					6027		BLOCK 3	KILLTASK MUST BE IN FIXED-FIXED.
0759	REF	2	LAST	526	6000		SETLOC FFTAG6	
0760					6027		BANK	
0761	REF	1					COUNT* \$\$/KILL	
0762	REF	1			6027	3 6035 1	KILLTASK	CA KILLBB
0763	REF	226	LAST	755	6030	22 000 1	LXCH	A
0764	REF	191	LAST	751	6031	50 002 0	INDEX	Q
0765					6032	3 0000 1	CA	0
0766	REF	18	LAST	595	6033	22 006 1	LXCH	BRANK
0767	REF	1			6034	1 2223 1	TCF	KILLTSK2

GET CADR.
 CONTINUE IN SWITCHED FIXED

0768	REF	20	LAST	757	E3,1410		EBANK= LST2	
0769	REF	2	LAST	757	6035	56063 1	BBCON	KILLTSK2

0770					27,2223		BANK	27
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0771	REF	3	LAST	59	27,2000		SETLOC	P40S1
0772					27,2223		BANK	
0773	REF	1					COUNT*	\$/KILL

0774	REF	10	LAST	555	27,2223	22 062 0	KILLTSK2	LXCH	ITEMP2	SAVE CALLER'S BBANK
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0775	REF	192	LAST	757	27,2224	24 002 0		INCR	Q		
0776					27,2225	0 0006 1		EXTEND			
0777	REF	29	LAST	622	27,2226	22 061 0		QXCH	ITFMP1	RETURN 2CADR IN ITEMP1, ITEMP2	
0778	REF	16	LAST	571	27,2227	54 063 0		TS	ITFMP3	CADR IS IN A	
0779	REF	5	LAST	468	27,2230	7 5012 0		MASK	LCW10		
0780	RFF	28	LAST	607	27,2231	6 4741 1		AD	BIT11		
0781	RFF	7	LAST	570	27,2232	54 064 1		TS	ITFMP4	GENADR OF TASK	
0782	REF	6	LAST	758	27,2233	4 5012 0		CS	LOW10		
0783	RFF	17	LAST	758	27,2234	7 0063 0		MASK	ITEMP3		
0784	REF	18	LAST	758	27,2235	54 063 0		TS	ITEMP3	FBANK OF TASK	
0785					27,2236	22 007 0		ZL			
0786	REF	101	LAST	755	27,2237	50 001 0	ADRSCAN	INDEX	L		
0787	REF	21	LAST	757	27,2240	4 1410 1		CS	LST2		
0788	REF	8	LAST	758	27,2241	6 0064 0		AD	ITFMP4	COMPARE GFNADRS	
0789					27,2242	0 0006 1		EXTEND			
0790	REF	1			27,2243	1 2255 0		BZF	TSTFBANK	IF THEY MATCH, COMPARE FBANKS	
0791	REF	1			27,2244	4 4747 0	LETITLIV	CS	LSTLIM		
0792	RFF	102	LAST	758	27,2245	6 0001 0		AD	L		
0793					27,2246	0 0006 1		EXTEND		ARE WE DONE?	
0794	RFF	1			27,2247	1 2253 0		BZF	DFAD	YES - DONE, SO RETURN	
0795	RFF	103	LAST	758	27,2250	24 001 0		INCR	L		
0796	RFF	104	LAST	758	27,2251	24 001 0		INCR	L		
0797	REF	1			27,2252	1 2237 1		TCF	ADRSCAN	CONTINUE LOOP.	
0798	REF	30	LAST	758	27,2253	52 062 1	DEAD	DXCH	ITFMP1		
0799					27,2254	52 006 0		DTCB			
0800	RFF	7	LAST	758	27,2255	4 5012 0	TSTFBANK	CS	LOW10		
0801	RFF	105	LAST	758	27,2256	50 001 0		INDEX	L		
0802	RFF	22	LAST	758	27,2257	7 1411 0		MASK	LST2 +1	COMPARE FBANKS ONLY.	
0803					27,2260	0 0006 1		EXTEND			
0804	REF	19	LAST	758	27,2261	60 063 1		SU	ITEMP3		
0805					27,2262	0 0006 1		EXTEND			
0806	REF	1			27,2263	1 2265 0		BZF	KILLDEAD	MATCH - KILL IT.	
0807	REF	1			27,2264	1 2244 0		TCF	LETITLIV	NO MATCH - CONTINUE.	
0808	RFF	1			27,2265	3 4353 0	KILLDFAD	CA	TCTSKOVR		
0809	REF	106	LAST	758	27,2266	50 001 0		INDEX	L		
0810	REF	23	LAST	758	27,2267	55 410 1		TS	LST2	REMOVE TASK BY INSERTING TASKOVR	
0811	RFF	2	LAST	758	27,2270	1 2253 0		TCF	DFAD		
0812	REF	34	LAST	756	4 747		LSTLIM	EQUALS	BIT5	DEC 16	

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P0001 PROGRAM DESCRIPTION P40BOTH DECEMBER 22, 1966
R0002 MOD 03 BY PETER ADLER MARCH 3, 1967
R0003 CALLED VIA JOB FROM V37E

R0004 FUNCTIONAL DESCRIPTION

R0005 1) TO COMPUTE A PREFERRED IMU ORIENTATION AND A PREFERRED VEHICLE ATTITUDE FOR A LM OPS
R0007 THRUSTING MANEUVER.

R0008 3) TO DO THE VEHICLE MANEUVER TO THE THRUSTING ATTITUDE.

R0009 4) TO CONTROL THE PGNC'S DURING COUNTDOWN, IGNITION, THRUSTING, AND THRUST TERMINATION OF A
R0011 PGNC'S CONTROLLED DPS MANEUVER.

R0012 5) IN POSTBURN--ZERO RENDEZVOUS COUNTER, MAINTAIN VG CALCULATIONS FOR POSSIBLE RCS MANEUVER,
R0014 SET MAXIMUM DEADBAND IN DAP, RESET STEERLAW CSTEER TO ZERO.

R0016 NOTE: P42, WHICH IS IN THIS LOG SECTION, DOES THE SAME FOR AN APS BURN, AND P41 DOES 1-3 FOR
R0018 RCS PLUS DISPLAYS PARAMETERS FOR MANUAL CONTROL.

R0019 SUBROUTINES USED

R0020 R02 IMU STATUS CHECK
R0021 S40.1 COMPUTATION OF THRUST DIRECTION
R0022 S40.13 LENGTH OF BURN
R0023 S40.2,3 PREFERRED IMU ORIENTATION
R0024 S40.8 X PRODUCT STEERING
R0025 S40.9 LAMBERT VTGAIN
R0026 R60LEM ATTITUDE MANEUVER
R0027 LEMPREC EXTRAPOLATE STATE VECTOR
R0028 PREREAD AVERAGE G, SERVICER
R0029 ALLCOAST OAP COASTING INITIALIZATION
R0030 CLOKTASK ERGO CLOCKJOB--COUNT DOWN
R0031 PHASCHNG, INTPRET, FLAGUP, FLAGDOWN, WAITLIST, LONGCALL, GOFLASH, GOFLASHR, GOPERF1, ALARM,
R0033 PRIOLARM, GOTOPOOH, ENDOFJOB, BANKCALL, SETMAXDB, SETMINDB, CHECKMM, FLATOUT, OUTFLAT,
R0035 KILLTASK, SGNAGREE, TPAGREE, ETC.

R0036 RESTARTS VIA GROUP 4

R0037 DISPLAYS

R0038 V50N25 203 A/P TO PGNC'S, AUTO THROTTLE MODE, AUTO ATTITUDE CONTROL
R0040 V06N40 TTI, VG, DELTAVM (DISPLAYED ONCE/SECOND BY CLOKTASK)
R0041 V50N99 PLEASE PERFORM ENGINE ON ENABLE
R0042 V06N40 TG (TIME TO GO TO CUTOFF), VG, DELTAVM--ONCE/SECOND
R0043 V16N40 FINAL VALUES OF TG, VG, DELTAVM
R0044 V16N85 COMP OF VG (BODY AXES) FOR POSS. RCS MANUAL MANEUVER
R0045 V05N09 POSSIBLE ALARMS
R0046 V50N07 PLEASE SELECT P00

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R0047 VIA R30

R0048 V06N44 HAPD, PFRI, TFF
 R0049 V06N35 TIME TO PERIGEE, HMS

R0050 ALARM OR ABORT EXIT MODES

R0051 PROGRAM ALARM, FLASHING DISPLAY OF ALARM CODE 1706 IF P40 SELECTED WITH DESCENT UNIT STAGED.
 R0053 V34E (TERMINATE) IS THE ONLY RESPONSE ACCEPTED. TC GOTOP00H.

R0054 PROGRAM ALARM, FLASH CODE 1703: TIG LESS THAN 45 SECS AWAY. V34E= GOTOP00H OR V33E= SLIP
 R0056 TIG BY 45 SECS.

R0057 ERASABLE INITIALIZATION
 R0058 DEBRIS
 R0059 OUTPUT

R0060 SEE SUBROUTINES E.G.: S40.1, S40.2,3, S40.13, S40.8, S40.9, TRIMGIMB
 R0062 XDELVFLG = 1 FOR EXT DELV COMPUTATION
 R0063 = 0 FOR AIMPT (LAMBERT) COMP

0064 REF 2 LAST 53 TO 53: 10 10* COUNT* \$\$/P40
 0065 REF 19 LAST 754 F7,1453 EBANK= WHICH

0066 36,3147 BANK 36
 0067 REF 5 LAST 755 36,2000 SETLOC P40S
 0068 36,3147 BANK

0069 REF 41 LAST 754 36,3147 0 5353 1 P40LM TC PHASCHNG
 00692 36,3150 04024 0 OCT 04024

00694 REF 1 36,3151 3 3131 1 CAF P40ADRES INITIALIZATION FOR BURNBABY.
 0070 REF 20 LAST 760 36,3152 55*453 0 TS WHICH

0071 REF 12 LAST 755 36,3153 3 0106 0 CA FLGRD10
 0072 REF 8 LAST 755 36,3154 7 4737 1 MASK APSFLBIT
 0073 REF 227 LAST 757 36,3155 10 000 0 CCS A
 0074 REF 1 36,3156 1 3722 1 TCF P40ALM
 0079 REF 198 LAST 755 36,3157 0 4616 1 TC BANKCALL
 0080 REF 5 LAST 514 36,3160 11175 1 CADR R02BOTH

GO DO IMU STATUS CHECK ROUTINE.

00801 REF 24 LAST 750 36,3161 4 0111 1 CS DAPBCOLS INITIALIZE DVMON
 00802 REF 5 LAST 309 36,3162 7 4737 1 MASK CSMDCKD
 00803 REF 228 LAST 760 36,3163 10 000 0 CCS A
 00804 REF 1 36,3164 3 2020 1 CAF THRESH1
 00805 REF 1 36,3165 6 2021 0 AD THRESH3
 00806 REF 2 LAST 121 36,3166 55*251 1 TS DVTHRUSH
 00807 REF 11 LAST 749 36,3167 3 4751 0 CAF FOUR
 00808 REF 23 LAST 756 36,3170 55*513 0 TS DVCNTR

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0081	REF	56	LAST	743	36,3171	0 6036 1	TC	INTPRET	LOAD CONSTANTS FOR DPS BURN
0082					36,3172	43175 0	VLOAD	CLEAR	LOAD F, MDOT, TDECAY
0083	REF	1			36,3173	34001 1		FDPS	
0084	REF	1			36,3174	02663 0		NOTHROTL	
0085	REF	2	LAST	158	36,3175	03734 1	STORF	F	
00852					36,3176	77735 0	SLOAD		
00854	REF	1			36,3177	26002 1		DPSVEX	
00856					36,3200	70476 0	P40IN	DCOMP SR1	
0086	REF	1			36,3201	37742 1	STCALL	VEX	LOAD EXHAUST VELOCITY FOR TGO COMP.
0087	REF	1			36,3202	56271 0		S40.1	COMPUTES UT AND VGTIG
0088					36,3203	77624 1	CALL		
0089	REF	1			36,3204	56436 0		S40.2,3	COMPUTES PREFERRED IMU ORIENTATION
0090					36,3205	77776 1	EXIT		
00901					36,3206	0 0004 0	INHINT		
00902	REF	27	LAST	754	36,3207	0 4674 0	TC	IBNKCALL	
00903	REF	1			36,3210	40142 1	CADR	PFLITEDB	ZERO ATTITUDE EPRORS, SET DB TO ONE DEG.
0091	REF	1			36,3211	0 3213 1	TC	P40SXT4	
R0092									
0093	REF	1			36,3212	1 2124 0	TCF	BURNBABY	
R0094									
0095					36,3213	0 0006 1	P40SXT4	EXTEND	
0096	REF	3	LAST	753	36,3214	23'142 1		QXCH P40/RET	
0100					36,3215	0 0003 1	P41MANU	RELINT	
0101	REF	59	LAST	754	36,3216	0 5516 0	TC	DOWNFLAG	CLEAR 3AXISFLG -- R60 WILL USE VECPOINT.
0102	REF	6	LAST	530	36,3217	00124 0	ADRES	3AXISFLG	
0103	REF	199	LAST	760	36,3220	0 4616 1	TC	BANKCALL	
0104	REF	4	LAST	530	36,3221	54101 0	CADR	R60LEM	DO ATTITUDE MANEUVER ROUTINE
0105	REF	4	LAST	761	36,3222	0 1142 1	TC	P40/RET	
0106	REF	7	LAST	748	E7,1460		EBANK=	TRKMKCNT	
0107	REF	19	LAST	753	36,3223	3 0005 1	POSTBURN	CA Z	
0108	REF	18	LAST	755	36,3224	55'163 0	TS	DISPDEX	
0109					36,3225	0 0006 1		EXTEND	
0110	REF	1			36,3226	3 2055 0	DCA	ACADN85	
0111	REF	5	LAST	748	36,3227	53'253 0	DXCH	AVEGEXIT	
0112	REF	1			36,3230	3 3743 1	CAF	V16N40	
0113	REF	200	LAST	761	36,3231	0 4616 1	TC	BANKCALL	
0114	REF	7	LAST	753	36,3232	20510 1	CADR	GOFLASHR	
0115	REF	1			36,3233	0 3256 0	TC	TERM40	
0116	REF	2	LAST	748	36,3234	1 3241 1	TCF	TIGNOW	
0117	REF	3	LAST	754	36,3235	0 3223 1	TC	POSTBURN	

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0118	RFF	42	LAST	760	36,3236	0 5353	1	P40PHS1	TC	PHASCHNG
0119					36,3237	00014	1		OCT	00014
0120	RFF	121	LAST	755	36,3240	1 5155	1		TCF	ENDOFJOB

0121					36,3241	0 0004	0	TIGNOW	INHINT	
01211	REF	28	LAST	761	36,3242	0 4674	0		TC	IBNKCALL
01212	REF	4	LAST	530	36,3243	40153	1		CADR	ZATTEROR
0122	RFF	29	LAST	762	36,3244	0 4674	0		TC	IBNKCALL
0123	RFF	3	LAST	530	36,3245	40140	0		CADR	SETM INDB
0124					36,3246	0 0003	1		RFLINT	
0125	REF	2	LAST	743	36,3247	3 3744	0		CAF	V16N85B
0126	REF	201	LAST	761	36,3250	0 4616	1		TC	BANKCALL
0127	REF	1			36,3251	20340	1		CADR	REFLASHR
0128	REF	2	LAST	761	36,3252	0 3256	0		TC	TERM40
0129	REF	3	LAST	762	36,3253	1 3256	1		TCF	TERM40
0130					36,3254	0 3247	0		TC	-5

01305	REF	1			36,3255	1 3236	1		TCF	P40PHS1
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0131					36,3256	0 0006	1	TERM40	EXTEND	
0132	REF	1			36,3257	3 2104	0		DCA	SERV CADR
0133	RFF	6	LAST	761	36,3260	53'253	0		DXCH	AVFGEXIT
0134	RFF	138	LAST	753	36,3261	3 4755	1		CAF	ZFRO
0135	REF	8	LAST	761	36,3262	55'460	0		TS	IRKMKCNT
0136	REF	20	LAST	761	36,3263	3 0005	1		CA	Z
0137	REF	19	LAST	761	36,3264	55'163	0		TS	DISPDEX
0138					36,3265	0 0004	0		INHINT	
0139	REF	30	LAST	762	36,3266	0 4674	0		TC	IBNKCALL
0140	RFF	6	LAST	530	36,3267	40123	0		CADR	RESTORDE
0141					36,3270	0 0003	1		RELINT	
0142	RFF	29	LAST	756	36,3271	0 6001	0		TC	GOTOPPOH

ZERO RENDZVS CNTERS.

0143	REF	21	LAST	760	F7,1453				EBANK=	WHICH
0144	RFF	1							COUNT*	\$/P41
0145	RFF	1			36,3272	3 3132	1	P41LM	CAF	P41ADRES
0146	RFF	22	LAST	762	36,3273	55'453	0		TS	WHICH

INITIALIZATION FOR BURNBABY

0147	REF	202	LAST	762	36,3274	0 4616	1		TC	BANKCALL
0148	RFF	6	LAST	760	36,3275	11175	1		CADR	RO2BOTH

0149	RFF	97	LAST	761	36,3276	0 6036	1		TC	INTPRET
0150					36,3277	71214	0		BON	DLOAD
0151	REF	1			36,3300	00700	0			NJETSFLG
0152	REF	1			36,3301	75305	0			P41FJET1
0153	REF	1			36,3302	34015	1			FEC54

BOTH LM

IF NJETSFLAG IS SET, LOAD 2 JET F

IF NJETSFLAG IS CLEAR, LOAD 4 JET F

0154	REF	3	LAST	761	36,3303	37734	0	P41FJET	STCALL	F
0155	REF	1			36,3304	75310	1			P41IN

0156					36,3305	77745	1	P41FJET1	DLOAD	
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0157	REE	1		36,3306	34017	0		ERCS2	
0158	REF	4	LAST	762	36,3307	03734	1	STORE	E
0159					36,3310	77624	1	P41IN	CALL
0160	REF	2	LAST	761	36,3311	56271	0		S40.1
0164					36,3312	77624	1	P41NORM	CALL
0165	REF	2	LAST	761	36,3313	56436	0		S40.2,3
0166					36,3314	77776	1	EXIT	
CALCULATE PREFERRED IMU ORIENTATION AND SET PERATFLG.									
0169					36,3315	0 0004	0	INHINT	
0170	REE	31	LAST	762	36,3316	0 4674	0	TC	IRNKCALL
0171	REE	5	LAST	762	36,3317	40153	1	CADR	ZATTEROR
0172	REF	32	LAST	763	36,3320	0 4674	0	TC	IRNKCALL
0173	REF	4	LAST	762	36,3321	40140	0	CADR	SETMINDB
0174	REE	2	LAST	761	36,3322	0 3213	1	TC	P40SXT4
SFT 0.3 DEGREE DEADBAND									
0175	REF	98	LAST	762	36,3323	0 6036	1	TC	INTPRET
0176					36,3324	45175	0	VLOAD	CALL
0177	REE	4	LAST	211	36,3325	03705	0		VGTIG
0178	REF	1			36,3326	57156	1		S41.1
0179	REF	6	LAST	331	36,3327	03500	1	STORE	VGBODY
0180					36,3330	77776	1	EXIT	
TRANSEORM VELOCITY-TO-BE-GAINED AT TIG FROM REFERENCE COORDINATES TO LM BODY-AXIS COORDINATES FOR V16N85 DISPLAY. (SCALED AT 2 (+7) METERS/CENTISECOND)									
0181	REF	3	LAST	762	36,3331	3 3744	0	CAE	V16N85B
0182	REE	203	LAST	762	36,3332	0 4616	1	TC	BANKCALL
0183	REE	1			36,3333	20324	0	CADR	GODSPRET
01831	REE	6	LAST	712	36,3334	3 5017	1	CAF	PRI05
01832	REF	20	LAST	762	36,3335	55'163	0	IS	DISPDEX
01833	REF	30	LAST	754	36,3336	0 5105	0	TC	FINDVAC
01834	REE	3	LAST	258	E7,1704			EBANK=	VGPREV
01835	REE	1			36,3337	03361	0	2CADR	DYNMDISP
01835	REE	1			36,3340	74067	0		
01836	REE	8	LAST	751	36,3341	0 5327	1	TC	2PHSCHNG
0184					36,3342	00076	0	OCT	00076
0185					36,3343	04024	0	OCT	04024
GROUP 6 RESTARTS AT REDD06.7 GROUP 4 RESTARTS HERE									

R0186
0187 REF 1 36,3344 1 2133 0
A01871

TCE B*PNB*B*

01872	REF	13	LAST	751	36,3345	3 4777	1	BLNKWAIT	CAF	1SEC
01873	REF	204	LAST	763	36,3346	0 4616	1	TC	BANKCALL	
01874	REE	13	LAST	726	36,3347	01735	1	CADR	DELAYJOB	

01875	REF	21	LAST	763	36,3350	3 1163	1	REDD0.7	CA	DISPDEX	ON A RESTART, DO NOT PUT UP DISPLAY IF
01876	REF	43	LAST	753	36,3351	6 4752	0		AD	TWO	BLANKING (BETWEEN TIG-35 AND TIG-30)

R0188 *****

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018801					36,3352	0 0006	1		EXTEND	
018802	REF	1			36,3353	1 3345	1		8ZF	8LNKWAIT
018803	REF	4	LAST	763	36,3354	3 3744	0		CAF	V16N85B
018804	REF	205	LAST	763	36,3355	0 4616	1		TC	BANKCALL
018805	REF	2	LAST	763	36,3356	20324	0		CADR	GODSPRET
018806	REF	7	LAST	763	36,3357	3 5017	1		CAF	PRI05
018807	REF	10	LAST	508	36,3360	0 5146	1		TC	PRI0CHNG
018808	REF	22	LAST	763	36,3361	3 1163	1	DYNMDISP	CA	DISPDEX
018809					36,3362	0 0006	1		EXTEND	
01881	REF	122	LAST	762	36,3363	6 5155	0		8ZMF	ENDOFJ08
018811	REF	99	LAST	763	36,3364	0 6036	1		TC	INTPRET
018812					36,3365	45175	0		VLOAD	CALL
018813	REF	4	LAST	763	36,3366	03705	0			VGPREV
018814	REF	2	LAST	763	36,3367	57156	1			S41.1
018815	REF	7	LAST	763	36,3370	03500	1		STORE	VG80DY
018816					36,3371	77776	1		EXIT	
018817	REF	14	LAST	763	36,3372	3 4777	1		CAF	1SEC
018818	REF	206	LAST	764	36,3373	0 4616	1		TC	BANKCALL
018819	REF	14	LAST	763	36,3374	01735	1		CADR	DELAYJ08
01882	REF	2	LAST	763	36,3375	1 3361	1		TCF	DYNMDISP
0189	REF	100	LAST	764	36,3376	0 6036	1	CALCN85	TC	INTPRET
0190					36,3377	77624	1		CALL	
0191	REF	1			36,3400	75611	0			UPDATEVG
0192					36,3401	45175	0		VLOAD	CALL
0193	REF	5	LAST	764	36,3402	03705	0			VGPREV
0194	REF	3	LAST	764	36,3403	57156	1			S41.1
0195	REF	8	LAST	764	36,3404	03500	1		STORE	VG80DY
0196					36,3405	77776	1		EXIT	
0197	REF	40	LAST	744	36,3406	0 4635	0		TC	POSTJUMP
0198	REF	3	LAST	740	36,3407	77525	0		CADR	SERVEXIT
0199	REF	1							COUNT*	\$/P42
0200	REF	23	LAST	762	E7,1453				EBANK=	WHICH
0201	REF	43	LAST	762	36,3410	0 5353	1	P42LM	TC	PHASCHNG
02012					36,3411	04024	0		OCT	04024
02014	REF	1			36,3412	3 3133	0		CAF	P42ADRS
0202	REF	24	LAST	764	36,3413	55'453	0		TS	WHICH
0203	REF	13	LAST	760	36,3414	4 0106	1		CS	FLGWRD10
0204	REF	9	LAST	760	36,3415	7 4737	1		MASK	APSLBIT
0205	REF	229	LAST	760	36,3416	10 000	0		CCS	A
0208	REF	2	LAST	760	36,3417	0 3722	0		TC	P40ALM
0209	REF	207	LAST	764	36,3420	0 4616	1		TC	BANKCALL

A NON-POSITIVE DISPDEX INDICATES PAST
TIG-35, SO SERVICER WILL BE DOING THE
UPDATING OF NOUN 85. STOP DYNMDISP.

INITIALIZATION FOR 8URN8ABY.

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0210	REF	7	LAST	762	36,3421	11175	1		CADR	R02BOTH	
02101	REF	1			36,3422	3 6000	1		CAF	THRESH2	INITIALIZE DVMON
02102	REF	3	LAST	760	36,3423	55'251	1		TS	DVTHRUSH	
02103	REF	12	LAST	760	36,3424	3 4751	0		CAF	FOUR	
02104	REF	24	LAST	760	36,3425	55'513	0		TS	DVCNTR	
0211	REF	101	LAST	764	36,3426	0 6036	1		TC	INTPRET	
0212					36,3427	77214	0		SET	VLOAD	LOAD FAPS, MDOAPS, AND ATDECAY INTO
0213	REF	7	LAST	738	36,3430	01072	0			AVFLAG	F, MDO, AND TDECAY BY VECTOR LOAD.
0214	REF	1			36,3431	34007	1			FAPS	
0215	REF	5	LAST	763	36,3432	03734	1		STORE	F	
0216					36,3433	52135	1		SLOAD	GOTO	
02162	REF	1			36,3434	26001	1			APSVFX	
02164	REF	1			36,3435	75200	1			P40IN	
0217	REF	25	LAST	764	E7,1453				EBANK =	WHICH	
0218	REF	1							COUNT*	\$/P47	
0219	REF	208	LAST	764	36,3436	0 4616	1	P47LM	TC	BANKCALL	
0220	REF	8	LAST	765	36,3437	11175	1		CADR	R02BOTH	
0221	REF	102	LAST	765	36,3440	0 6036	1		TC	INTPRET	
0222					36,3441	77624	1		CALRB		
0223	REF	1			36,3442	27577	1			MIDTCAV2	
0224	REF	279	LAST	751	36,3443	3 0155	0		CA	MPAC +1	
0225	REF	19	LAST	755	36,3444	0 5173	1		TC	TWIDDLF	
0226	REF	1			36,3445	03447	0		ADRES	STARTP47	
02261	REF	123	LAST	764	36,3446	1 5155	1		TCF	ENDOFJOB	
0227	REF	44	LAST	764	36,3447	0 5353	1	STARTP47	TC	PHASCHNG	
02391					36,3450	05014	1		OCT	05014	
02392					36,3451	77777	0		OCT	77777	
02393					36,3452	0 0006	1		EXTEND		
0240	RFF	1			36,3453	3 3747	0		DCA	ACADN83	
0241	REF	7	LAST	762	36,3454	53'253	0		DXCH	AVEGFXIT	
0242	REF	5	LAST	745	36,3455	3 4736	1		CAF	PRI020	
0243	REF	31	LAST	763	36,3456	0 5105	0		TC	FINDVAC	
0244	REF	4	LAST	331	E7,1620				FBANK =	DELVIMU	
0245	REF	1			36,3457	03513	0		2CADR	P47BODY	
0245	REF	1			36,3460	74067	0				
0246	REF	2	LAST	255	36,3461	1 2333	1		TCF	REDO4.2	CHECKS PHASE 5 AND GOES TO PRERFAD
A0247											SEE TIG-30 IN BURNBABY.
0248	REF	103	LAST	765	36,3462	0 6036	1	CALCN83	TC	INTPRET	
0249					36,3463	53375	0		VLOAD	VAD	
0250	REF	1			36,3464	03500	1			DELVCTL	
0251	REF	2	LAST	162	36,3465	03525	0			DELVRFF	
0252	REF	12	LAST	735	36,3466	03654	0		STORE	DELVSIN	TFMP STORAGE FOR RESTARTS

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0253				36,3467	77624	1		CALL		
0254	REF	4	LAST	764	36,3470	57156	1		S4I.1	
0255	REF	5	LAST	765	36,3471	03621	1	STORE	DELVIMU	
0256					36,3472	77776	1	EXIT		
02561	REF	45	LAST	765	36,3473	0 5353	1	TC	PHASCHNG	
02562					36,3474	10035	0	OCT	1C035	REREADAC AND HERE
02563	REF	104	LAST	765	36,3475	0 6036	1	TC	INTPRET	
02564					36,3476	77775	1	VLOAD		
02565	REF	13	LAST	765	36,3477	03654	0		DELVSIN	
02566	REF	2	LAST	765	36,3500	03500	1	STORE	DELVCTL	
02567					36,3501	77776	1	EXIT		
0257	REF	41	LAST	764	36,3502	0 4635	0	TC	POSTJUMP	
0258	REF	4	LAST	764	36,3503	77525	0	CADR	SERVEXIT	
0259	REF	1			36,3504	3 3745	1	P47BOD	CAF	V1683
0260	REF	209	LAST	765	36,3505	0 4616	1		TC	BANKCALL
0261	REF	8	LAST	761	36,3506	20510	1		CADR	GCFLASHR
0262	REF	30	LAST	762	36,3507	0 6001	0		TC	GCTOPOCH
0263	REF	31	LAST	766	36,3510	0 6001	0		TC	GCTOPOCH
02631	REF	2	LAST	765	36,3511	1 3513	1		TCF	P47BODY
02632	REF	2	LAST	762	36,3512	1 3236	1		TCF	P40PHS1
0264	REF	105	LAST	766	36,3513	0 6036	1	P47BODY	TC	INTPRET
0265					36,3514	77775	1		VLOAD	
0266	REF	5	LAST	729	36,3515	06424	0			H16ZEROS
0267	REF	6	LAST	766	36,3516	03621	1	STORE	DELVIMU	
0268	REF	3	LAST	766	36,3517	03500	1	STORE	DELVCTL	
0269					36,3520	77776	1	EXIT		
0270	REF	1			36,3521	0 3504	0	TC	P47BOD	
0271	REF	5	LAST	756 TO	757:	14 615*		COUNT*	\$/P40	
0272	REF	7	LAST	754	36,3522	3 1515	1	IMPLBURN	CA	TGC +1
02721	REF	1			36,3523	0 3710	1		TC	GETDT
0273	REF	20	LAST	765	36,3524	0 5173	1		TC	TWIDDLE
0274	REF	2	LAST	256	36,3525	03542	1		ADRES	ENGOFTSK
0275	REF	60	LAST	761	36,3526	0 5516	0		TC	DOWNFLAG
0276	REF	3	LAST	748	36,3527	00153	0		ADRES	IGNFLAG
0277	REF	61	LAST	766	36,3530	0 5516	0		TC	DOWNFLAG
0278	REF	4	LAST	753	36,3531	00154	1		ADRES	ASTNFLAG
0279	REF	62	LAST	766	36,3532	0 5516	0		TC	DOWNFLAG
0280	REF	1			36,3533	00044	1		ADRES	IMPULSW
0281	REF	46	LAST	766	36,3534	0 5353	1		TC	PHASCHNG
0282					36,3535	40114	1	OCT	40114	RESTART PROTECT ENGOFTSK (ENGINEOFF)
0283	REF	13	LAST	751	36,3536	0 5221	0	TC	FIXDELAY	WAIT HALF A SECOND
0284					36,3537	00062	0	DEC	50	

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0285	REF	3	LAST	753	36,3540	0 2656 0	TC	NOULLAGE	TURN OFF ULLAGE
0286	REF	48	LAST	752	36,3541	0 5261 1	TC	TASKOVER	
0287	REE	33	LAST	763	36,3542	0 4674 0	ENGOF2SK	TC	IBNKCALL
0288	REF	1			36,3543	75545 1	CADR	ENGINEEE	THIS CODING ALLOWS ENGINEOFF ET AL TO BF
0289	REF	49	LAST	767	36,3544	0 5261 1	TC	TASKOVER	USED BOTH BY WAITLIST AND BY TC IBNKCALL
0290	REF	3	LAST	754	36,3545	3 4644 0	ENGINEOFF	CAF	PRIQ12
0291	REF	32	LAST	765	36,3546	0 5105 0	TC	FINDVAC	MUST BE LOWER PRIQ THAN CLOCKJOB
0292	REF	9	LAST	762	E7,1460		EBANK=	TRKMKCNT	
0293	REF	4	LAST	761	36,3547	03223 1	2CADR	POSTBURN	
0293					36,3550	74067 0			
0294	REE	40	LAST	754	36,3551	3 4753 1	ENGINEOF2	CAF	BIT1
0295	REF	32	LAST	724	36,3552	0 5203 0	TC	WAITLIST	
0296	REF	4	LAST	740	E6,1420		EBANK=	OMEGAQ	
0297	REF	1			36,3553	03606 1	2CADR	CCASTSET	
0297	REE	1			36,3554	74066 1			
0298	REF	12	LAST	754	36,3555	4 0103 1	ENGINEOF1	CS	FLAGWRD7
0299	REF	1			36,3556	7 4745 1	MASK	IDLEFBIT	SET THE IDLE BIT.
0300	REF	13	LAST	767	36,3557	26 103 1	ADS	ELAGWRD7	
0301	REF	4	LAST	767	36,3560	0 2656 0	TC	NOULLAGE	
0302					36,3561	0 0006 1	ENGINEOF4	EXTEND	
0303	REF	22	LAST	752	36,3562	3 0025 0	DCA	TIME2	
0304	REF	5	LAST	746	36,3563	53'345 0	DXCH	TEVENT	
0305	REF	4	LAST	746	36,3564	4 4745 1	ENGINEOF3	CS	ENGONBIT
03051	REF	20	LAST	747	36,3565	7 0101 0	MASK	FLAGWRD5	INSURE ENGONFLG IS CLEAR.
03052	REF	21	LAST	767	36,3566	54 101 0	TS	FLAGWRD5	
03053	REF	7	LAST	746	36,3567	4 4355 1	CS	PRIQ30	ENGINEOF3 IS USED AS A PRE-ENGINE ARM
0306					36,3570	0 0006 1	EXTEND		SUBROUTINE.
0307	REF	24	LAST	746	36,3571	02 011 0	RAND	DSALMOUT	
0308	REF	6	LAST	765	36,3572	6 4736 1	AD	PRIQ20	TURN OFF THE ENGINE - DPS OR APS
0309					36,3573	0 0006 1	EXTEND		
0310	REF	25	LAST	767	36,3574	01 011 0	WRITE	DSALMOUT	
0314	REF	25	LAST	760	36,3575	4 0111 1	CS	DAPBCOLS	TURN OFF TRIM GIMBAL
0315	REF	1			36,3576	7 4736 0	MASK	USFQRJTS	
0316	REF	26	LAST	767	36,3577	26 111 1	ADS	DAPRQOLS	
0317	REF	1			36,3600	4 4737 1	CS	HIRTHROT	ZERO AUTO-THROTTLE WHENEVER THE ENGINE
0319	REF	3	LAST	749	36,3601	54 055 0	TS	THRUST	IS TURNED OFF.
0320	REF	31	LAST	749	36,3602	3 4750 1	CAE	BIT4	THE HARDWARE DOES SO ONLY WHEN THE
0321					36,3603	0 0006 1	EXTEND		ENGINE IS DISARMED.
0322	REF	9	LAST	749	36,3604	05 014 1	WOR	CHAN14	
0323	REF	3	LAST	622	36,3605	0 4707 0	TC	ISWRETRN	

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0324	REF	34	LAST	767	36,3606	0 4674 0	COASTSET	TC	IBNKCALL	DO DAP COASTING INITIALIZATION
0325	REF	4	LAST	754	36,3607	40204 0		CADR	ALLCCAST	
0326	REF	50	LAST	767	36,3610	0 5261 1		TC	TASKCVER	
0327	REF	5	LAST	767	E6,1420				EBANK= OMEGAQ	
0328					36,3611	45020 1	UPDATEVG	STQ	CALL	
0329	REF	3	LAST	157	36,3612	03663 1			QTEMP1	
0330	REF	1			36,3613	56472 0			S40.8	X-PRODUCT STEERING
0331					36,3614	43014 0		BON	BOFSET	
0332	REF	6	LAST	735	36,3615	01307 1			XDELVFLG	
0333	REF	4	LAST	768	36,3616	03663 1			QTEMP1	
0334	REF	1			36,3617	01045 1			CYCLESW	
0335	REF	5	LAST	768	36,3620	03663 1			QTEMP1	
0336					36,3621	77776 1		EXIT		
03361	REF	1			36,3622	10 755 1		CCS	PHASE2	
03362	REF	1			36,3623	1 3636 0		TCF	ENDSTEER	GROUP 2 ACTIVE --> LAMBERT STILL GOING.
0337	REF	4	LAST	312	36,3624	3 4737 0		CAF	PRID10	
0338					36,3625	0 0004 0		INHINT		
0339	REF	33	LAST	767	36,3626	0 5105 0		TC	FINDVAC	
0340	REF	2	LAST	158	E7,1713			EBANK= VG		
0341	REF	1			36,3627	02745 0		2CADR	S40.9	LAMBERT VTOGAIN
0341	REF	1			36,3630	56067 0				
0342	REF	9	LAST	763	36,3631	0 5327 1		TC	2PHSCHNG	
0343					36,3632	00172 0		OCT	00172	2.17SPOT FOR S40.9
0344					36,3633	10035 0		OCT	10035	HERE AND REREADAC AFTER RESTART
0345	REF	63	LAST	766	36,3634	0 5516 0		TC	DOWNFLAG	
0346	REF	2	LAST	768	36,3635	00043 0		ADRES	CYCLESW	VG CALCULATION OMITTED
0347	REF	106	LAST	766	36,3636	0 6036 1	ENDSTEER	TC	INTPRET	
0348					36,3637	77650 1		GOTO		
0349	REF	6	LAST	768	36,3640	03663 1			QTEMP1	
0350	REF	107	LAST	768	36,3641	0 6036 1	STEERING	TC	INTPRET	
0351					36,3642	77624 1		CALL		
0352	REF	2	LAST	764	36,3643	75611 0			UPDATEVG	
0353					36,3644	77776 1		EXIT		
0354	REF	25	LAST	765	E7,1513				EBANK= DVCNTR	
0355					36,3645	0 0004 0	NSTEER	INHINT		
0356	REF	4	LAST	687	36,3646	3 5016 0		CA	FRANK7	
0357	REF	18	LAST	721	36,3647	54 003 0		TS	EBANK	
0358	PHASE CHANGE IN SERVERICER NEEDED HERE *****									
0359	REF	18	LAST	748	36,3650	4 0076 1		CS	FLAGWRD2	CHECK IMPULSE SWITCH. IT IS SET EITHER
0360	REF	2	LAST	748	36,3651	7 4743 1		MASK	IMPULBIT	BY S40.13 IF TBURN<6 SECS OR BY S40.8 IF
0361	REF	230	LAST	764	36,3652	10 000 0		CCS	A	STEERING IS ALMOST DONE.
0362					36,3653	1 3660 0		TCF	+5	IMPULSW = 0 EXIT

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0363	REF	14	LAST	767	36,3654	4 0103 1	CS	FLAGWRD7	IMPULSW = 1 WHY? CHECK IDLEFLAG
0364	REF	2	LAST	767	36,3655	7 4745 1	MASK	IDLEFBIT	(IDLEFLAG = 0 --> DVMON ON)
0365	REF	231	LAST	768	36,3656	10 000 0	CCS	A	
0366					36,3657	1 3662 1	TCF	+3	DVMON ON-->THPUSTING-->IMPULSW VIA S40.8
0367	REF	42	LAST	766	36,3660	0 4635 0	TC	POSTJUMP	DVMON OFF-->IMPULSW ON VIA S40.13-->EXIT
0368	REF	5	LAST	766	36,3661	77525 0	CADR	SERVEXIT	
03681	REF	35	LAST	768	36,3662	0 4674 0	TC	IBNKCALL	
03682	REF	3	LAST	376	36,3663	40165 1	CADR	STOPRATE	
0369	REF	64	LAST	768	36,3664	0 5516 0	TC	DOWNFLAG	TURN OFF IMPULSW
0370	REF	2	LAST	766	36,3665	00044 1	ADRES	IMPULSW	
0371	REF	43	LAST	753	36,3666	0 5504 0	TC	UPFLAG	
0372	REF	4	LAST	749	36,3667	00161 1	ADRES	IDLEFLAG	TURN OFF DVMON
0373					36,3670	0 0004 0	INHINT		
0374					36,3671	0 0006 1	EXTEND		
0375	REF	35	LAST	752	36,3672	3 1440 0	DCA	TIG	
0376	REF	280	LAST	765	36,3673	52 155 1	DXCH	MPAC	
0377					36,3674	0 0006 1	EXTEND		
0378	REF	23	LAST	767	36,3675	4 0025 1	DCS	TIME2	
0379	REF	281	LAST	769	36,3676	20 155 1	DAS	MPAC	
0380	REF	8	LAST	751	36,3677	0 7256 1	TC	TPAGREE	
0381	REF	282	LAST	769	36,3700	30 155 0	CAE	MPAC +1	
0382	REF	2	LAST	766	36,3701	0 3710 1	TC	GETDT	
0391	REF	21	LAST	766	36,3702	0 5173 1	TC	TWIDDLE	
0392	REF	3	LAST	766	36,3703	03542 1	ADRES	ENGOF TSK	
0393	REF	10	LAST	768	36,3704	0 5327 1	TC	2PHSCHNG	
0394					36,3705	40114 1	OCT	40114	ENGOF TSK (ENGINEOFF)
0395					36,3706	00035 1	OCT	00035	SERVICER--REREADAC
0396	REF	124	LAST	765	36,3707	1 5155 1	TCF	ENDOFJOB	
0397	REF	232	LAST	769	36,3710	10 000 0	GETDT	CCS	A
0398					36,3711	1 3714 1	TCF	+3	
0399					36,3712	1 3714 1	TCF	+2	
0400	REF	139	LAST	762	36,3713	3 4755 1	CAF	ZERO	
0401	REF	84	LAST	733	36,3714	6 4753 1	AD	ONE	
0402	REF	107	LAST	758	36,3715	56 001 0	XCH	L	
0403	REF	140	LAST	769	36,3716	3 4755 1	CAF	ZERO	
0404	REF	8	LAST	766	36,3717	53'515 0	DXCH	TGO	
0405	REF	9	LAST	769	36,3720	3 1515 1	CA	TGO +1	
0406	REF	193	LAST	758	36,3721	0 0002 0	TC	Q	
0407	REF	29	LAST	671	36,3722	0 5567 0	P40ALM	TC	ALARM
0408					36,3723	01706 1	OCT	01706	ASTRONAUT DOESN'T AGREE WITH STAGF
0409	REF	4	LAST	671	36,3724	3 5006 1	CAF	V05N09	VERIFY DISCRETE. HE HAS SELECTED P40,
0410	REF	210	LAST	766	36,3725	0 4616 1	TC	BANKCALL	BUT THE DAP THINKS THAT THE DESCENT UNIT
0411	REF	20	LAST	738	36,3726	20351 1	CADR	GOF LASH	IS GONE--A SITUATION THAT WOULD MAKE A
									DPS BURN EXCEEDINGLY DIFFICULT.

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0412	REF 32	LAST 766	36,3727	1 6001	1	TCF	GOTDPOOH	V34E	TERMINATE
0413			36,3730	1 3724	1	TCF	-4	V33E	PROCEED (ILLEGAL)
0414			36,3731	1 3724	1	TCF	-5		RECYCLE (ILLEGAL)

R0424 *****

0425			36,3732	00000	1	SEC15DP	OCT	00000	DON'T SEPARATE
0426			36,3733	02734	0	SEC15	DEC	1500	DON'T SEPARATE
0427			36,3734	00000	1	SEC30DP	2DEC	3000	
0427			36,3735	05670	0				
0428			36,3736	00000	1	SEC45DP	OCT	00000	DON'T MOVE FROM JUST BEFORE SEC45
0429			36,3737	10624	0	SEC45	DEC	4500	
0430			36,3740	00000	1	5SECDP	OCT	00000	DON'T MOVE FROM JUST BEFORE 5SEC
0431			36,3741	00764	1	5SEC	DEC	500	
0432			36,3742	05050	1	26SECS	DEC	2600	
0437			36,3743	04050	0	V16N40	VN	1640	
0438			36,3744	04125	0	V16N85B	VN	1685	
0439			36,3745	04123	0	V1683	VN	1683	
0440	REF 15	LAST 764	4777			SEC01	=	1SEC	
0441	REF 2	LAST 756	36,2054			ACADNB5	=	P41TABLE +2	

0442	REF 7	LAST 766	E7,1620			EBANK=	DELVIMU
0443	REF 1		36,3746	03462	1	ACADNB3	2CADR CALCN83
0443	REF 1		36,3747	74067	0		

R0444 *****

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P0445 PROGRAM DESCRIPTION S40.1      DATE15NOV66
R0446 MCD NC2      LCG SECTION  P40-P47
R0447 MCD BY ZELDIN AND ADAPTED BY TALAYCO
R0448 FUNCTIONAL DESCRIPTION
R0449      COMPUTE INITIAL THRUST DIRECTION(UT) AND INITIAL VALUE OF VG
R0450      VECTOR(VGTIG).
R0451 CALLING SEQUENCE
R0452      L CALL
R0453      L+1      S40.1
R0454 NORMAL EXIT MODE
R0455      AT L+2 OF CALLING SEQUENCE (GOTO L+2)  NORMAL RETURN OR
R0456      ERROR RETURN IF NOSOFLAG =1
R0457 SUBROUTINES CALLED
R0458      LEMPREC
R0459      INITVEL
R0460      CALCGRAV
R0461      MIDGIM
R0462 ALARM OR ABORT EXIT MODES
R0463      L+2 OF CALLING SEQUENCE, UNSOLVABLE CONIC IF NOSOFLAG=1
R0464 ERASABLE INITIALIZATION REQUIRED
R0465      WEIGHT/G  ANTICIPATED VEHICLE MASS      DP  B16KGM
R0466      XDELVFLG      1=DELTA-V MANEUVER,0=AIMPT STEER
R0467      F      THRUST FOR ENGINE USED
R0468 IF DELTA-V MANEUVER
R0469     DELVSIN      SPECIFIED DELTA-V REQUIRED IN
R0470     INERTIAL COORDS. OF ACTIVE VEHICLE
R0471     AT TIME OF IGNITION      VECTOR B7M/CS
R0472     DELVSAB      MAG. OF DELVSIN      DP      B7M/CS
R0473     RTIG      POSITION AT TIME OF IGNITION      VECTOR B29M
R0474     VTIG      VELOCITY AT TIME OF IGNITION      VECTOR B7M/CS
R0475 IF AIMPT STEER
R0476     TIG      TIME OF IGNITION      DP      B28CS
R0477     RTARG      POSITION TARGET TIME      VECTOR B29M
R0478     CSTEER      C FOR STEER LAW      DP      B2
R0479     DLTARG      TARGET TIME-IGNITION TIME      DP      B28CS
R0480 OUTPUT
R0481     UT      DESIRED THRUST DIRECTION      VECT. B2M/(CS.CS)
R0482     VGTIG      INITIAL VALUE OF VELOCITY
R0483     TO BE GAINED (INERT. COORD.)      VECTOR B7M/CS
R0484     DELVLVC      VGTIG IN LOC. VERT. COORDS.      B7M/CS
R0485     BDT      V REQUIRED AT TIG -V REQUIRED AT (TIG-2SEC)
R0486     -GDT FOR S40.13      VECT B7M/CS
R0487     RTIG      CALC IN S40.1B(AIMPT) FOR S40.2,3  VECTOR B29M
R0488     POSITION AT TIME OF IGNITION
R0489 DEBRIS      QTEMP1
R0490     MPAC,QPRET
R0491     PUSHLIST
R0492     14,2347      BANK I4
R0493 REF 4 LAST 757 27,2000      SFTLOC P40S1
R0494     27,2271      BANK

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0495	REF	1		27,2271	44014	1	S40.1	COUNT* \$\$\$/S40.1		
0496				27,2272	03264	1		CLEAR	STQ	
0497	REF	1		27,2273	03630	1			EIRSTFLG	
0498	REF	3	LAST	627	27,2274	77614	1	DELVTEST	BOFF	
0499					01347	0			XDELVFLG	
0500	REF	7	LAST	768	27,2276	56363	1		S40.1B	
0501	REF	1		27,2277	77201	1	CALCTHET	SETPD	VLOAD	
0502					00001	0			0	
0503				27,2300	03646	0			VTIG	
0504	REF	6	LAST	662	27,2302	02335	0	STORE	VINIT	
0505	REF	8	LAST	701	27,2303	53435	0	VXV	UNIT	
0506					27,2304	03640	0		RTIG	
0507	REF	8	LAST	663	27,2305	27677	1	STOVL	UT	UP IN UT
0508	REF	2	LAST	158	27,2306	03640	0		RTIG	
0509	REF	9	LAST	772	27,2307	02327	0	STORE	RINIT	
0510	REF	9	LAST	701	27,2310	65236	0	VSQ	PDDL	
0511					27,2311	00045	0		36D	
0512					27,2312	56205	0	DMP	DDV	
0514	REF	1		27,2313	16435	1			THETACON	
0515					27,2314	41205	0	DMP	DMP	
0516	REF	4	LAST	655	27,2315	03662	0		DELVSAB	
0517	REF	1			27,2316	01245	0		WEIGHT/G	
0518					27,2317	77671	1	DDV		
0519	REF	6	LAST	765	27,2320	03734	1		F	
0520					27,2321	24017	1	STOVL	14D	
0521	REF	14	LAST	766	27,2322	03654	0		DELVSIN	
0522					27,2323	74241	0	DOT	VXSC	
0523	REF	3	LAST	772	27,2324	03677	1		UT	
0524	REF	4	LAST	772	27,2325	03677	1		UT	
0525					27,2326	41552	0	VSL2	PUSH	(DELTA V.UP)UP SCALED AT 2(+7) P.D.L. 0
0526					27,2327	65245	1	BVSU	PDDL	DELTA VP SCALED AT 2(+7) P.D.L. 6
0527	REF	15	LAST	772	27,2330	03654	0		DELVSIN	
0528					27,2331	00017	1		14D	
0529					27,2332	63356	1	SIN	PDDL	
0530					27,2333	00007	0		6D	
0531					27,2334	53435	0	VXV	UNIT	
0532	REF	5	LAST	772	27,2335	03677	1		UT	
0533					27,2336	45561	1	VXSC	STADR	
0534	REF	5	LAST	763	27,2337	50072	1	STOVL	VG TIG	UNIT(VPXUP)SIN(THETAT/2) IN VGTIG.
0535					27,2340	65256	0	UNIT	PDDL	UNIT(DELTA VP) IN P.D.L. 6
0536					27,2341	00017	1		14D	
0537					27,2342	74346	0	COS	VXSC	
0538					27,2343	74255	0	VAD	VXSC	
0539	REF	6	LAST	772	27,2344	03705	0		VG TIG	
0540					27,2345	00045	0		36D	
0541					27,2346	53352	0	VSL2	VAD	
0542					27,2347	77626	0	STADR		
0543	REF	7	LAST	772	27,2350	74072	1	STORE	VG TIG	VG IGNITION SCALED AT 2(+7)M/CS

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0544				27,2351	77656 1	UNIT		
0545	REF	6	LAST	772	27,2352	STOVL	UT	THRUST DIRECTION SCALED AT 2(+1)
0546	REF	8	LAST	772	27,2353		VTIG	
0547					27,2354	PUSH	CALL	
0548	REF	3	LAST	701	27,2355		GET.LVC	VTIG IN LV COOR AT 2(+7)M/CS IN DELVLVC
0549					27,2356	VLOAD		
0550	REF	11	LAST	686	27,2357		ZEROVECS	
0551	REF	3	LAST	159	27,2360	STORE	8DT	
0552					27,2361	GOTO		
0553	REF	4	LAST	772	27,2362		QTEMP	
0554					27,2363			
0555	REF	36	LAST	769	27,2364	S40.18 DLOAD	TIG	
0556	REF	46	LAST	742	27,2365	STORE	TDEC1	
0557					27,2366	BDSU		
0558	REF	9	LAST	684	27,2367		TPASS4	
0559	REF	7	LAST	698	27,2370	STCALL	DELLT4	INTERCEPT TIME - TIG.
0560	REF	8	LAST	738	27,2371		LEMPREC	
0561					27,2372	VLOAD	SETPD	LOAD STATE VECTOR AT TIG FOR INITVEL.
0562	REF	27	LAST	734	27,2373		RATT	
0563					27,2374		0	
0564	REF	10	LAST	772	27,2375	STORE	RTIG	
0565	REF	10	LAST	772	27,2376	STOVL	RINIT	
0566	REF	21	LAST	734	27,2377		VATT	
05665	REF	7	LAST	772	27,2400	STORE	VTIG	
0567	REF	9	LAST	772	27,2401	STORE	VINIT	
0568					27,2402	DLOAD	PDDL	NUMIT = 0
0569	REF	12	LAST	773	27,2403		ZEROVECS	
0570	REF	1			27,2404		FPS1	
0571					27,2405	BOFF	DAD	
0572	REF	3	LAST	696	27,2406		NORMSW	
0573	REF	1			27,2407		SMALLEPS	
0574	REF	1			27,2410		EPS2	EPSILON4 = 10 DEGREES OR 45 DEGREES.
0575					27,2411	SMALLEPS PUSH	SXA,1	
0576	REF	11	LAST	707	27,2412		RTX1	
0577					27,2413		SXA,2	
0578	REF	13	LAST	708	27,2414		CALL	
0579	REF	3	LAST	682	27,2415		RTX2	
0580					27,2416		INITVEL	
0581	REF	14	LAST	735	27,2417	VLOAD	PUSH	
0582	REF	9	LAST	773	27,2420		DELVEFT3	VTIG = VR - VN.
0583					27,2421	STORE	VTIG	
0584	REF	7	LAST	773	27,2422	UNIT		UT = UNIT (VTIG)
0585					27,2423	STOVL	UT	
0586	REF	4	LAST	663	27,2424		36D	
0587	REF	4	LAST	773	27,2425	STCALL	VGDISP	CONVERT VTIG (IN PUSHLIST) TO LOCAL
0588					27,2426		GET.LVC	VERTICAL COORDINATES.
0589	REF	5	LAST	773	27,2427	GOTO		
							QTEMP	
0590				27,2430	00707 1	EPS1	2DEC*	2.77777778 E-2* 10 DEGREES AT 1 REVOLUTION.
0590				27,2431	03434 1			

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0591	27,2432	03070 0	EPS2	2DEC*	9.722222222 E-2*	35 DEGREES AT 1 REVOLUTION.
0591	27,2433	34344 0				
0592	27,2434	00024 1	THETACON	2DEC	.31830989 B-8	
0592	27,2435	13714 1				

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R0593 SUBROUTINE NAME: S40.2,3 MOD. NO. 3 DATE: APRIL 4, 1967

R0594 MODIFICATION BY: JONATHAN D. ADDELSTON (ADAMS ASSOCIATES)

R0595 MOD. NO. 4: JULY 18, 1967: PETER ADLER (MIT/IL)

R0596 MOD. NO. 5: OCTOBER 18, 1967: PETER ADLER (MIT/IL)

R0597 ORIGINALLY BY: SAYDEAN ZELDIN (MIT INSTRUMENTATION LAB) AND RICHARD TALAYCO (SYSTEM DEVELOPMENT CORP)

R0599 S40.2,3 COMPUTES "POINTVSM" WHICH IS THE HALF-UNIT DESIRED THRUST VECTOR IN STABLE-MEMBER COORDINATES FROM "UT"
R0601 WHICH IS THE SAME VECTOR IN REFERENCE COORDINATES. IT DETERMINES THE CORRECT VALUES FOR "SCAXIS" USING THE +X
R0603 AXIS FOR DPS, APS, AND RCS BURNS. THE "WINGS-LEVEL HEADS-UP" LM ORIENTATION IS THEN COMPUTED IN REFERENCE
R0605 COORDINATES. THESE VECTORS ALSO DEFINE THE "PREFERRED IMU ORIENTATION". UPON COMPLETION OF THIS CALCULATION,
R0607 THE "PREFERRED ATTITUDE COMPUTED" FLAG IS SET (PFRATFLG).

R0608 CALLING SEQUENCE:

A0609	L	CALL	INTERPRETIVE CALL.
A0610	L +1	S40.2,3	
A0611	L +2	(RETURN)	GIMBAL ANGLE VECTOR IN MPAC.

R0612 SUBROUTINES CALLED: NONE.

R0613 NCRMAL RETURN: L +2 (SEE CALLING SEQUENCE ABOVE).

R0614 ALARM/ABORT MODES: NONE.

R0615 INPUT:

R0616	1. REFSMMAT	MATRIX FROM REFERENCE TO STABLE-MEMBER COORDINATES SCALED AT 2.
R0618	2. UT	HALF-UNIT DESIRED THRUST DIRECTION.
R0619	3. RTIG	POSITION AT TIG IN REFERENCE COORDINATES.

R0621 OUTPUT:

R0622	1. : XSCREF :	WINGS-LEVEL HEADS-UP LM ORIENTATION
R0623	: YSCREF :	IN REFERENCE COORDINATES
R0624	: ZSCREF :	(PREFERRED IMU ORIENTATION).
R0625	2. POINTVSM	DESIRED THRUST DIRECTION IN STABLE-MEMBER COORDINATES.
R0627	3. SCAXIS	HALF-UNIT OF AXIS TO ALIGN IN STABLE-MEMBER COORDINATES.
R0629	4. PFRATFLG	INTERPRETIVE FLAG. ON: PREFERRED ORIENTATION COMPUTED; OFF: NOT COMPUTED.

R0631 DEBRIS: NONE.

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0632	REF	1							COUNT* \$\$/S40.2
0633				27,2436	77775	1	S40.2,3	VLOAD	
0634	REF	8	LAST	773	27,2437	03677	1		JT
0635				27,2440	76521	0		MXV	VSL1
0636	REF	20	LAST	742	27,2441	01734	0		REFSMAT
0637	REF	5	LAST	529	27,2442	27767	1		POINTVSM
0638	REF	6	LAST	590	27,2443	06422	0		UNITX
0639	REF	20	LAST	529	27,2444	27761	1		STOVL SCAXIS
0640	REF	9	LAST	776	27,2445	03677	1		UT
0641	REF	1		27,2446	03605	1	PLUSX	STORF	XSCREF
0642				27,2447	53435	0		VXV	UNIT
0643	REF	11	LAST	773	27,2450	03640	0		RTIG
06431				27,2451	46125	0		PDDL	BHIZ
06432				27,2452	00045	0			36D
06433	REF	1		27,2453	56464	1			FIXY
06434				27,2454	45575	1	STORY	VLOAD	STADR
0644	REF	1		27,2455	74164	1		STORE	YSCREF
0645				27,2456	76435	1		VXV	VSL1
0646	REF	2	LAST	776	27,2457	03605	1		XSCREF
0647				27,2460	77676	0		VCOMP	
0648	REF	1		27,2461	03621	1		STORE	ZSCREF
0649				27,2462	43414	1		SET	RVD
0650	REF	1		27,2463	01073	1			PERATFLG
06501				27,2464	47375	0	FIXY	VLOAD	VXV
06502	REF	3	LAST	776	27,2465	03605	1		XSCREF
06503	REF	8	LAST	773	27,2466	03646	0		VTIG
06504				27,2467	41456	0		UNIT	PUSH
06505				27,2470	77650	1		GOTO	
06506	REF	1		27,2471	56454	1			STORY

UT: DESIRED THRUST DIRECTION (HALF-UNIT)
 (PUT INTO TOP OF PUSH-DOWN-LIST.)
 TRANSFORM THRUST DIRECTION TO STABLE-
 MEMBER FROM REFERENCE COORDS (RESCALE).
 SAVE FOR "VECPPOINT" ROUTINE (LEMMANU).
 SCAXIS SET TO +X, FOR P40 AND P42 AND
 FOR P41 IF RCS NOT -X,+Y,-Y,+Z,-Z.

ASSUME +X BURN ALWAYS, EVEN FOR RCS.
 XSCREF = UT (DESIRED THRUST DIRECTION.)
 RTIG = POSITION AT TIME-OF-IGNITION.
 YSCREF = UNIT(UT X RTIG)

TEST MAGNITUDE OF UT X RTIG
 IF SMALL, USE UT X VTIG AS YSC

COMPUTE (YSCREF X XSCREF), BUT FOR A
 RIGHT HANDED SYSTEM, NEED (X CROSS Y).
 ZSCREF = - (YSCREF X XSCREF)
 = + (XSCREF X YSCREF)

IN THIS CASE,
 YSCREF = UNIT(XSCREF X VTIG)

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P0651 SUBROUTINE S40.8

R0652 MODIFIED APRIL 3, 1968 BY PETER ADLER MIT/IL

R0653 DESCRIPTION

R0654 S40.8 UPDATES THE VELOCITY-TO-BE-GAINED VECTOR, VG, (AND FOR LAMBERT TARGETTED BURNS ALSO EXTRAPOLATES VG
R0656 USING THE BDT VECTOR) COMPUTES THE TIME FOR ISSUING THE ENGINE OFF COMMAND, TGO, AND CALLS THE ROUTINE
R0658 "FINDCDUW", WHICH GENERATES STEERING COMMANDS FOR THE DAP.

R0659 CALLING SEQUENCE

R0660 L-1 CALL
R0661 L S40.8
R0662 L+1 INTERPRETIVE RETURN

R0663 ALARM

R0664 IF VG . DELVREF IS NEGATIVE (VG AND DELVREF OVER 90 DEGREES APART), BYPASS TGO AND STEERING COMPUTATIONS
R0666 AND SET ALARM 1407. RETURN TO CALLER NORMALLY.

R0667 INPUT AND INITIALIZATION

R0668 VGPREV REFERENCE 2(7) M/CS
R0669 DELVREF REFERENCE 2(7) M/CS
R0670 BDT REFERENCE 2(7) M/CS
R0671 TDECAY TAIL-OFF TIME 2(28) CS
R0672 XDELVFLG 1 = EXTERNAL DELTA-V; 0 = LAMBERT (AIMPOINT)
R0673 STEERSW 1 = DO STEERING AND TGO COMPUTATIONS; 0 = VG UPDATE ONLY
R0674 FIRSTFLG 1 = GONE TO LAMBERT AT LEAST ONCE; 0 = HAVEN'T GONE TO LAMBERT YET

R0676 NOTE: VGTIG EQUALS VGPREV

R0677 OUTPUT

R0678 STEERSW SEE INPUT
R0679 IMPULSW 1 = ENGINE OFF IN TGO CENTISECONDS; 0 = CONTINUE BURN
R0680 TGC TIME TO CUT-OFF 2(28) CS
R0681 SEE FINDCDUW FOR STEERING OUTPUTS.

R0682 SUBROUTINE CALLED

R0683 FINDCDUW

R0684 DEBRIS

R0685 MPACS, PUSHLIST

0686 REF 1 COUNT* \$\$/S40.8

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0687	REF	6	LAST	768	F6,1420	43175 0	S40.8	EBANK=	DMFGAQ		
0688					27,2472	03705 0		VLOAD	BON		
0689	REF	6	LAST	764	27,2473	01307 1			VGPREV		
0690	REF	8	LAST	772	27,2474	56502 0			XDEL VFLG		
0691	REF	1			27,2475	53214 0			VGNEW		
0692					27,2476	03344 1		BOFF	VAD		
0693	REF	2	LAST	772	27,2477	56502 0			FIRSTFLG		
0694	REF	2	LAST	778	27,2500	03671 1			VGNEW		
0695	REF	4	LAST	773	27,2501	77651 0			BDT		
0696					27,2502	03525 0		VGNEW	VSU		
0697	REF	3	LAST	765	27,2503	03714 0			DFLVREF		
0698	REF	3	LAST	768	27,2504	76521 0		VGAIN*	STORE VG	VELOCITY TO BE GAINED SCALED AT (7)M/CS	
0699					27,2505	01734 0			MXV	VSL1	
0700	REF	21	LAST	776	27,2506	03252 1				REFSMAT	
0701	REF	3	LAST	215	27,2507	77214 0			STORE	UNFC /2	
0702					27,2510	03304 0			BON	VLOAD	
0703	REF	3	LAST	778	27,2511	56515 0				FIRSTFLG	
0704	REF	1			27,2512	06424 0				BDTOK	
0705	REF	6	LAST	766	27,2513	03671 1				H16ZFROS	
0706	REF	5	LAST	778	27,2514	51575 1			STORE	BDT	
0707					27,2515	03714 0		BDTOK	VLOAD	ABVAL	
0708	REF	4	LAST	778	27,2516	03662 0				VG	
0709	REF	5	LAST	773	27,2517	77201 1			STORE	VGDISP	
0710					27,2520	00001 0		TGOCALC	SETPD	VLOAD	
0711					27,2521	03714 0				O	
0712	REF	5	LAST	778	27,2522	27705 0				VG	
0713	REF	7	LAST	778	27,2523	03525 0			STOVL	VGPREV	
0714	REF	4	LAST	778	27,2524	57414 1				DELVRFF	
0715					27,2525	01344 0			BOFF	VCOMP	
0716	REF	1			27,2526	00052 0				STEERSW	
0717	REF	5	LAST	719	27,2527	77656 1				OPRET	
0718					27,2530	41441 0			UNIT		
0719					27,2531	03714 0			DOT	PUSH	
0720	REF	6	LAST	778	27,2532	56244 0				VG	
0721					27,2533	56562 0			BPL	DDV	
0722	REF	1			27,2534	03742 0				ALARMIT	
0723	REF	2	LAST	761	27,2535	41215 1				VFX	
0724					27,2536	06422 0			DAD	DMP	
0725	REF	12	LAST	678	27,2537	56261 1				DPHALF	
0726					27,2540	20613 1			SR	DCV	
0727					27,2541	00045 0				10D	
0728					27,2542	43205 1				36D	
0729					27,2543	16571 0			DMP	DAD	
0730	REF	1			27,2544	03740 1				-FOURDT	
0731	REF	1			27,2545	03515 0				TDECAY	
0732	REF	10	LAST	769	27,2546	77615 0			STORE	TGO	
0733					27,2547	01235 1			DAD		
0734	REF	6	LAST	715	27,2550	17440 1				PIPTIME	
0735	REF	37	LAST	773	27,2551	03515 0			STOOL	TIG	
0736	REF	11	LAST	778	27,2552					TGO	

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0737				27,2553	51025 1	DSU	BPL		
0738	REF	1		27,2554	16573 1		FOUR SECS	400 CS	
0739	REF	1		27,2555	61062 1		FINDCDUW -2		
0740				27,2556	43014 0	SET	CLRGD		
0741	REF	3	LAST 769	27,2557	01066 0		IMPULSW		
0742	REF	2	LAST 778	27,2560	01224 1		STEERSW		
0743	REF	6	LAST 778	27,2561	00052 0		QPPET		
0744				27,2562	77776 1	ALARMIT	EXIT		
0745	REF	30	LAST 769	27,2563	0 5567 0		TC	ALARM	
0746				27,2564	01407 0		OCT	01407	
0747	REF	108	LAST 768	27,2565	0 6036 1		TC	INTPRET	
0748				27,2566	77650 1	GOTO			
07485	REF	2	LAST 779	27,2567	61062 1		FINDCDUW -2	SKIP TGO COMPUTATION BUT CALL FINDCDUW. FINDCDUW WILL EXIT TO UPDATEVG +3.	
0749				27,2570	77715 1	-FOURDT	2DEC	-800 B-18	-4 (200 CS.) B (-18)
0749				27,2571	77777 0				
0751				27,2572	00000 1	FOURSECS	2DEC	400	400 CS SCALED AT 2(+28)CS
0751				27,2573	00620 0				
07515	REF	3	LAST 778	E7,1741		2VEXHUST =	VEX		

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P0752 NAME S40.13 - TIMEBURN
 R0753 FUNCTION (1) DETERMINE WHETHER A GIVEN COMBINATION OF VELOCITY TO
 R0754 BE GAINED AND ENGINE CHOICE RESULT IN A BURN TIME
 R0755 SUEFICIENT TO ALLOW STEERING AT THE VEHICLE DURING THE
 R0756 BURN
 R0757 (2) THE MAGNITUDE OF THE RESULTING BURN TIME -- IF IT
 R0758 IS SHORT -- AND THE ASSOCIATED TIME OF THE ENGINE OFF
 R0759 SIGNAL
 R0760 CALLING SEQUENCE VIA FINDVAC AS A NEW JOB
 R0761 INPUT VGTIG VELOCITY TO BE GAINED VECTOR (METERS/CS) AT +7
 R0762 WEIGHT/G MASS OF VEHICLE IN KGM AT +16
 R0763 F APS ENGINE THRUST IN M.NEWTONS AT +7
 R0764 AND ALSO FOR RCS ENGINE
 R0765 MDOT RATE OF DECREASE OF VEHICLE MASS DURING ENGINE
 R0766 BURN IN KILOGRAMS/CS AT +3 . THIS SCALING MAY
 R0767 REQUIE MODIFICATION FOR SATURN BURNS.
 R0768 ENGLFLAG SWITCH TO DECIDE WHETHER APS OR DPS ENGINE IS USED
 R0769 =0 DPS
 R0770 =1 APS
 R0771 OUTPUT IMPULSW ZERO FOR STEERING
 R0772 ONE FOR ATTITUDE HOLD
 R0773 NOTHROTL ZERO FOR THROTTLING
 R0774 ONE TO INHIBIT THROTTLING
 R0775 TGO TIME TO BURN IN CS
 R0776 THE QUANTITY M.NEWTON = 10000 NEWTONS WILL BE USED TO EXPRESS
 R0777 FORCE

0778	REF	12	LAST	778	E7,1514		EBANK= TGO	
0779	REF	1					COUNT* S4/40.13	
0780	REE	109	LAST	779	27,2574	0 6036 1	S40.13	TC INTPRET
0781					27,2575	43001 1		SETPD CLEAR
0782					27,2576	00001 0		000
0783	REF	4	LAST	779	27,2577	01266 1		IMPULSW ASSUME NO STEERING UNTIL FOUND OTHERWISE
0784					27,2600	51575 1		VLOAD ABVAL
0785	REE	10	LAST	773	27,2601	03705 0		VGTIG VELOCITY TO BE GAINED AT +7
0786					27,2602	41325 0		PDDL DMP 000 = MAG OF VGTIG AT +7
0787	REE	1			27,2603	16742 1		7SEC 700 CS AT + 18
0788	REF	2	LAST	763	27,2604	34017 0		FRCS2
0789					27,2605	62471 1		DDV SL2 SCALE
0790	REF	2	LAST	772	27,2606	01245 0		WEIGHT/G
0791					27,2607	41421 0		BDSU PUSH
0792					27,2610	43014 0		BOEF SET
0793	REF	1			27,2611	05342 1		APSFLAG
0794	REE	1			27,2612	56662 0		S40.130 FOR DPS ENGINE
0795	REF	2	LAST	761	27,2613	02463 1		NOTHROTL
0796					27,2614	56345 0		DLOAD DDV 000 = MAG OF VGTIG CORRECTED
0797	REF	1			27,2615	16001 1		KIVAL M.NEWTONS-CS AT +24
0798	REF	3	LAST	780	27,2616	01245 0		WFIGHT/G
0799					27,2617	50021 1		BDSU BMN

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0800			27,2620	00001 0		00D	
0801	REF	1	27,2621	56644 1		S40.131	TGO LESS THAN 100 CS
0802			27,2622	41325 0	PDDL	DMP	02D = TEMP1 AT +7
0803	REF	2 LAST 158	27,2623	03736 0		MDOT	

R0804 MDCT REPRESENTS THE RATE OF DECREASE OF VEHICLE MASS DURING ENGINE
 R0805 BURN IN KILOGRAMS/CS . WHEN SATURN IS USED , THE SCALING MAY
 R0806 REQUIRE ADJUSTMENT

0807	REF	1	27,2624	16734 0		3.5SEC	350 CS AT +14
0808			27,2625	65221 0	BDSU	PDDL	
0809	REF	4 LAST 780	27,2626	01245 0		WEIGHT/G	
0810	REF	7 LAST 772	27,2627	03734 1		F	
0811			27,2630	60405 0	DMP	SR2	SCALE
0812	REF	1	27,2631	16736 1		5SECS	
0813			27,2632	41471 0	DDV	PUSH	04D = TEMP2
0814			27,2633	51021 0	BDSU	8PL	
0815			27,2634	00003 1		02D	
0816	REF	2 LAST 780	27,2635	56662 0		S40.13D	
0817			27,2636	55345 0	DLOAD	BDDV	
0818			27,2637	43205 1	DMP	DAD	
0819	REF	2 LAST 781	27,2640	16736 1		5SECS	
0820	REF	1	27,2641	16732 0		1SEC2D	100 CS AT +14
0821			27,2642	77650 1	GOTO		
0822	REF	1	27,2643	56652 0		S40.132	
0823			27,2644	41345 0	S40.131 DLOAD	DMP	
0824	REF	5 LAST 781	27,2645	01245 0		WEIGHT/G	
0825			27,2646	41542 1	SR1	PUSH	
0826			27,2647	56215 1	DAD	DDV	
0827	REF	1	27,2650	16003 0		K2VAL	M.NEWTON CS AT +24
0828	REF	1	27,2651	16005 0		K3VAL	M.NEWTON CS AT +10
0829			27,2652	77414 0	S40.132 SET	EXIT	
0830	REF	5 LAST 780	27,2653	01066 0		IMPULSW	
0831	REF	9 LAST 769	27,2654	0 7256 1	S40.132* TC	TPAGREE	
0832	REF	283 LAST 769	27,2655	3 0154 1		CA	MPAC
0833	REF	108 LAST 769	27,2656	56 001 0		XCH	L
0834	REF	141 LAST 769	27,2657	3 4755 1		CA	ZERO
0835	REF	13 LAST 780	27,2660	53*515 0		DXCH	TGO
0836	REF	1	27,2661	1 2704 1		TCF	S40.134

0837			27,2662	41345 0	S40.13D DLOAD	DMP	FOR DPS ENGINE
0838			27,2663	00001 0		00D	
0839	REF	6 LAST 781	27,2664	01245 0		WEIGHT/G	
0840			27,2665	43006 0	PUSH	BON	
0841	REF	2 LAST 780	27,2666	05302 0		APSFAG	
0842	REF	1	27,2667	56725 1		APSTGO	
0843			27,2670	43071 0	DDV	CLEAR	
0844	REF	1	27,2671	16007 1		S40.136	
0845	REF	3 LAST 780	27,2672	02663 0		NOTHROTL	
0846			27,2673	41400 0	BOV	PUSH	

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0847	REF	1		27,2674	56707 1		S40.130V	
0848				27,2675	51025 1	S40.137	DSU	9PL
0849	REF	1		27,2676	16740 0			5SEC
0850	REF	1		27,2677	56715 1			S40.138
0851				27,2700	52015 1		DAD	GOTO
0852	REF	2	LAST	782	27,2701	16740 0		6SEC
0853	REF	2	LAST	781	27,2702	56652 0		S40.132
0854				27,2703	77776 1	S40.133	FXIT	
0855	REF	47	LAST	766	27,2704	0 5353 1	S40.134	TC
0856				27,2705	00003 1		OCT	PHASCHNG
0857	REF	125	LAST	769	27,2706	0 5155 0		TC
0858				27,2707	40545 1	S40.130V	DLOAD	00003
0859				27,2710	77671 1		DDV	ENDOFJOB
0860	REF	1		27,2711	16011 0			SR4
0861	REF	14	LAST	781	27,2712	03515 0		S40.136_
0862				27,2713	77776 1		STORE	TGO
0863	REF	2	LAST	781	27,2714	1 2704 1		EXIT
							TCF	S40.134
								REJOIN COMMON CODING FOR RESTART PROTECT
0864				27,2715	51025 1	S40.138	DSU	8PL
0865	REF	1		27,2716	16744 1			89SECS
0866	REF	1		27,2717	56722 0			STORETGO
0867				27,2720	77614 1		SET	
0868	REF	4	LAST	781	27,2721	02463 1		NOTHROTL
0869				27,2722	77745 1	STORETGO	DLOAD	LOAD TGO AT 2(14)
0870				27,2723	77776 1		EXIT	
0871	REF	1		27,2724	1 2654 0		TCF	S40.132*
0872				27,2725	62471 1	APSTGO	DDV	SL2
0873	REF	2	LAST	765	27,2726	34007 1		FAPS
08735				27,2727	77650 1		GOTO	
0874	REF	2	LAST	782	27,2730	56723 1		STORETGO +1
0878				27,2731	00144 0	1SEC2D	2DEC	100.0 8-14
0878				27,2732	00000 1			100.0 CS AT +14
0879				27,2733	01274 1	3.5SEC	2DEC	350.0 8-13
0879				27,2734	00000 1			350 CS AT +13
0880				27,2735	00764 1	5SECS	2DEC	500.0 8-14
0880				27,2736	00000 1			500.0 CS AT +14
0881				27,2737	01130 1	6SEC	2DEC	600.0 8-14
0881				27,2740	00000 1			600.0 CS AT +14
0882				27,2741	00053 1	7SEC	2DEC	700 8-18
0882				27,2742	30000 1			700.0 CS AT + 18
0886				27,2743	21304 0	89SECS	2DEC	8900.0 8-14
0886				27,2744	00000 1			
0888	FUNCTION							(1) GENERATES REQUIRED VELOCITY AND VELOCITY-TO-BE-GAINED
0889								VECTORS FOR USE DURING AIMPOINT MANEUVERS EVERY TWO
0890								COMPUTATION CYCLES (4 SECONDS).
0891								(2) UPDATES THE 8 VECTOR WHICH IS USED IN THE FINAL
0892								CALCULATION OF EXTRAPOLATING THE VELOCITY-TO-BE-GAINED
0893								THROUGH ONE 2-SECOND INTERVAL INTO THE FUTURE.
0894	CALLING SEC							VIA FINDVAC AS NEW JOB.

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R0895	INFUT	RN	- ACTIVE VEHICLE RADIUS VECTOR IN METERS AT +29.			
R0896		VN	- ACTIVE VEHICLE VELOCITY VECTOR IN METERS/CS AT +7			
R0897		VRPREV	- LAST COMPUTED VELOCITY REQUIRED VECTOR IN			
R0898			METERS/CS AT +7.			
R0899		TIG	- TIME OF IGNITION IN CS AT +28.			
R0900		DLTARG	- COMPUTATION CYCLE INTERVAL = 200 CS AT +28.			
R0901		PIPTIME	- TIME OF RN AND VN IN CS AT +28.			
R0902		GDT/2	- HALF OF VELOCITY GAINED IN DELTA T TIME DUE TO			
R0903			ACCELERATION OF GRAVITY IN METERS/CS AT +7.			
R0904		DELVREF	- CHANGE IN VELOCITY DURING LAST 2 SEC IN			
R0905			METERS/CS AT +7.			
R0906	OUTPUT	VGPREV	- VELOCITY TO BE GAINED VECTOR IN METERS/CS AT +7.			
R0907		VGDISP	- MAG OF VGPREV FOR DISPLAY PURPOSES.			
R0908		VRPREV	- VELOCITY REQUIRED VECTOR IN METERS/CS AT +7.			
R0909		BDT	- B VECTOR IN METERS/CS AT +7.			
R0910	SUBROUTINES USED	-	INITVEL			
0911	REF 8 LAST 778		E7,1704	EBANK=	VGPREV	
0912	REF 2 LAST 59 TO		59: 2 2*	COUNT*	\$\$/S40.9	
0913	REF 110 LAST 780		27,2745 0 6036 1 S40.9	TC	INTPRET	
0914			27,2746 77201 1	SETPD	VLOAD	
0915			27,2747 00001 0	OOD		
0916	REF 7 LAST 725		27,2750 01221 1	RN	ACTIVE VEHICLE RADIUS VECTOR AT T1	
0917	REF 11 LAST 773		27,2751 26327 0	STOVL	RINIT	
0918	REF 7 LAST 725		27,2752 01227 1	VN	ACTIVE VEHICLE VELOCITY VECTOR AT T1	
0919	REF 10 LAST 773		27,2753 16335 0	STOOL	VINIT	
0920	REF 7 LAST 778		27,2754 01235 1	PIPTIME		
0921	REF 2 LAST 158		27,2755 03730 0	STORE	TNIT	
0922			27,2756 77621 1	BDSU		
0923	RFF 10 LAST 773		27,2757 03627 1	TPASS4		
0924	REF 8 LAST 773		27,2760 03450 0	STORE	DELLT4	T2 - T1
0925			27,2761 71214 0	SET	DLOAD	
0926	REF 8 LAST 765		27,2762 01072 0	AVFLAG	SET AVFLAG FOR LEM ACTIVE	
0927	REF 7 LAST 778		27,2763 06424 0	H16ZERDS		
0928			27,2764 77725 1	PDDL		
0929	REF 2 LAST 773		27,2765 16431 0	EPS1		
0930			27,2766 43214 1	BOFF	EPSILON4 = 10 OR 45 DEGREES.	
0931	REF 4 LAST 773		27,2767 03745 1	NORMSW		
0932	REF 1		27,2770 56772 0	EPSSMALL		
0933	REF 2 LAST 773		27,2771 16433 1	EPS2		
0934			27,2772 77606 1	EPSSMALL PUSH		
0935			27,2773 45014 0	S40.92	BOFSET	CALL
0936	REF 4 LAST 778		27,2774 03044 1		FIRSTFLG	
0937	REF 1		27,2775 57102 0		INITINIT	
0938	REF 1		27,2776 22002 0		HAVEGUF5	
0939			27,2777 52375 1	VLOAD	VSU	
0940	REF 9 LAST 735		27,3000 02343 1		VIPRIME	
0941	REF 2 LAST 158		27,3001 03722 0		VRPREV	
0942			27,3002 45325 1	PDDL	DSU	
0943	REF 3 LAST 783		27,3003 03730 0		TNIT	
0944	REF 1		27,3004 03732 1		TNITPREV	

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0945					27,3005	74265	0		BDDV	VXSC	
0946	RFF	1			27,3006	17101	1			100B28	
0947					27,3007	76451	0		VSU	VSL1	
0948	REF	4	LAST	687	27,3010	01237	0			GDT/2	
0949	REF	6	LAST	778	27,3011	03671	1		STORE	BDT	
0950					27,3012	53135	0	FIRSTTME	SLOAD	BZE	
0951	REE	14	LAST	773	27,3013	03377	1			RTX2	
0952	RFF	1			27,3014	57020	1			GETGOBL	
0953					27,3015	52175	0		VLOAD	GOTO	NO OBLATENESS COMP IF 1N MOON SPHERE
0954	RFF	15	LAST	773	27,3016	03366	1			DELVEET3	
0955	REE	1			27,3017	57034	1			NOGOBL	
0956					27,3020	53575	0	GETGOBL	VLOAD	UNIT	CALCULATE OBLATENESS TERM.
0957	REE	8	LAST	783	27,3021	01221	1			RN	
0958					27,3022	45345	1		DLOAD	DSU	
0959	REF	8	LAST	783	27,3023	01235	1			PIPTIME	2
0960	REE	3	LAST	741	27,3024	03510	0			GOBLTIME	$G = -(MU/R) (UNITGOBL) (T - TIG)$
0961					27,3025	56205	0		DMP	DDV	OBL
0962	REF	1			27,3026	16013	1			EARTHMU	
0963					27,3027	00043	0			34D	34D = /RN/ (2) FROM UNIT OPERATION.
0964					27,3030	53361	0		VXSC	VAD	
0965	REE	1			27,3031	03517	1			UNITGOBL	
0966	REF	16	LAST	784	27,3032	03366	1			DELVFFT3	OUTPUT FROM INITVEL VG = VR - VN
0967	REF	17	LAST	784	27,3033	03366	1		STORE	DELVEET3	VG = VR + GOBL - VN
0968					27,3034	77646	0	NOGOBL	ABVAL		
0969	REE	6	LAST	778	27,3035	17662	0		STODL	VGDISP	
0970	REE	4	LAST	783	27,3036	03730	0			TNIT	
0971	REE	2	LAST	783	27,3037	03732	1		STORE	TNITPREV	
0972					27,3040	77776	1		EXIT		
0973	REF	48	LAST	782	27,3041	0 5353	1		TC	PHASCHNG	
0974					27,3042	05022	1		OCT	05022	
0975					27,3043	14000	1		OCT	14000	
0976	REE	111	LAST	783	27,3044	0 6036	1		TC	INTPRET	
0977					27,3045	77775	1		VLOAD		
0978	REE	10	LAST	783	27,3046	02343	1			VIPRIME	VR(T)
0979	REE	3	LAST	783	27,3047	03722	0		STORF	VRPREV	
0980					27,3050	77776	1		EXIT		
0981	REE	49	LAST	784	27,3051	0 5353	1		TC	PHASCHNG	
0982					27,3052	04022	0		OCT	04022	
0983	REF	112	LAST	784	27,3053	0 6036	1		TC	INTPRET	
0984					27,3054	77214	0		RON	VLOAD	
0985	REE	3	LAST	768	27,3055	01305	0			CYCLESW	
0986	RFF	1			27,3056	57064	1			S40.91	
0987	REE	18	LAST	784	27,3057	03366	1			DELVEET3	
0988	REF	9	LAST	783	27,3060	03705	0		STORE	VGPREV	
0989					27,3061	52014	0		SET	SCIC	
0990	REE	4	LAST	784	27,3062	01065	0			CYCLESW	
0991	REE	1			27,3063	57074	0			ENDS40.9	
0992											

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0995      27,3067  77651 0      VSU
0996 REF 5 LAST 778 27,3070 03525 0      DELVREF
0997 REF 10 LAST 784 27,3071 03705 0      STORE VGPREV
0998      27,3072  77646 0      ABVAL
0999 REF 7 LAST 784 27,3073 03662 0      STORE VGDISP      FOR DISPLAY PURPOSES
1000      27,3074  77776 1      EXIT
1001 REF 50 LAST 784 27,3075 0 5353 1      TC PHASCHNG
1002      27,3076  00002 0      OCT 2
1003 REF 126 LAST 782 27,3077 0 5155 0      TC ENDOFJOB
1004      27,3100  00000 1      100828 2DEC 100
1004      27,3101  00144 0
1005      27,3102  77624 1      INIT1INIT CALL
1006 REF 2 LAST 783 27,3103 22002 0      HAVEGUES
1007      27,3104  77650 1      GOTO
1008 REF 1      27,3105  57012 0      FIRSTTME
R1010 MCD 0      24 FEB 67      PETER ADLER
R1011 FUNCTION:
R1012 TRIMS DPS ENGINE TO MINIMIZE THRUST/CG OFFSET. ENGINE IS GIMBALLED TO FULL + PITCH AND + ROLL (TO LOCK)
R1014 FOR REFERENCE AND IS THEN BROUGHT BACK TO TRIM POSITION BY RUNNING FOR THE PROPER TIMES (TO BE
R1016 SPECIFIED BY GAEC) IN - PITCH AND - ROLL.
R1017 CALLING SEQUENCE:
R1018 VIA WAITLIST FROM R03
R1019 INPUT:
R1020 PITTIME TIME TO RUN FROM FULL + PITCH TO TRIM (CS)
R1021 ROLLTIME TIME TO RUN FROM FULL + ROLL TO TRIM (CS)
R1022 SUBROUTINES USED:
R1023 WAITLIST, FIXDELAY, VARDELAY, FLAGUP, FLAGDOWN, NOVAC

1024 REF 1      COUNT* $$/S40.6
1025 REF 3 LAST 329 E6,1401      EBANK= ROLLTIME      OCTAL MASKS: PRI05=05000 EBANK5=02400

1026 REF 65 LAST 769 27,3106 0 5516 0      TRIMGIM8 TC DOWNFLAG
1027 REF 1      27,3107  00137 1      ADRES GMBDRVSW      GMBDRVSW FLAG IS SET WHEN EITHER ROLL OR
PITCH IS COMPLETED, WHICHEVER IS FIRST.

1028 REF 8 LAST 764 27,3110 4 5017 0      CS PRI05      TURN OFF - PITCH, - ROLL, IF ON.
1029      27,3111  0 0006 1      EXTEND
1030 REF 43 LAST 618 27,3112 03 012 1      WAND CHAN12
1031 REF 3 LAST 606 27,3113 3 5014 1      CAF EBANK5      TURN ON + PITCH, + ROLL.
1032      27,3114  0 0006 1      EXTEND
1033 REF 44 LAST 785 27,3115 05 012 1      WOR CHAN12
1034 REF 14 LAST 766 27,3116 0 5221 0      TC FIXDELAY
1035      27,3117  13560 0      DEC 5000      WAIT ONE MINUTE TO MAKE SURE ENGINE IS
AT FULL + PITCH AND FULL + ROLL
1036 REF 4 LAST 785 27,3120 4 5014 0      CS EBANK5      TURN OFF + PITCH, + ROLL.
1037      27,3121  0 0006 1      EXTEND
1038 REF 45 LAST 785 27,3122 03 012 1      WAND CHAN12
1039 REF 9 LAST 785 27,3123 3 5017 1      CAF PRI05      TURN ON - PITCH, - ROLL.
1040      27,3124  0 0006 1      EXTEND
1041 REF 46 LAST 785 27,3125 05 012 1      WOR CHAN12
1042 REF 2 LAST 329 27,3126 31'402 0      CAE PITTIME      GET TIME TO SHUT OFF - PITCH AND SFT UP
1043 REF 22 LAST 769 27,3127 0 5173 1      TC TWIDDLE      TWIDDLE-TASK TO TURN IT OFF THEN

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1044	REF	1		27,3130	03147 0	ADRES	PITCHOFF	
1045	REF	4	LAST	785	27,3131	31'401 0	GAE	ROLLTIME
1046	REF	6	LAST	616	27,3132	0 5224 0	TC	VARDELAY
1047	REF	37	LAST	713	27,3133	4 4740 1	CS	BIT12
1048					27,3134	0 0006 1	EXTEND	
1049	REF	47	LAST	785	27,3135	03 012 1	WAND	CHAN12
1050	REF	2	LAST	201	27,3136	3 0102 1	CA	FLAGWRD6
1051	REF	1			27,3137	7 4742 0	MASK	GMBDRBIT
1052					27,3140	0 0006 1	EXTEND	
1053	REF	2	LAST	786	27,3141	1 3153 1	BZF	PITCHOFF +4
1054	REF	5	LAST	768	27,3142	3 4737 0	CAF	PRI010
1055	REF	20	LAST	751	27,3143	0 5072 1	TC	NOVAC
1056	REF	6	LAST	604	E7,1467		EBANK=	WHOCARFS
1057	REF	1			27,3144	02320 1	2CADR	TRIMDONE
1057	REF	1			27,3145	02067 1		
1058	REF	51	LAST	768	27,3146	0 5261 1	TC	TASKOVER
1059	REF	40	LAST	617	27,3147	4 4742 0	PITCHOFF	CS
1060					27,3150	0 0006 1	EXTEND	
1061	REF	48	LAST	786	27,3151	03 012 1	WAND	CHAN12
1062	REF	1			27,3152	1 3136 1	TCF	ROLLOVER
1063	REF	44	LAST	769	27,3153	0 5504 0	TC	JPFLAG
1064	REF	2	LAST	785	27,3154	00137 1	ADRES	GMBDRVSW
1065	REF	52	LAST	786	27,3155	0 5261 1	TC	TASKOVER

GET TIME TO SHUT OFF - ROLL AND GO AWAY
UNTIL THEN

SHUT OFF ROLL
IF HERE INLINE (ROLL DONE) IS PITCH DONE
IF HERE FROM PITCHOFF, IS ROLL DONE?

NO. SET FLAG, ROLL OR PITCH DONE.
RETURN TO R03

SHUT OFF PITCH
SEE IF ROLL HAS FINISHED ALSO.
ROLL DONE; OR PITCH DONE; BUT NOT BOTH.

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P1066 SUBROUTINE NAME: S41.1 MOD. NO. 0 DATE: FEBRUARY 28, 1967

R1067 MOD. NO. 1 DATE: JANUARY 23, 1968: BY PETER AOLER (MIT/IL)

R1069 AUTHOR: JONATHAN D. ADELSTON (ADAMS ASSOCIATES)

R1070 S41.1 PERFORMS THE COORDINATE SYSTEM TRANSFORMATION FROM THE REFERENCE FRAME TO THE BODY OF THE LM.
 R1072 SPECIFICALLY, IT IS USED TO TRANSFORM A VELOCITY (SCALED AT 2(+7) METERS/CENTISECOND) FROM REFERENCE TO LM AXIS
 R1074 COORDINATES. FIRST THE VECTOR IS TRANSFORMED TO THE STABLE MEMBER COORDINATES BY THE MATRIX REFSMMAT. THIS
 R1076 LEAVES THE VECTOR IN MPAC, SCALED AT 2(+8) METERS/CENTISECOND. THEN
 R1077 THE SUBROUTINE COUTRIG IS CALLED TO SET UP THE DOUBLE-PRECISION CDU VECTOR ALONG WITH ITS SINES AND COSINES.
 R1079 THE VECTOR IS THEN TRANSFORMED FROM STABLE MEMBER COORDINATES TO SPACECRAFT (OR LM) COORDINATES BY THE
 R1081 SUBROUTINE *SMNB*. FINALLY(THE VECTOR IS RESCALED TO 2(+7) METERS/CENTISECOND, AND CONTROL IS RETURNED TO THE
 R1083 CALLER WITH C(MPAC) = VELOCITY(LM).

R1084 CALLING SEQUENCE:

A1085	L	VLOAD	CALL	
A1086	L +1		VELOCITY(REF)	SCALED AT 2(+7)M/CS IN REFERENCE COORDS.
A1087	L +2		S41.1	
A1088	L +3	STOPE	VELOCITY(LM)	SCALED AT 2(+7)M/CS IN LM BODY AXIS SYS.

R1089 SUBROUTINES CALLED:

R1090 1. COUTRIG,
 R1091 WHICH CALLS COULOGIC.
 R1092 2. *SMNB*

R1093 NORMAL RETURN: L +3 (SEE CALLING SEQUENCE, ABOVE.)

R1094 ALARM/ABORT MODES: NONE.

R1095 RESTART PROTECTION: NONE.

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P1096 INPUT:

R1097 1. REFSMMAT.
 R1098 2. CDUX, CDUY, CDUZ.
 R1099 3. VELOCITY (REF) IN MPAC.

R1100 OUTPUT:

R1101 1. CDUSPOT: DOUBLE PRECISION CDU VECTOR, ORDERED Y,Z,X.
 R1102 2. SINCDU: HALF SINES OF CDUSPOT COMPONENTS.
 R1103 3. COSCDU: HALF COSINES OF CDUSPOT COMPONENTS.
 R1104 4. MPAC: VELOCITY(LM) (SCALED AT 2(+7) METERS/CENTISECOND)

R1105 DEBRIS: NONE.

R1106 CHECKCUT STATUS: CODED.

1107	REF	1					COUNT* S41.1
1108				27,3156	76521 0	S41.1	MXV VSL1
1109	REF	22	LAST	778	27,3157	01734 0	REFSMMAT
1110					27,3160	77650 1	GOTO
1111	REF	2	LAST	529	27,3161	47552 0	CDU*SMNB
A1112							

CONVERT VECTOR IN MPAC FROM REF AT 2(+7)
 TO SM AND RESCALE DUE TO HALFUNIT MATRIX
 CONVERT TO BODY AT 2(+7) USING PRESENT
 CDU ANGLES. CDU*SMNB WILL RETURN
 VIA RVQ TO THE CALLER OF S41.1

L THE LUNAR LANDING

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0001					32,2772				BANK	32	
0002	REF	3	LAST	611	32,2000				SETLOC	F2DPS*32	
0003					32,2772				BANK		

0004	REF	1			E7,1617				EBANK=	E2DPS	
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R0005	*****										
R0006	P63: THE LUNAR LANDING, BRAKING PHASE										
R0007	*****										

0008	REF	1							COUNT*	\$/P63	
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0009	REF	51	LAST	785	32,2772	0 5353	1	P63LM	TC	PHASCHNG	
0010					32,2773	04024	0		OCT	04024	

0011	REF	211	LAST	769	32,2774	0 4616	1		TC	BANKCALL	00 IMU STATUS CHECK ROUTINE P02
0012	REF	9	LAST	765	32,2775	11175	1		CADR	R02BOTH	

0013	REF	1			32,2776	3 3246	1		CAF	P63ADRES	INITIALIZE WHICH FOR BURNBABY
0014	REF	26	LAST	765	32,2777	55'453	0		TS	WHICH	

00141	REF	1			32,3000	3 2010	1		CAF	DPSTHRSH	INITIALIZE DVMON
00142	REF	4	LAST	765	32,3001	55'251	1		TS	DVTHRUSH	
00143	REF	13	LAST	765	32,3002	3 4751	0		CAF	FOUR	
00144	REF	26	LAST	768	32,3003	55'513	0		TS	DVCNTR	

0015	REF	85	LAST	769	32,3004	4 4753	0		CS	ONE	INITIALIZE WCHPHASE AND FLPASSO
0016					32,3005	22 007	0		ZL		FOR IGNITION ALGORITHM
0017	REF	5	LAST	756	32,3006	53'621	1		OXCH	WCHPHASE	

0018	REF	63	LAST	617	32,3007	4 4736	0		CS	BIT14	
0019					32,3010	0 0006	1		EXTEND		
0020	REF	49	LAST	786	32,3011	03 012	1		WAND	CHAN12	REMOVE TRACK-ENABLE DISCRETE.

0023	REF	113	LAST	784	32,3012	0 6036	1	FLAGORGY	TC	INTPRET	DIONYSIAN FLAG WAVING
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0024					32,3013	43014	0		CLEAR	CLEAR	
0025	REF	5	LAST	782	32,3014	02663	0			NOTHROTL	
0026	REF	1			32,3015	03271	0			REOFLAG	
0030					32,3016	43014	0		CLEAR	SET	
0031	REF	1			32,3017	05660	1			LRBYPASS	
0032	REF	2	LAST	742	32,3020	03067	0			MUNFLAG	
0033					32,3021	43014	0		CLEAR	CLEAR	

0034	REF	3	LAST	514	32,3022	00266	0			P25FLAG	TERMINATE P25 IF IT IS RUNNING.
0035	REF	4	LAST	576	32,3023	00270	1			RNDVZFLG	TERMINATE P20 IF IT IS RUNNING

A0036

0037					32,3024	77201	1	IGNALG	SETPD	VLOAD	FIRST SET UP INPUTS FOR RP-TO-R:-
0038					32,3025	00001	0			0	AT 0D LANDING SITE IN MOON FIXED FRAME
0039	REF	5	LAST	725	32,3026	02023	1			RLS	AT 6D ESTIMATED TIME OF LANDING

L THE LUNAR LANDING

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0040				32,3027	41525 0	PDDL	PUSH	MPAC NON-ZERO TO INDICATE LUNAR CASE
0041	REF	3	LAST	215	32,3030		TLAND	
0042	REF	2	LAST	165	32,3031	STCALL	IPIP	ALSO SET IPIP FOR FIRST GUIDANCE PASS
0043	REF	1			32,3032		RP-TO-R	
0044					32,3033	VSL4	MXV	
0045	REF	23	LAST	788	32,3034		REFSMAT	
0046	REF	3	LAST	215	32,3035	STCALL	LAND	
0047	REF	1			32,3036		GUIDINIT	GUIDINIT INITIALIZES WM AND /LAND/
0048					32,3037	DLOAD	DSU	
0049	REF	4	LAST	790	32,3040		TLAND	
0050	REF	1			32,3041		GUIDURN	
0051	REF	47	LAST	773	32,3042	STCALL	IDEC1	INTEGRATE STATE FORWARD TO THAT TIME
0052	REF	9	LAST	773	32,3043		LEMPREC	
0053					32,3044	SSP	VLOAD	
00531	REF	1			32,3045		NIGNLOOP	
00532					32,3046		40D	
0057	REF	7	LAST	776	32,3047		UNITX	
0058	REF	2	LAST	138	32,3050	STOVL	CG	
0059	REF	4	LAST	590	32,3051		UNITY	
0060	REF	3	LAST	790	32,3052	STOVL	CG +6	
0061	REF	6	LAST	591	32,3053		UNITZ	
0062	REF	4	LAST	790	32,3054	STODL	CG +14	
00621	REF	1			32,3055		99999CON	
00622	REF	4	LAST	330	32,3056	STOVL	DELTAH	INITIALIZE DELTAH FOR VI6N68 DISPLAY
00623	REF	13	LAST	773	32,3057		ZEROVECS	
00624	REF	4	LAST	778	32,3060	STODL	UNFC/2	INITIALIZE TRIM VELOCITY CORRECTION TERM
0063	REF	8	LAST	783	32,3061		HI6ZEROS	
0065	REF	3	LAST	215	32,3062	STORE	TTF/8	
0066					32,3063	IGNALOOP	DLOAD	
0067	REF	14	LAST	742	32,3064		TAT	
0068	REF	4	LAST	742	32,3065	STOVL	PIPTIME1	
0073	REF	9	LAST	742	32,3066		RATT1	
0074					32,3067	VSL4	MXV	
0075	REF	24	LAST	790	32,3070		REFSMAT	
0076	REF	5	LAST	609	32,3071	STCALL	R	
0077	REF	2	LAST	742	32,3072		MUNGRAV	
0078	REF	5	LAST	784	32,3073	STCALL	GDT/2	
0079	REF	1			32,3074		?GUIDSUB	WHICH DELIVERS N PASSES OF GUIDANCE

R0080 DDUMCALC IS PROGRAMMED AS FOLLOWS:-

R0081
 R0083
$$(RIGNZ - RGU) / 16 + 16(RGU)^2 KIGNY/B8 + (RGU - RIGNX) KIGNX/B4 + (ABVAL(VGU) - VIGN) KIGNV/B4$$

 R0085
 R0086
$$DDUM = \frac{\frac{(RIGNZ - RGU)^2}{2} + \frac{16(RGU)^2 KIGNY}{1} + \frac{(RGU - RIGNX) KIGNX}{0}}{10}$$

 R0088
 R0089
$$2 \frac{(VGU - 16 VGU KIGNX/B4)}{2}$$

 R0090

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R0091 THE NUMERATOR IS SCALED IN METERS AT 2(28). THE DENOMINATOR IS A VELOCITY IN UNITS OF 2(10)M/CS.
 R0093 THE QUOTIENT IS THUS A TIME IN UNITS OF 2(18) CENTISECONDS. THE FINAL SHIFT RESCALES TO UNITS OF 2(28) CS.
 R0095 THERE IS NO DAMPING FACTOR. THE CONSTANTS KIGNX/B4, KIGNY/B8 AND KIGNV/B4 ARE ALL NEGATIVE IN SIGN.

0097	REF	2	LAST	790	32,3075	55'644 1	DDUMCALC	TS	NIGNLOOP	
00971	REF	114	LAST	789	32,3076	0 6036 1		TC	INTPRET	
00972					32,3077	57345 1		DLOAD	DMPP	FORM DENOMINATOR FIRST
0098	REF	3	LAST	215	32,3100	03625 0			VGU	
0099	REF	2	LAST	137	32,3101	02471 1			KIGNX/B4	
0100					32,3102	44232 1		SL4R	BDSU	
0101	REF	4	LAST	791	32,3103	03631 0			VGU +4	
0102					32,3104	45325 1		PDDL	DSU	
0103	REF	2	LAST	137	32,3105	02467 0			RIGNZ	
0104	REF	2	LAST	215	32,3106	02550 0			RGU +4	
0105					32,3107	65222 0		SR4R	PDDL	
0106	REF	3	LAST	791	32,3110	02546 1			RGU +2	
0107					32,3111	57316 1		DSQ	DMPR	
0108	REF	2	LAST	137	32,3112	02473 0			KIGNY/B8	
0109					32,3113	65232 1		SL4R	PDDL	
0110	REF	4	LAST	791	32,3114	02544 0			RGU	
0111					32,3115	57225 0		DSU	DMPR	
0112	REF	2	LAST	137	32,3116	02465 1			RIGNX	
0113	REF	3	LAST	791	32,3117	02471 1			KIGNX/B4	
0114					32,3120	51515 1		PDVL	ABVAL	
0115	REF	5	LAST	791	32,3121	03625 0			VGU	
0116					32,3122	57225 0		DSU	DMPR	
0117	REF	2	LAST	137	32,3123	02463 1			VIGN	
0118	REF	2	LAST	137	32,3124	02475 0			KIGNV/B4	
0119					32,3125	43215 0		DAD	DAD	
0120					32,3126	56215 1		DAD	DDV	
0121					32,3127	77661 0		SRR		
0122					32,3130	21613 0			100	
0123					32,3131	43206 1		PUSH	DAD	
0124	REF	5	LAST	790	32,3132	03557 0			PIPTIME1	
0125	REF	48	LAST	790	32,3133	14041 1		STOVL	TDEC1	STORE NEW GUESS FOR NEXT INTEGRATION
0126					32,3134	45246 0		ABS	DSU	
0127	REF	1			32,3135	25256 1			DDUMCRIT	
0128					32,3136	45040 1		BMN	CALL	
0129	REF	1			32,3137	65156 0			DDUMGOOD	
0130	REF	25	LAST	718	32,3140	27412 0			INTSTALL	
0131					32,3141	43014 0		SET	SET	
0132	REF	13	LAST	718	32,3142	01473 0			INTYPELG	
0133	REF	11	LAST	719	32,3143	00063 1			MOONFLAG	
0134					32,3144	77745 1		DLOAD		
0136	REF	6	LAST	791	32,3145	03557 0			PIPTIME1	
0137	REF	11	LAST	718	32,3146	25517 0		STOVL	TET	HOPEFULLY ?GUIDSUB DID NOT
0138	REF	10	LAST	790	32,3147	00017 1			RATT1	CLOBBER RATT1 AND VATT1
0139	REF	11	LAST	718	32,3150	25535 0		STOVL	RCV	
0140	REF	12	LAST	742	32,3151	00025 0			VATT1	

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0141	REF	9	LAST	718	32,3152	35543	0	STCALL	VCV		
0142	REF	6	LAST	718	32,3153	27107	1		INTEGRVS		
0143					32,3154	77650	1	GOTO			
0144	REF	1			32,3155	65063	1		IGNALOOP		
0145					32,3156	54335	0	DDUMGOOD	SLOAD	SR	
0146	REF	4	LAST	747	32,3157	03425	1		ZOOMTIME		
0147					32,3160	20617	0		14D		
0148					32,3161	77621	1	BDSU			
0149	REF	49	LAST	791	32,3162	00041	1		TDFC1		
0150	REF	38	LAST	778	32,3163	27440	1	STOVL	TIG		COMPUTE DISTANCE LANDING SITE WILL BE
0151	REF	3	LAST	609	32,3164	03525	0		V		OUT OF LM'S ORBITAL PLANE AT IGNITION:
0152					32,3165	53435	0	VXV	UNIT		SIGN IS + IF LANDING SITE IS TO THE
0153	REF	6	LAST	790	32,3166	03517	1		R		RIGHT, NORTH; - IF TO THE LEFT, SOUTH.
0154					32,3167	72441	0	DOT	SL1		
0155	REF	4	LAST	790	32,3170	03633	1		LAND		
0156	REF	3	LAST	330	32,3171	26534	1	R60INIT	STOVL	OUTOFLN	INITIALIZATION FOR CALCMANU
0157	REF	5	LAST	790	32,3172	03252	1		UNFC/2		
0158	REF	2	LAST	138	32,3173	02536	0	STORE	R60VSAVF		STORE UNFC/2 TEMPORARILY IN R60SAVE
0162					32,3174	77776	1	EXIT			
A0163											*****
0164	REF	52	LAST	789	32,3175	0 5353	1	IGNALGRT	TC	PHASCHNG	PREVENT REPEATING IGNALG
0165					32,3176	04024	0		OCT	04024	
0166	REF	1			32,3177	4 3247	1	ASTNCLOCK	CS	ASTNDEX	
0167	RFF	212	LAST	789	32,3200	0 4616	1		TC	BANKCALL	
0168	REF	2	LAST	741	32,3201	74667	0		CADR	STCLOCK2	
0169	REF	127	LAST	785	32,3202	1 5155	1		TCF	ENDOFJOB	RETURN IN NEW JOB AND IN EBANK FIVE
0170	REF	115	LAST	791	32,3203	0 6036	1	ASTNRET	TC	INTPRET	
0171					32,3204	47131	1		SSP	RTB	GO PICK UP DISPLAY AT END OF R51:
0172	RFF	2	LAST	139	32,3205	02747	1			QMAJ	"PROCEED" WILL DO A FINE ALIGNMENT
0173	REF	1			32,3206	65210	1		FCADR	P63SPOT2	" ENTER " WILL RETURN TO P63SPOT2
0174	REF	1			32,3207	30776	1			R51P63	
0175					32,3210	53575	0	P63SPOT2	VLOAD	UNIT	INITIALIZE KALCMANU FOR BURN ATTITUDE
01751	RFF	3	LAST	792	32,3211	02536	0			R60VSAVF	
01752	REF	6	LAST	776	32,3212	27767	1		STOVL	POINTVSM	
01753	REF	8	LAST	790	32,3213	06422	0			UNITX	
01754	REF	21	LAST	776	32,3214	03761	1	STORE	SCAXIS		
01755					32,3215	77776	1	EXIT			
01756	REF	5	LAST	768	32,3216	3 5016	0	CAF	EBANK7		
01757	REF	19	LAST	768	32,3217	54 003	0	TS	EBANK		
0176					32,3220	0 0004	0	INHINT			
0177	REF	36	LAST	769	32,3221	0 4674	0	TC	IBNKCALL		
0178	RFF	2	LAST	761	32,3222	40142	1	CADR	PFLITEDB		
0179					32,3223	0 0003	1	RELINT			

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0180	REF	213	LAST	792	32,3224	0 4616 1		TC	BANKCALL	
0181	REF	5	LAST	761	32,3225	54101 0		CADR	R60LEM	
0182	REF	53	LAST	792	32,3226	0 5353 1		TC	PHASCHNG	PREVENT RECALLING R60
0183					32,3227	04024 0		OCT	04024	
0184	REF	40	LAST	690	32,3230	3 4746 0	P63SPOT3	CA	BIT6	IS THE LR ANTENNA IN POSITION 1 YET
0185					32,3231	0 0006 1		EXTEND		
0186	REF	21	LAST	615	32,3232	02 033 0		RAND	CHAN33	
0187					32,3233	0 0006 1		EXTEND		
0188	REF	1			32,3234	1 3242 1		BZF	P63SPOT4	BRANCH IF ANTENNA ALREADY IN POSITION 1
0189	REF	1			32,3235	3 3250 0		CAF	CODE500	ASTRONAUT: PLEASE CRANK THE
0190	REF	214	LAST	793	32,3236	0 4616 1		TC	BANKCALL	SILLY THING AROUND
0191	REF	4	LAST	755	32,3237	20476 0		CADR	GOPERF1	
0192	REF	33	LAST	770	32,3240	1 6001 1		TCF	GOTOPOOH	TERMINATE
0193	REF	1			32,3241	1 3230 1		TCF	P63SPOT3	PROCEED SEE IF HE'S LYING
0194	REF	215	LAST	793	32,3242	0 4616 1	P63SPOT4	TC	BANKCALL	ENTER INITIALIZE LANDING RADAR
0195	REF	1			32,3243	67704 0		CADR	SETPOS1	
0196	REF	43	LAST	769	32,3244	0 4635 0		TC	POSTJUMP	OFF TO SEE THE WIZARD...
0197	REF	2	LAST	761	32,3245	74124 0		CADR	BURNBABY	

R0198

R0199

CONSTANTS FOR P63LM AND IGNALG

0200	REF	2	LAST	756	32,3246	02074 0	P63ADRES	GENADR	P63TABLE	
0202					32,3247	00027 1	ASTNDEX	OCT	00027	INDEX FOR CLOKTASK
0203					32,3250	00500 1	CODE500	OCT	00500	
02035					32,3251	00035 1	99999CON	2DEC	30479.7	B-24
02035					32,3252	30373 0				
0204					32,3253	00003 1	GUIDDURN	2DEC	+65164	
0204					32,3254	37214 1				
0205					32,3255	00000 1	DDUMCRIT	2DEC	+8	B-28
0205					32,3256	00010 0				CRITERION FOR IGNALG CONVERGENCE

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R0206

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P0207
R0208
R0209*****
P68: LANDING CONFIRMATION

0210					31,2172				BANK	31		
0211	REF	3	LAST	59	31,2000				SETLOC	F2DPS*31		
0212					31,2172				BANK			
0213	REF	1							COUNT*	\$/P 6567		
0214	REF	54	LAST	793	31,2172	0 5353	1	LANDJUNK	TC	PHASCHNG		
0215					31,2173	04024	0		OCT	04024		
02151					31,2174	0 0004	0		INHINT			
0216	REF	216	LAST	793	31,2175	0 4616	1		TC	BANKCALL		ZERO ATTITUDE ERROR
0217	REF	6	LAST	763	31,2176	40153	1		CADR	ZATTIROP		
0219	REF	217	LAST	795	31,2177	0 4616	1		TC	BANKCALL		SET 5 DEGREE DEADBAND
0220	REF	1			31,2200	40127	1		CADR	SETMAXDB		
0221	REF	116	LAST	792	31,2201	0 6036	1		TC	INTPRET		TO INTERPRETIVE AS TIME IS NOT CRITICAL
0222					31,2202	43014	0		SET	CLEAR		
0223	REF	13	LAST	714	31,2203	04067	1			SURFFLAG		
0224	REF	1			31,2204	04666	0			LETA BORT		
0225					31,2205	43014	0		SET	CLEAR		
0226	REF	3	LAST	781	31,2206	05062	0			APSFLAG		
0227	REF	1			31,2207	03664	0			SWANDISP		
0228					31,2210	77214	0		SET	VLOAD		
0229	REF	2	LAST	789	31,2211	05460	0			LRBYPASS		
0230	REF	9	LAST	784	31,2212	01221	1			RN		
0231	REF	3	LAST	666	31,2213	16032	1		STODL	ALPHAV		
0232	REF	9	LAST	784	31,2214	01235	1			PIPTIME		
0233					31,2215	45014	0		SET	CALL		
0234	REF	3	LAST	666	31,2216	01463	1			LUNAFLAG		
0235	REF	2	LAST	666	31,2217	26351	1			LAT-LONG		
0236					31,2220	77201	1		SETPD	VLOAD		COMPUTE RLS AND STORE IT AWAY
0237					31,2221	00001	0			0		
0238	REF	10	LAST	795	31,2222	01221	1			RN		
0239					31,2223	65352	0		VSL2	PDDL		
0240	REF	10	LAST	795	31,2224	01235	1			PIPTIME		
0241					31,2225	45006	0		PUSH	CALL		
0242	REF	1			31,2226	51531	1			R-TO-RP		
0243	REF	6	LAST	789	31,2227	02023	1		STORE	RLS		
0244					31,2230	77776	1		EXIT			
0245	REF	1			31,2231	3 2246	0		CAF	V06N43*		ASTRONAUT: NOW LOOK WHERE YOU ENDED UP
0246	REF	218	LAST	795	31,2232	0 4616	1		TC	BANKCALL		
0247	REF	21	LAST	769	31,2233	20351	1		CADR	GOF LASH		
0248	REF	34	LAST	793	31,2234	1 6001	1		TCF	GOTOPOOH		TERMINATE
0249					31,2235	1 2237	1		TCF	+2		PROCEED
0250					31,2236	1 2231	1		TCF	-5		RECYCLE

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0251	REF 117	LAST 795	31,2237	0 6036	1	TC	INTPRET	
0252			31,2240	77775	1	VLOAD		INITIALIZE GSAV AND (USING REFMF)
0253	REF 9	LAST 792	31,2241	06422	0		JNITX	YNBSAV, ZNBSAV AND ATTFLAG FOR P57
0254	REF 5	LAST 217	31,2242	36235	0	STCALL	GSAV	
0255	REF 1		31,2243	33470	1		REFMF	
0256			31,2244	77776	1	EXIT		
0257	REF 35	LAST 795	31,2245	1 6001	1	TCF	GOTOPDOH	ASTRONAUT: PLEASE SELECT P57
0258			31,2246	01453	1	V06N43*	VN	0643

L THROTTLE CONTROL ROUTINES

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```

0001          31,2247          BANK 31
0002 REF 3 LAST 56 31,2000          SETLOC FTHROT
0003          31,2247          BANK
0004 REF 2 LAST 164 E7,1610          EBANK= PIF
0005 REF 3 LAST 56 TO 56: 2 5*          COUNT* $$/THROT
R0006 *****

```

R0008 HERE FC, DESIRED THRUST, AND FP, PRESENT THRUST, UNWEIGHTED, ARE COMPUTED.

```

0010 REF 3 LAST 226 31,2247 3 1246 0 THROTTLE CA ABDELV          COMPUTE PRESENT ACCELERATION IN UNITS OF
0011          31,2250 0 0006 1          EXTEND          2(-4) M/CS/CS, SAVING SERVICER TROUBLE
0012 REF 1          31,2251 7 2444 0          MP /AF/CNST
0013          31,2252 0 0006 1          EXTEND
0014 REF 2 LAST 164 31,2253 23'605 0          QXCH RTHOLD
0015 REF 1          31,2254 0 2425 0          TC MASSMUL
0016 REF 1          31,2255 53'563 1          DXCH EP          FP = PRESENT THRUST
0017          31,2256 0 0006 1          EXTEND
0018 REF 1          31,2257 3 1574 0          DCA /AFC/
0019 REF 2 LAST 797 31,2260 0 2425 0          TC MASSMUL
0020 REF 3 LAST 215 31,2261 55'613 0          TS FC          FC = THRUST DESIRED BY GUIDANCE
0021 REF 2 LAST 164 31,2262 53'561 0          DXCH FCODD          FCODD = WHAT IT IS GOING TO GET

```

R0022 IF IT HAS BEEN LESS THAN 3 SECONDS SINCE THE LAST THROTTLING, AUGMENT FP USING THE FWEIGHT CALCULATED THEN.

```

0024 REF 2 LAST 164 31,2263 4 1615 0          CS TTHROT          THIS CODING ASSUMES A FLATOUT WITHIN
0025 REF 8 LAST 751 31,2264 6 0025 0          AD TIME1          80 SECONDS BEFORE FIRST THROTTLE CALL
0026 REF 14 LAST 568 31,2265 7 4733 0          MASK POSMAX
0027          31,2266 4 0000 0          COM
0028 REF 1          31,2267 6 5002 0          AD 3SECS
0029          31,2270 0 0006 1          EXTEND
0030 REF 1          31,2271 6 2275 0          BZMF WHERETO          BRANCH IF (TIME1-TTHROT +1) > 3 SECONDS
0031          31,2272 0 0006 1          EXTEND
0032 REF 2 LAST 164 31,2273 3 1607 1          DCA FWEIGHT
0033 REF 2 LAST 797 31,2274 21'563 1          DAS FP

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R0034 THIS LOGIC DETERMINES THE THROTTLING IN THE REGION 10% - 94%. THE MANUAL THROTTLE, NOMINALLY SET AT
R0036 MINIMUM BY ASTRONAUT OR MISSION CONTROL PROGRAMS, PROVIDES THE LOWER BOUND. A STOP IN THE THROTTLE HARDWARE
R0038 PROVIDES THE UPPER.

```

0039 REF 5 LAST 785 31,2275 3 5014 1 WHERETO CA EBANK5          INITIALIZE L*WCR*T AND H*GHCRT FROM
0040 REF 20 LAST 792 31,2276 54 003 0          TS ERANK          PAD LOADED ERASABLES IN W-MATRIX

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L THROTTLE CONTROL ROUTINES

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00401	REF	2	LAST	137	E5,1476		EBANK=	LOWCRIT	
0041					31,2277	0 0006 1	EXTEND		
0042	REF	3	LAST	798	31,2300	3 1477 1	DCA	LOWCRIT	
0043	REF	1			31,2301	52 131 0	DXCH	L*WCR*T	
0044	REF	6	LAST	792	31,2302	3 5016 0	CA	EBANK7	
0045	REF	21	LAST	797	31,2303	54 003 0	TS	EBANK	
00451	REF	3	LAST	797	E7,1610		EBANK=	PIF	
0046	REF	142	LAST	781	31,2304	4 4755 0	CS	ZERO	INITIALIZE PIFPSET
0047	REF	2	LAST	164	31,2305	55*604 0	TS	PIFPSET	
0048	REF	1			31,2306	4 0131 0	CS	H*GHCR*T	
0049	REF	2	LAST	164	31,2307	6 1616 1	AD	FCOLD	
0050					31,2310	0 0006 1	EXTEND		
0051	REF	1			31,2311	6 2323 1	BZMF	LOWFCOLD	BRANCH IF FCOLD < OR = HIGHCRIT
0052	REF	2	LAST	798	31,2312	4 0130 1	CS	L*WCR*T	
0053	REF	3	LAST	797	31,2313	6 1560 0	AD	FCODD	
0054					31,2314	0 0006 1	EXTEND		
0055	REF	1			31,2315	6 2320 1	BZMF	FCOMPSET	BRANCH IF FC < OR = LOWCRIT
0056	REF	3	LAST	797	31,2316	3 1562 1	CA	FP	SEE NOTE 1
0057	REF	1			31,2317	1 2337 0	TCF	FLATOUT1	
0058	REF	1			31,2320	4 2002 0	FCOMPSET	CS	FMAXODD
0059	REF	4	LAST	798	31,2321	6 1562 1	AD	FP	SEE NOTE 2
0060	REF	1			31,2322	1 2341 1	TCF	FLATOUT2	
0061	REF	2	LAST	798	31,2323	4 0131 0	LOWFCOLD	CS	H*GHCR*T
0062	REF	4	LAST	798	31,2324	6 1560 0	AD	FCODD	
0063					31,2325	0 0006 1	EXTEND		
0064	REF	1			31,2326	6 2342 0	BZMF	DOPIF	BRANCH IF FC < OR = HIGHCRIT
0065	REF	3	LAST	786	31,2327	3 0102 1	CA	FLAGWRD6	IS POUTFLAG SET?
0066	REF	1			31,2330	7 4745 1	MASK	POUTBIT	
0067					31,2331	0 0006 1	EXTEND		
0068	REF	2	LAST	798	31,2332	1 2336 1	BZF	FLATOUT1 -1	
00681	REF	3	LAST	798	31,2333	3 0131 1	CA	H*GHCR*T	YES: THROTTLE-UP ONLY TO HIGHCRIT
00682	REF	5	LAST	798	31,2334	55*560 1	TS	FCODD	
00683	REF	2	LAST	798	31,2335	1 2342 1	TCF	DOPIF	
0069	REF	1			31,2336	3 2003 0	CA	FMAXPOS	NO: THROTTLE-UP
0070	REF	6	LAST	798	31,2337	53*561 0	FLATOUT1	DXCH	FCODD
0071	REF	1			31,2340	3 4737 0	CA	FFXTRA	
0072	REF	3	LAST	798	31,2341	55*604 0	FLATOUT2	TS	PIFPSET

A0073
A0074NOTE 1 FC IS SET EQUAL TO FP SO PIF WILL BE ZERO. THIS IS DESIRABLE
AS THERE IS ACTUALLY NO THROTTLE CHANGE.A0075
A0076
A0077
A0078NOTE 2 HERE, SINCE WE ARE ABOUT TO RETURN TO THE THROTTLEABLE REGION
(BELOW 55%) THE QUANTITY -(FMAXODD - FP) IS COMPUTED AND PUT
INTO PIFPSET TO COMPENSATE FOR THE DIFFERENCE BETWEEN THE
NUMBER OF BITS CORRESPONDING TO FULL THROTTLE (FMAXODD) AND THE

L THROTTLE CONTROL ROUTINES

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A0079 NUMBER CORRESPONDING TO ACTUAL THRUST (FP). THUS THE TOTAL
A0080 THROTTLE COMMAND PIF = FC - FP -(FMAXODD - FP) = FC - FMAXODD.

0081	REF	1		31,2342	0 3721 0	DOPIF	TC	FASTCHNG	RESTART PROTECTION
0082				31,2343	0 0006 1		EXTEND		
0083	REF	7	LAST 798	31,2344	3 1561 1		DCA	FCDD	
0084	REF	3	LAST 798	31,2345	55'616 0		TS	FCOLD	
0085	REF	4	LAST 798	31,2346	53'611 1		DXCH	PIF	
0086				31,2347	0 0006 1		EXTEND		
0087	REF	5	LAST 798	31,2350	4 1563 1		DCS	FP	
0088	REF	5	LAST 799	31,2351	21'611 1		DAS	PIF	PIF = FC - FP, NEVER EQUALS +0
0089	REF	6	LAST 799	31,2352	3 1610 1	DOIT	CA	PIF	
0090	REF	4	LAST 798	31,2353	6 1604 1		AD	PIFSET	ADD IN PIFSET, WITHOUT CHANGING PIF
0091	REF	3	LAST 215	31,2354	55'612 1		TS	PSEUDO55	
0092	REF	4	LAST 767	31,2355	54 055 0		TS	THRUST	
0093	REF	32	LAST 767	31,2356	3 4750 1		CAF	BIT4	
0094				31,2357	0 0006 1		EXTEND		
0095	REF	10	LAST 767	31,2360	05 014 1		WOR	CHAN14	
0096	REF	9	LAST 797	31,2361	3 0025 0		CA	TIMEL	
0097	REF	3	LAST 797	31,2362	55'615 0		TS	TTHROT	

R0098 SINCE /AF/ IS NOT AN INSTANTANEOUS ACCELERATION, BUT RATHER AN "AVERAGE" OF THE ACCELERATION LEVELS DURING
R0100 THE PRECEDING PIPA INTERVAL, AND SINCE FP IS COMPUTED DIRECTLY FROM /AF/, FP IN ORDER TO CORRESPOND TO THE
R0102 ACTUAL THRUST LEVEL AT THE END OF THE INTERVAL MUST BE WEIGHTED BY

R0103
$$\text{FWEIGHT} = \frac{\text{PIF}(\text{PPROCESS} + \text{TL})}{\text{PGUID}} + \frac{\text{PIF} / \text{PIF}}{2 \text{ PGUID FRATE}}$$

R0104
R0105

R0106 WHERE PPROCESS IS THE TIME BETWEEN PIPA READING AND THE START OF THROTTLING, PGUID IS THE GUIDANCE PERIOD, AND
R0108 FRATE IS THE THROTTLING RATE (32 UNITS PER CENTISECOND). PGUID IS ASSUMED TO BE 2 SECONDS. THE "TL" IN THE
R0110 FIRST TERM REPRESENTS THE ENGINE'S RESPONSE LAG. HERE FWEIGHT IS COMPUTED FOR USE NEXT PASS.

0112	REF	2	LAST 180	31,2363	3 5003 1		CA	4SECS	
0113	REF	154	LAST 769	31,2364	54 002 1		TS	Q	
0114	REF	11	LAST 795	31,2365	4 1235 0		CS	PIPTIME +1	TIME OF LAST PIPA READING
0115	REF	10	LAST 799	31,2366	6 0025 0		AD	TIMEL	
0116	REF	1		31,2367	6 2004 1		AD	THROTLAG	COMPENSATE FOR ENGINE RESPONSE LAG
0117	REF	4	LAST 473	31,2370	7 4357 0		MASK	LOW8	MAKE SURE SMALL AND POSITIVE
0118				31,2371	22 007 0		ZL		
0119				31,2372	0 0006 1		EXTEND		
0120	REF	195	LAST 799	31,2373	10 002 1		DV	Q	
0121				31,2374	0 0006 1		EXTEND		
0122	REF	7	LAST 799	31,2375	7 1610 0		MP	PIF	
0123				31,2376	6 0000 1		DOUBLE		
0124	REF	3	LAST 797	31,2377	53'607 0		DXCH	FWEIGHT	
0125	REF	1		31,2400	3 7715 0		CA	2.PG.FRT	
0126	REF	196	LAST 799	31,2401	54 002 1		TS	Q	

L THROTTLE CONTROL ROUTINES

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0127	REF	8	LAST	799	31,2402	11'610 0	CCS	PIF
0128	REF	86	LAST	789	31,2403	6 4753 1	AD	ONE
0129					31,2404	1 2406 0	TCF	+2
0130	REF	87	LAST	800	31,2405	6 4753 1	AD	ONE
0131					31,2406	0 0006 1	EXTEND	
0132	REF	9	LAST	800	31,2407	7 1610 0	MP	PIF
0133					31,2410	0 0006 1	EXTEND	
0134	REF	197	LAST	799	31,2411	10 002 1	DV	Q
0135					31,2412	22 007 0	ZL	
0136	REF	4	LAST	799	31,2413	21'607 0	DAS	FWEIGHT

0137	REF	3	LAST	797	31,2414	0 1605 0	THDUMP	TC	RTNHOLD
------	-----	---	------	-----	---------	----------	--------	----	---------

R0138 FLATOUT THROTTLES UP THE DESCENT ENGINE, AND IS CALLED AS A BASIC SUBROUTINE.

0140	REF	33	LAST	749	31,2415	3 4737 0	FLATOUT	CAF	BIT13	4096 PULSES
0141	REF	5	LAST	799	31,2416	55'604 0	WHATOUT	TS	PIFPSET	USE PIFPSET SO FWEIGHT WILL BE ZERO
0142	REF	143	LAST	798	31,2417	4 4755 0		CS	ZERO	
0143	REF	4	LAST	799	31,2420	55'616 0		TS	FCOLD	
0144	REF	10	LAST	800	31,2421	55'610 0		TS	PIF	
0145					31,2422	0 0006 1		EXTEND		
0146	REF	4	LAST	800	31,2423	23'605 0		QXCH	RTNHOLD	
0147	REF	1			31,2424	1 2352 0		TCF	DOIT	

R0148 MASSMUL T SCALES ACCELERATION, ARRIVING IN A AND L IN UNITS OF 2(-4) M/CS/CS, TO FORCE IN PULSE UNITS.

0150					31,2425	0 0006 1	MASSMUL T	EXTEND		
0151	REF	47	LAST	470	31,2426	22 130 0		QXCH	BUF	
0152					31,2427	0 0006 1		EXTEND		
0153	REF	5	LAST	310	31,2430	7 1244 0		MP	MASS	LEAVES ODDLY SCALED FORCE IN A AND L
0154	REF	284	LAST	781	31,2431	52 155 1		DXCH	MPAC	
0155	REF	15	LAST	448	31,2432	0 7102 0		TC	DMP	LEAVES PROPERLY SCALED FORCE IM MPAC
0156	REF	1			31,2433	02005 0		ADRES	SCALEFAC	
0157	REF	10	LAST	781	31,2434	0 7256 1		TC	TPAGREE	
0158	REF	285	LAST	800	31,2435	3 0154 1		CA	MPAC	
0159					31,2436	0 0006 1		EXTEND		
0160					31,2437	1 2442 0		BZF	+3	
0161	REF	15	LAST	797	31,2440	3 4733 1		CAF	POSMAX	
0162	REF	48	LAST	800	31,2441	0 0130 0		TC	BUF	
0163	REF	286	LAST	800	31,2442	52 156 1		DXCH	MPAC +1	
0164	REF	49	LAST	800	31,2443	0 0130 0		TC	BUF	

R0165 CONSTANTS:-

0171	REF	34	LAST	800	4737	FEXTRA	=	BIT13
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L THROTTLE CONTROL ROUTINES

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0173 REF 2 LAST 349 7715 2.PG.FRT = PRI031 DECIMAL 12800

0174 31,2444 04143 0 /AF/CNST DEC .13107

R0177 * * * * *

L LUNAR LANDING GUIDANCE EQUATIONS

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P0001

0002 REF 2 LAST 789 E7,1617 EBANK= E2DPS

0003 REF 3 LAST 59 TD 59: 2 4* CDUNT* \$\$/F2DPS

R0004 *****
 R0006 LUNAR LANDING FLIGHT SEQUENCE TABLES
 R0007 *****

R0009 FLIGHT SEQUENCE TABLES ARE ARRANGED BY FUNCTION. THEY ARE REFERENCED USING AS AN INDEX THE REGISTER WCHPHASE:

A0011	WCHPHASE = -1 --->	IGNALG
A0012	WCHPHASE = 0 --->	BRKQUAD
A0013	WCHPHASE = 1 --->	BRKLLING
A0014	WCHPHASE = 2 --->	APPRQUAD
A0015	WCHPHASE = 3 --->	APPRLLING
A0016	WCHPHASE = 4 --->	VERTICAL

R0017 *****

R0019 RDUTINES FOR STARTING NEW GUIDANCE PHASES:

0020	REF 1	31,2445	1 2657 0	TCE	TTFINCR	IGNALG
0021	REE 2 LAST 802	31,2446	1 2657 0	NEWPHASE	TTEINCR	BRKQUAD
0022	REF 1	31,2447	1 2643 0	TCE	LINSET?	BRKLLING
0023	REF 1	31,2450	1 2627 1	TCF	STARTP64	APPRQUAD
0024	REE 1	31,2451	1 2647 1	TCE	LINSET	APPRLLING
0025	REF 1	31,2452	1 2616 0	TCF	P65START	VERTICAL

R0026

R00261 PRE-GUIDANCE COMPUTATIONS:

00262	REF 1	31,2453	1 3025 1	TCE	CALCRGVG	IGNALG
00263	REF 1	31,2454	1 3035 0	PREGUIDE	RGVGCALC	BRKQUAD
00264	REF 2 LAST 802	31,2455	1 3035 0	TCF	RGVGCALC	BRKLLING
00265	REF 1	31,2456	1 2725 1	TCE	REDESIG	APPRQUAD
00266	REF 3 LAST 802	31,2457	1 3035 0	TCE	RGVGCALC	APPRLLING
00267	REF 4 LAST 802	31,2460	1 3035 0	TCE	RGVGCALC	VERTICAL

R00268

R0027 GUIDANCE EQUATIONS:

0028	REF 1	31,2461	1 3107 0	TCF	TTF/8CL	IGNALG
0029	REF 2 LAST 802	31,2462	1 3107 0	WHATGUID	TTE/8CL	BRKQUAD
0030	REE 1	31,2463	1 3101 0	TCE	LINGUID	BRKLLING
0031	REF 3 LAST 802	31,2464	1 3107 0	TCE	TTE/8CL	APPRQUAD
0032	REF 2 LAST 802	31,2465	1 3101 0	TCE	LINGUID	BRKLLING
0033	REE 1	31,2466	1 3477 1	TCF	VERTGUID	VERTICAL

R0034

L LUNAR LANDING GUIDANCE EQUATIONS

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R0035 POST GUIDANCE EQUATION COMPUTATIONS:

0036	REF	1		31,2467	1 3240 0	TCF	CGCALC	IGNALG
0037	REF	2	LAST 803	31,2470	1 3240 0	AFTRGUID TCF	CGCALC	BRKQUAD
0038	REF	1		31,2471	1 3270 0	TCF	LINXLOGC	BRKLING
0039	REF	3	LAST 803	31,2472	1 3240 0	TCF	CGCALC	APPRQUAD
0040	REF	2	LAST 803	31,2473	1 3270 0	TCF	LINXLOGC	APPRLING
0041	REF	1		31,2474	1 3411 1	TCF	EXVERT	VERTICAL

R0042

R0043 WINDOW VECTOR COMPUTATIONS:

0044	REF	1		31,2475	1 3304 1	TCF	EXGSUB	IGNALG
0045	REF	1		31,2476	1 3325 1	WHATEXIT TCF	EXBRK	BRKQUAD
0046	REF	2	LAST 803	31,2477	1 3445 0	TCF	EXBRK	BRKLING
0047	REF	1		31,2500	1 3333 0	TCF	EXNORM	APPRQUAD
0048	REF	2	LAST 803	31,2501	1 3333 0	TCF	EXNORM	APPRLING

R0050

R0051 DISPLAY ROUTINES:

0052	REF	2	LAST 756	31,2502	1 3441 1	WHATDISP TCF	P6DISPS	BRKQUAD
0053	REF	3	LAST 803	31,2503	1 3441 1	TCF	P6DISPS	BRKLING
0054	REF	1		31,2504	1 3445 0	TCF	P6DISPS	APPRQUAD
0055	REF	2	LAST 803	31,2505	1 3445 0	TCF	P6DISPS	APPRLING
0056	REF	1		31,2506	1 3475 0	TCF	VFTDISP	VERTICAL

R0057

R0058 INDICES FOR REFERENCING TARGET PARAMETERS:

0059				31,2507	00000 1	OCT	0	IGNALG
0060				31,2510	00000 1	TARGETDEX OCT	0	BRKQUAD
0061				31,2511	00000 1	OCT	0	BRKLING
0062				31,2512	00030 1	OCT	30	APPRQUAD
0063				31,2513	00030 1	OCT	30	APPRLING

R0065

R0074 *****

R0076 ENTRY PCINTS: 2GUIDSUB FOR THE IGNITION ALGORITHM, LUNLAND FOR SERVOUT

R0077 *****

R0079 IGNITION ALGORITHM ENTRY: DELIVERS N PASSES OF QUADRATIC GUIDANCE

0080				31,2514	77776 1	?GUIDSUB	EXIT	
0081	REF	44	LAST 763	31,2515	3 4752 0	CAF	TWO	N = 3
0082	REF	1		31,2516	55'645 0	TS	NGUIDSUB	
0083	REF	1		31,2517	1 2600 1	TCF	GUILDRET	
0084	REF	2	LAST 803	31,2520	55'645 0	GUIDSUB	TS	NGUIDSUB
0085	REF	2	LAST 802	31,2521	1 3025 1	TCF	CALCRGVG	ON SUCCEEDING PASSES SKIP TTFINCR

L LUNAR LANDING GUIDANCE EQUATIONS

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R0086 NCRML ENTRY: CONTROL COMES HERE FROM SERVOUT

0087	REF	55	LAST	795	31,2522	0 5353 1	LUNLAND	TC	PHASCHNG
0088					31,2523	00035 1		OCT	00035
00885	RFF	56	LAST	804	31,2524	0 5353 1		TC	PHASCHNG
0089					31,2525	05023 0		OCT	05023
0090					31,2526	21000 1		OCT	21000

GROUP 5: RETAIN ONLY PIPA TASK

GROUP 3: PROTECT GUIDANCE WITH PRIO 21
JUST HIGHER THAN SERVICER'S PRIORITY

R0091 *****
 R0093 GULDENSTERN: AUTO-MODES MONITOR (R13)
 R0094 *****

0096 REF 1 COUNT* \$\$/R13

R0097 HERE IS THE PHILOSOPHY OF GULDENSTERN: ON EVERY APPEARANCE OR DISAPPEARANCE OF THE MANUAL THROTTLE
 R0099 DISCRETE TO SELECT P67 OR P66 RESPECTIVELY; ON EVERY APPEARANCE OF THE ATTITUDE-HOLD DISCRETE TO SELECT P66
 R0101 UNLESS THE CURRENT PROGRAM IS P67 IN WHICH CASE THERE IS NO CHANGE.

0102					31,2527	0 0006 1	GULDEN	EXTEND		IS UN-AUTO-THROTTLE DISCRETE PRESENT?
0103	REF	6	LAST	755	31,2530	00 030 1	STERN	READ	CHAN30	
0104	REF	35	LAST	758	31,2531	7 4747 0		MASK	BIT5	
0105	REF	233	LAST	769	31,2532	10 000 0		CCS	A	
0106	REF	1			31,2533	1 2564 0		TCF	STARTP67	YES
0107	REF	5	LAST	747	31,2534	0 5321 1	P67NOW?	TC	CHECKMM	NO: ARE WE IN P67 NOW?
0108					31,2535	00103 0		DEC	67	
0109	RFF	1			31,2536	1 2570 0		TCF	STABL?	NO
0110	REF	2	LAST	799	31,2537	0 3721 0	STARTP66	TC	FASTCHNG	YES
0111	RFF	2	LAST	386	31,2540	0 5311 1		TC	NEWMODEX	
0112					31,2541	00102 1		DEC	66	
0113					31,2542	0 0006 1		EXTEND		INITIALIZE VDGVERT USING
0114	REF	6	LAST	791	31,2543	3 1625 1		DCA	VGU	PRESENT DOWNWARD VELOCITY
0115	RFF	1			31,2544	53'643 0		DXCH	VDGVERT	
0116	REF	144	LAST	800	31,2545	3 4755 1		CAF	ZERO	
0117	RFF	1			31,2546	55'644 1		TS	RODCOUNT	
0118	RFF	1			31,2547	55'645 0	VRTSTART	TS	WCHVFT	
0119	REF	14	LAST	789	31,2550	3 4751 0		CAF	FOUR	WCHPHASE = 4 --> VERTICAL: P65,P66,P67
0120	REF	3	LAST	747	31,2551	55'617 1		TS	WCHPHOLD	
0121	REF	6	LAST	789	31,2552	55'620 0		TS	WCHPHASE	
0122	REF	219	LAST	795	31,2553	0 4616 1		TC	8ANKCALL	TEMPORARY, I HOPE HOPE HOPE
0123	REF	4	LAST	769	31,2554	40165 1		CADR	STOPRATE	TEMPORARY, I HOPE HOPE HOPE
0124	REF	66	LAST	785	31,2555	0 5516 0		TC	DOWNFLAG	PERMIT X-AXIS OVERRIDE
0125	RFF	3	LAST	244	31,2556	00311 1		ADRES	XQVINFLG	
0126	REF	67	LAST	804	31,2557	0 5516 0		TC	DOWNFLAG	
0127	REF	2	LAST	789	31,2560	00143 1		ADRES	REDFLAG	
0128	RFF	68	LAST	804	31,2561	0 5516 0		TC	DOWNFLAG	PERMIT PULSE-OUTS
0129	REF	1			31,2562	00142 0		ADRES	POUTFLAG	
0130	REF	2	LAST	803	31,2563	1 2600 1		TCF	GUILDRET	
0131	REF	3	LAST	804	31,2564	0 5311 1	STARTP67	TC	NEWMODEX	NO HARM IN "STARTING" P67 OVER AND OVER
0132					31,2565	00103 0		DEC	67	SO NO NEED FOR A FASTCHNG AND NO NEED

L LUNAR LANDING GUIDANCE EQUATIONS

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0133 REF 6 LAST 480 31,2566 3 4363 0
 0134 REF 1 31,2567 1 2547 1

CAF TEN
 TCF VRTSTART

TO SEE IF ALREADY IN P67

0135 REF 35 LAST 800 31,2570 3 4737 0
 0136 31,2571 0 0006 1

STABL?

CAF BITI3
 EXTEND

IS UN-ATTITUDE-HOLD DISCRETE PRESENT?

0137 REF 4 LAST 529 31,2572 02 031 1

RAND CHAN31

0138 REF 234 LAST 804 31,2573 10 000 0

CCS A

0139 REF 3 LAST 804 31,2574 1 2600 1

TCF GUILDRET

YES: ALL'S WELL

0140 REF 6 LAST 804 31,2575 0 5321 1

P66NOW?

TC CHECKMM

NO: ARE WE IN P66 NOW?

0141 31,2576 00102 1

DEC 66

0142 REF 1 31,2577 1 2537 0

TCF STARTP66

NO

A0143 (CONTINUE TO GUILDRET)

YES

R0144 *****
 R0146 INITIALIZATION FOR THIS PASS
 R0147 *****

0149 REF 4 LAST 802 TO 804: 50 54*

COUNT* \$\$/F2DPS

0150 31,2600 0 0006 1

GUILDRET

EXTEND

0151 REF 3 LAST 790 31,2601 3 1623 1

DCA TPIP

0152 REF 2 LAST 164 31,2602 53'572 1

DXCH TPIPOLD

0153 REF 3 LAST 804 31,2603 0 3721 0

TC FASTCHNG

0154 31,2604 0 0006 1

EXTEND

0155 REF 7 LAST 791 31,2605 3 1557 1

DCA PIPTIME1

0156 REF 4 LAST 805 31,2606 53'623 0

DXCH TPIP

0157 31,2607 0 0006 1

EXTEND

0158 REF 4 LAST 790 31,2610 3 1641 0

DCA ITF/8

0159 REF 2 LAST 164 31,2611 53'551 0

DXCH ITF/8TMP

0164 REF 3 LAST 747 31,2612 11'621 1

CCS FLPASSO

0165 REF 3 LAST 802 31,2613 1 2657 0

TCF ITFINCR

0166 REF 7 LAST 804 31,2614 51'620 1

BRSPOT1

INDEX #CHPHASE

0167 REF 1 31,2615 1 2446 1

TCF NEWPHASE

R0168 *****
 R0170 ROUTINES TO START NEW PHASES
 R0171 *****

0173 REF 4 LAST 804 31,2616 0 5311 1

P65START

TC NEWMODEX

0174 31,2617 00101 1

DEC 65

0175 REF 45 LAST 803 31,2620 4 4752 1

CS TWO

0176 REF 2 LAST 804 31,2621 55'645 0

TS WCHVERT

0177 REF 69 LAST 804 31,2622 0 5516 0

TC DOWNFLAG

PERMIT X-AXIS OVERRIDE

0178 REF 4 LAST 804 31,2623 00311 1

ADRES XOVINFLG

L LUNAR LANDING GUIDANCE EQUATIONS

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0179	REF	70	LAST	805	31,2624	0 5516 0	COMSTART	TC	DOWNFLAG
0180	REF	2	LAST	804	31,2625	00142 0		ADRES	POUTFLAG
0181	REF	4	LAST	805	31,2626	1 2657 0		TCF	TTFINCR

0182	REF	1			31,2627	3 3743 1	STARTP64	CAF	DELTTFAP	AUGMENT TTF/8 (TWO-PHASE ONLY)
0183	REF	3	LAST	805	31,2630	27'550 1		ADS	TTF/8TMP	
0184	REF	5	LAST	805	31,2631	0 5311 1	+2	TC	NEWMCDFX	
0185					31,2632	00100 0		DEC	64	
01851	REF	46	LAST	805	31,2633	3 4752 0		CAF	TWO	
01852	REF	8	LAST	805	31,2634	55'620 0		TS	WCHPHASE	
0186	REF	38	LAST	786	31,2635	3 4740 0		CA	BIT12	ENABLE RUPT10
0187					31,2636	0 0006 1		EXTEND		
0188	REF	15	LAST	568	31,2637	05 013 0		WOR	CHAN13	
0189	REF	71	LAST	806	31,2640	0 5516 0		TC	DOWNFLAG	INITIALIZE REDESIGNATION FLAG
0190	REF	3	LAST	804	31,2641	00143 1		ADRES	REDFLAG	
0191	REF	1			31,2642	1 2624 1		TCF	COMSTART	

R0192 *****
 R0194 SET LINEAR GUIDANCE COEFFICIENTS
 R0195 *****

0197	REF	4	LAST	798	31,2643	3 0102 1	LINSET?	CA	FLAGWRD6	ONE-PHASE OR TWO-PHASE?
0198	REF	1			31,2644	7 4743 1		MASK	2PHASBIT	
0199					31,2645	0 0006 1		EXTEND		
0200	REF	2	LAST	802	31,2646	1 2631 0		BZF	STARTP64 +2	ONE-PHASE: GO DIRECTLY TO APPROACH PHASE
0204	REF	1			31,2647	0 3667 0	LINSET	TC	INTPRETX	
0205					31,2650	51775 0		VLOAD	VSJ*	
0206	REF	2	LAST	135	31,2651	02271 1			ACS	JLING = (ACG - ADG)/TTF
0207	REF	1			31,2652	02417 1			ADG, 1	
0208					31,2653	70322 0		VSR3	V/SC	
0209	REF	4	LAST	806	31,2654	03551 0			TTF/8TMP	TTF/8 NOT YET UPDATED
0210	REF	2	LAST	135	31,2655	02277 1		STORE	JLING	JLING IS IN UNITS OF 2(-18) M/CS/CS/CS
0211					31,2656	77776 1		EXIT		

A0212 (CONTINUE TO TTF INCR)

R0213 *****
 R0215 INCREMENT TTF/8, UPDATE LAND FOR LUNAR ROTATION, DO OTHER USEFUL THINGS
 R0216 *****

R0218 TTFINCR COMPUTATIONS ARE AS FOLLOWS:-

R0219 TTF/8 UPDATED FOR TIME SINCE LAST PASS:

R0220 $TTF/8 = TTF/8 + (TPIP - TPIPOLD)/8$

R0221 LANDING SITE VECTOR UPDATED FOR LUNAR ROTATION:

L LUNAR LANDING GUIDANCE EQUATIONS

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R0222
R0224

LAND = /LAND/ UNIT(LAND - LAND(TPIP - TPIPOLD) * WM)

R0226 SLANT RANGE TO LANDING SITE, FOR DISPLAY:

R0227
R0228

RANGEDSP = A8VAL(LAND - R)

0229	REF	118	LAST	796	31,2657	0 6036	1	TTF INCR	TC	INTPRET
0230					31,2660	45345	1		DLOAD	DSU
0231	REF	5	LAST	805	31,2661	03623	0			TPIP
0232	REF	3	LAST	805	31,2662	03572	1			TPIPOLD
0233					31,2663	41461	1		SLR	PUSH
0234					31,2664	21214	0			110
0235					31,2665	47361	0		VXSC	VXV
0236	REF	5	LAST	792	31,2666	03633	1			LAND
0237	REF	2	LAST	136	31,2667	02331	1			WM
0238					31,2670	47045	0		8VSU	RT8
0239	REF	6	LAST	807	31,2671	03633	1			LAND
0240	REF	2	LAST	352	31,2672	21700	0			NORMUNIT
0241					31,2673	76561	1		VXSC	VSL1
0242	REF	3	LAST	136	31,2674	02337	1			/LAND/
0243	REF	2	LAST	164	31,2675	03543	0		STORE	LANDTEMP
0244					31,2676	51451	0		VSU	A8VAL
0245	REF	7	LAST	792	31,2677	03517	1			R
0246	REF	3	LAST	330	31,2700	16532	1		STODL	RANGEDSP
0247					31,2701	77776	1		EXIT	

SHIFT SCALES DELTA TIME TO 2(17) CSECS

0248	REF	287	LAST	800	31,2702	52 155	1		DXCH	MPAC
0249	REF	5	LAST	806	31,2703	21'551	0		DAS	TTF/8TMP

NOW HAVE INCREMENTED TTF/8 IN TTF/8TMP

0250	REF	4	LAST	805	31,2704	0 3721	0		TC	FASTCHNG
------	-----	---	------	-----	---------	--------	---	--	----	----------

0251					31,2705	0 0006	1		EXTEND	
0252	REF	6	LAST	807	31,2706	3 1551	1		DCA	TTF/8TMP
0253	REF	5	LAST	805	31,2707	53'641	1		DXCH	TTF/8

0254					31,2710	0 0006	1		EXTEND	
0255	REF	3	LAST	807	31,2711	3 1543	1		DCA	LANDTEMP
0256	REF	7	LAST	807	31,2712	53'633	1		DXCH	LAND
0257					31,2713	0 0006	1		EXTEND	
0258	REF	4	LAST	807	31,2714	3 1545	1		DCA	LANDTEMP +2
0259	REF	8	LAST	807	31,2715	53'635	1		DXCH	LAND +2
0260					31,2716	0 0006	1		EXTEND	
0261	REF	5	LAST	807	31,2717	3 1547	0		DCA	LANDTEMP +4
0262	REF	9	LAST	807	31,2720	53'637	0		DXCH	LAND +4

0263	REF	1			31,2721	0 3674	1		TC	TDISPSET
0264	REF	5	LAST	807	31,2722	0 3721	0		TC	FASTCHNG

SINCE REDESIG MAY CHANGE LANDTEMP

L LUNAR LANDING GUIDANCE EQUATIONS

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0265 REF 9 LAST 806 31,2723 51'620 1 BRSPOT2 INDEX WCHPHASE
02651 REF 1 31,2724 1 2454 1 TCF PREGUIDE

R0266 *****
R0268 LANDING SITE PERTURBATION EQUATIONS
R0269 *****

0271	REF	5	LAST	806	31,2725	3 0102 1	REDESIG	CA	FLAGWRD6	IS REDFLAG SET?
0272	REF	1			31,2726	7 4746 1		MASK	REDFLBIT	
0273					31,2727	0 0006 1		EXTEND		
0274	REF	5	LAST	802	31,2730	1 3035 0		BZF	RGVGCALC	NO: SKIP REDESIGNATION LOGIC
0275	REF	1			31,2731	3 1664 1		CA	TREDES	YES: HAS TREDES REACHED ZERO?
0276					31,2732	0 0006 1		EXTEND		
0277	REF	6	LAST	808	31,2733	1 3035 0		BZF	RGVGCALC	YES: SKIP REDESIGNATION LOGIC
0278					31,2734	0 0004 0		INHINT		
0279	REF	3	LAST	165	31,2735	3 1642 0		CA	ELINCR1	
0280	REF	2	LAST	164	31,2736	55'552 0		TS	ELINCR	
0281	REF	2	LAST	165	31,2737	3 1643 1		CA	AZINCR1	
0282	REF	2	LAST	164	31,2740	55'554 0		TS	AZINCR	
0283	REF	6	LAST	807	31,2741	0 3721 0		TC	FASTCHNG	
0284	REF	145	LAST	804	31,2742	3 4755 1		CA	ZFRO	
0285	REF	4	LAST	808	31,2743	55'642 1		TS	ELINCR1	
0286	REF	3	LAST	808	31,2744	55'643 0		TS	AZINCR1	
0287					31,2745	0 0003 1		RELINT		
0288	REF	3	LAST	808	31,2746	55'553 1		TS	ELINCR +1	
0289	REF	3	LAST	808	31,2747	55'555 1		TS	AZINCR +1	
0290	REF	19	LAST	612	31,2750	3 0120 1		CA	FIXLOC	SET PD TO 0
0291	REF	6	LAST	614	31,2751	54 166 1		TS	PUSHLOC	
0292	REF	119	LAST	807	31,2752	0 6036 1		TC	INTPRET	
0293					31,2753	52375 1		VLOAD	VSU	
0294	REF	10	LAST	807	31,2754	03633 1			LAND	
0295	REF	8	LAST	807	31,2755	03517 1			R	
0296					31,2756	41434 1		RTB	PUSH	PUSH DOWN UNIT (LAND - R)
0297	REF	3	LAST	807	31,2757	21700 0			NORMUNIT	
0298					31,2760	76435 1		VXV	VSL1	
0299	REF	2	LAST	130	31,2761	02154 0			YNBPIP	
0300					31,2762	65361 0		VXSC	PDDL	PUSH DOWN - ELINCR(YNB * UNIT(LAND - R))
0301	REF	4	LAST	808	31,2763	03553 1			ELINCR	
0302	REF	4	LAST	808	31,2764	03555 1			AZINCR	
0303					31,2765	52361 1		VXSC	VSU	
0304	REF	3	LAST	808	31,2766	02154 0			YNBPIP	
0305					31,2767	41455 0		VAD	PUSH	RESULTING VECTOR IS 1/2 REAL SIZE
0306					31,2770	45345 1		DLOAD	DSU	MAKE SURE REDESIGNATION IS NOT
0307					31,2771	00001 0			0	TOO CLOSE TO THE HORIZON

L LUNAR LANDING GUIDANCE EQUATIONS

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0308	REF	1		31,2772	23762	0		DEPRCRIT
0309				31,2773	71240	1	8MN	DLDAD
0310	REF	1		31,2774	62777	1		REDES1
0311	REF	2	LAST	809	31,2775	23762	0	DEPRCRIT
0312				31,2776	00001	0	STORE	0
0313				31,2777	45345	1	REDES1	DLOAD
0314	REF	11	LAST	808	31,3000	03633	1	DSU
0315	REF	9	LAST	808	31,3001	03517	1	LAND
0316				31,3002	74271	0		R
0317				31,3003	00001	0	DDV	VXSC
0318				31,3004	53455	0		0
0319	REF	10	LAST	809	31,3005	03517	1	VAD
0320				31,3006	76561	1		UNIT
0321	REF	4	LAST	807	31,3007	02337	1	R
0322	REF	6	LAST	807	31,3010	03543	0	VXSC
0323				31,3011	77776	1		VSL1
							STORE	/LAND/
							EXIT	LANDTEMP
								LOOKANGL WILL BE COMPUTED AT RGVGCALC
0324	REF	7	LAST	808	31,3012	0 3721	0	TC
								FASTCHNG
0325				31,3013	0 0006	1		EXTEND
0326	REF	7	LAST	809	31,3014	3 1543	1	DCA
0327	REF	12	LAST	809	31,3015	53'633	1	LANDTEMP
0328				31,3016	0 0006	1	DXCH	LAND
0329	REF	8	LAST	809	31,3017	3 1545	1	EXTEND
0330	REF	13	LAST	809	31,3020	53'635	1	DCA
0331				31,3021	0 0006	1	DXCH	LAND +2
0332	REF	9	LAST	809	31,3022	3 1547	0	EXTEND
0333	REF	14	LAST	809	31,3023	53'637	0	DCA
							DXCH	LAND +4
0334	REF	7	LAST	808	31,3024	1 3035	0	TCF
								RGVGCALC

R0335 *****
 R0337 COMPUTE STATE IN GUIDANCE COORDINATES
 R0338 *****

R0340 RGVGCALC COMPUTATIONS ARE AS FOLLOWS:-

R0341 VELOCITY RELATIVE TO THE SURFACE:

R0342 $\bar{V} = \bar{V} + \bar{R} \neq \bar{W}$
 R0343

R0344 STATE IN GUIDANCE COORDINATES:

R0345 $\bar{R} = \bar{C}G (\bar{R} - \bar{L}AND)$
 R0346

R0347 $\bar{V} = \bar{C}G (\bar{V} - \bar{W} * \bar{R})$
 R0348

L LUNAR LANDING GUIDANCE EQUATIONS

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R0349 HORIZONTAL VELOCITY FOR DISPLAY:

R0350 VHORIZ = 8 ABVAL (0, VG , VG)
 R0351 2 1

R0352 DEPRESSION ANGLE FOR DISPLAY:

R0353 LOOKANGL = ARCSIN(UNIT(R - LAND).XMBPIP)
 R0354

03541 REF 120 LAST 808 31,3025 0 6036 1 CALCRGVG TC INTPRET IN IGNALG, COMPUTE V FROM INTEGRATION
 03542 31,3026 64375 1 VLOAD MXV OUTPUT AND TRIM CORRECTION TERM
 03543 REF 13 LAST 791 31,3027 00025 0 VATT1 COMPUTED LAST PASS AND LEFT IN UNFC/2
 03544 REF 25 LAST 790 31,3030 01734 0 REFSMMAT
 03545 31,3031 53362 0 VSR1 VAD
 03546 REF 6 LAST 792 31,3032 03252 1 UNFC/2
 03547 REF 4 LAST 792 31,3033 03525 0 STORE V
 03548 31,3034 77776 1 EXIT

0355 REF 121 LAST 810 31,3035 0 6036 1 RGVGCALC TC INTPRET ENTER HERE TO RECOMPUTE RG AND VG
 0356 31,3036 47375 0 VLOAD VVV
 0357 REF 11 LAST 809 31,3037 03517 1 R
 0358 REF 3 LAST 807 31,3040 02331 1 WM
 0359 31,3041 70455 1 VAD VSR2 RESCALE TO UNITS OF 2(9) M/CS
 0360 REF 5 LAST 810 31,3042 03525 0 V
 0361 REF 2 LAST 135 31,3043 02305 0 STORE ANGTERM
 0362 31,3044 77721 0 MXV
 0363 REF 5 LAST 790 31,3045 02510 1 CG NO SHIFT SINCE ANGTERM IS DOUBLE SIZED
 0364 REF 7 LAST 804 31,3046 03625 0 STORE VGU
 0365 31,3047 55525 0 PDDL VDEF FORM (0,VG ,VG) IN UNITS OF 2(10) M/CS
 0366 REF 14 LAST 790 31,3050 06424 0 ZEROVECS 2 1
 0367 31,3051 52446 0 ABVAL SL3
 0368 REF 3 LAST 330 31,3052 26267 0 STOVL VHORIZ VHORIZ FOR DISPLAY DURING P65, P66, P67
 0369 REF 12 LAST 810 31,3053 03517 1 R
 0370 31,3054 41451 1 VSU PUSH PUSH DOWN R - LAND
 0371 REF 15 LAST 809 31,3055 03633 1 LAND
 0372 31,3056 76521 0 MXV VSL1
 0373 REF 6 LAST 810 31,3057 02510 1 CG
 0374 REF 5 LAST 791 31,3060 26544 0 STOVL RGU
 0375 31,3061 50234 1 RTB DOT NOW IN MPAC IS SINE(LOOKANGL)/4
 0376 REF 4 LAST 808 31,3062 21700 0 NORMUNIT
 0377 REF 2 LAST 130 31,3063 02146 0 XNBPIP
 0378 31,3064 77776 1 EXIT

03781 REF 20 LAST 808 31,3065 3 0120 1 CA FIXLOC RESET PUSH DOWN POINTER
 03782 REF 7 LAST 808 31,3066 54 166 1 TS PUSHLOC

0379 REF 288 LAST 807 31,3067 3 0154 1 CA MPAC COMPUTE LOOKANGL ITSELF
 0380 31,3070 6 0000 1 DOUBLE
 0381 REF 220 LAST 804 31,3071 0 4616 1 TC BANKCALL

L LUNAR LANDING GUIDANCE EQUATIONS

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0382	REF	1		31,3072	61643	1	CADR	SPARCSIN -1	
0383	REF	1		31,3073	6	3742	AD	1/2DEG	
0384				31,3074	0	0006	EXTEND		
0385	REF	1		31,3075	7	3741	MP	180DEGS	
0386	REF	1		31,3076	55	665	TS	LOOKANGL	LOOKANGL FOR DISPLAY DURING P64

0387	REF	10	LAST	808	31,3077	51	620	1	BRSPOT3	INDEX	WCHPHASE
0388	REF	1			31,3100	1	2462	1		TCF	WHATGUID

R0389 *****
 R0391 LINEAR GUIDANCE EQUATION
 R0392 *****

0394	REF	2	LAST	806	31,3101	0	3667	0	LINGUID	TC	INTPRETX
0395					31,3102		74375	0		VLOAD	VXSC
0396	REF	3	LAST	806	31,3103		02277	1			JLING
0397	REF	6	LAST	807	31,3104		03641	1			TTF/8
0398					31,3105		52132	0		VSL3	GCTD
0399	REF	1			31,3106		63171	0			AFCCALC

- - -
 ACQ = ADG + JLING TTF
 PICK UP THE VAD* AT AFCCALC

R0400 *****
 R0402 TTF/4 COMPUTATION
 R0403 *****

0405	REF	3	LAST	811	31,3107	0	3667	0	TTF/8CL	TC	INTPRETX
0406					31,3110		77743	1		DLOAD*	
0407	REF	1			31,3111		02431	0			JDG2TTF,1
0408	REF	3	LAST	164	31,3112		23567	1		STODL*	TABL TTF +6
0409	REF	1			31,3113		02427	1			ADG2TTF,1
0410	REF	4	LAST	811	31,3114		17565	1		STODL	TABL TTF +4
0411	REF	8	LAST	810	31,3115		03631	0			VGU +4
0412					31,3116		42605	1		DMP	DAD*
0413	REF	1			31,3117		23755	1			3/4DP
0414	REF	1			31,3120		02425	0			VDG2TTF,1
0415	REF	5	LAST	811	31,3121		23563	0		STODL*	TABL TTF +2
0416	REF	1			31,3122		02407	0			RDG +4,1
0417					31,3123		41225	1		DSU	DMP
0418	REF	6	LAST	810	31,3124		02550	0			RGU +4
0419	REF	1			31,3125		23753	1			3/8DP
0420	REF	6	LAST	811	31,3126		03561	0		STORE	TABL TTF
0421					31,3127		77776	1		EXIT	

A(3) = 8 JDG TO TABLTTF
 2
 A(2) = 6 ADG TO TABLTTF
 2
 A(1) = (6 VGU + 18 VDG)/8 TO TABLTTF
 2 2
 A(0) = -24(RGU - RDG)/64 TO TABLTTF
 2 2

0422	REF	28	LAST	623	31,3130	3	4744	1		CA	BIT8
0423	REF	7	LAST	811	31,3131	55	570	0		TS	TABL TTF +10

FRACTIONAL PRECISION FOR TTF TO TABLE

0424					31,3132	0	0006	1		EXTEND	
0425	REF	7	LAST	811	31,3133	3	1641	0		DCA	TTF/8
0426	REF	289	LAST	810	31,3134	52	155	1		DXCH	MPAC
0427	REF	47	LAST	806	31,3135	3	4752	0		CAF	TWO
0428	REF	109	LAST	781	31,3136	54	001	1		TS	L

LOADS TTF/8 (INITIAL GUESS) INTO MPAC
 DEGREE - ONE

L LUNAR LANDING GUIDANCE EQUATIONS

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0429	REF	1		31,3137	3 3733 0	CAF	TABLTTFL	
0430	REF	1		31,3140	0 3543 0	TC	ROOTPSRS	YIELDS TTF/8 IN MPAC
0431	REF	4	LAST 468	31,3141	0 5652 0	TC	PODDCO	BAD RETURN
0432				31,3142	01406 1	OCT	01406	
0433				31,3143	0 0006 1	EXTEND		GOOD RETURN
0434	REF	290	LAST 811	31,3144	3 0155 0	DCA	MPAC	FETCH TTF/8 KEEPING IT IN MPAC
0435	REF	8	LAST 811	31,3145	53'641 1	DXCH	TTF/8	CORRECTED TTF/8
0436	REF	2	LAST 807	31,3146	0 3674 1	TC	TDISPSFT	

A0437

(CONTINUE TO QUADGUID)

R0438 *****
 R0440 MAIN GUIDANCE EQUATION
 R0441 *****

R0443 AS PUBLISHED:-

R0444
 R0445
$$ACG = ADG + \frac{6(VDG + VG)}{TTF} + \frac{12(RDG - RG)}{(TTF)(TTF)}$$

 R0446
 R0447

R0448 AS HERE PROGRAMMED:-

R0449
 R0450
$$ACG = \frac{3 \left(\frac{1}{4}(RDG - RG) - \frac{VDG + VG}{TTF/8} \right)}{TTF/8} + ADG$$

 R0451
 R0452
 R0453
 R0454

0455	REF	1		31,3147	3 3732 1	QUADGUID	CAF	30SEC*17	PULSE-OUTS ARE INHIBITED WHENEVER
0456	REF	9	LAST 812	31,3150	6 1640 1		AD	TTF/8	TTF < 30 SECONDS, REGARDLESS OF
0457				31,3151	0 0006 1		EXTEND		THE DURATION OF LINEAR GUIDANCE
0458	REF	1		31,3152	6 3155 0		BZMF	Q**DG**D	
0459	REF	45	LAST 786	31,3153	0 5504 0		TC	UPFLAG	
0460	REF	3	LAST 806	31,3154	00142 0		ADRES	POUTFLAG	
0461	REF	4	LAST 811	31,3155	0 3667 0	Q**DG**D	TC	INTPRETX	
0462				31,3156	52373 1		VLOAD*	VSU	
0463	REF	2	LAST 811	31,3157	02403 1			RDG,I	
0464	REF	7	LAST 811	31,3160	02544 0			RGU	
0465				31,3161	70541 0		V/SC	VSP2	
0466	REF	10	LAST 812	31,3162	03641 1			TTF/8	
0467				31,3163	53253 0		VAD*	VAD	
0468	REF	1		31,3164	02411 1			VDG,1	
0469	REF	9	LAST 811	31,3165	03625 0			VGU	
0470				31,3166	74341 1		V/SC	VXSC	
0471	REF	11	LAST 812	31,3167	03641 1			TTF/8	

L LUNAR LANDING GUIDANCE EQUATIONS

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0472	REF	2	LAST	811	31,3170	23755	1			3/4DP	
0473					31,3171	77653	1	AFCCALC	VAD*		
0474	REF	2	LAST	806	31,3172	02417	1			ADG,1	CURRENT TARGET ACCELERATION
0475	REF	3	LAST	806	31,3173	02271	1		STORE	ACG	
0476					31,3174	76505	0	AFCCALC1	VXM	VSL1	VERTGUID COMES HERE
0477	REF	7	LAST	810	31,3175	02510	1			CG	
0478					31,3176	70315	1		PDVL	V/SC	
0479	REF	6	LAST	790	31,3177	01237	0			GDT/2	
0480	REF	1			31,3200	23751	0			GSCALE	
0481					31,3201	45445	0		BVSU	STADR	
0482	REF	7	LAST	810	31,3202	74525	0		STORE	UNFC/2	UNFC/2 NEED NOT BE UNITIZED
0483					31,3203	77646	0		ABVAL		
0484	REF	2	LAST	797	31,3204	03574	1	AFCCALC2	STORE	/A=C/	MAGNITUDE OF AFC FOR THROTTLE
0485					31,3205	71214	0		BON	DLOAD	
0486	REF	1			31,3206	03306	1			2PHASFLG	
0487	REF	1			31,3207	63231	1			AFCCLEND	
0488	REF	8	LAST	813	31,3210	03252	1			UNFC/2	VERTICAL COMPONENT
0489					31,3211	65316	0		DSQ	PDDL	
0490	REF	9	LAST	813	31,3212	03254	1			UNFC/2	+2 OUT-OF-PLANE
0491					31,3213	65316	0		DSQ	PDDL	
0492	REF	1			31,3214	23735	1			HIGHESTIF	
0493					31,3215	63471	0		DDV	DSQ	
0494	REF	6	LAST	800	31,3216	01245	0			MASS	
0495					31,3217	45225	0		DSU	DSU	AMAXHORIZ = $\sqrt{A_{TOTAL}^2 - A_1^2 - A_2^2}$
04951					31,3220	71244	0		BPL	DLOAD	
04952	REF	1			31,3221	63223	1			AFCCALC3	
04953	REF	15	LAST	810	31,3222	06424	0			ZEROVECS	
0496					31,3223	43366	0	AFCCALC3	SQRT	DAD	
0497	REF	10	LAST	813	31,3224	03256	0			UNFC/2	+4
0498					31,3225	44244	0		BPL	BDSU	
0499	REF	2	LAST	813	31,3226	63231	1			AFCCLEND	
0500	REF	11	LAST	813	31,3227	03256	0			UNFC/2	+4
0501	REF	12	LAST	813	31,3230	03256	0		STORE	UNFC/2	+4
0502					31,3231	77776	1	AFCCLEND	EXIT		
0503	REF	8	LAST	809	31,3232	03721	0		TC	FASTCHNG	
05031	REF	11	LAST	811	31,3233	31620	1	CA	WCHPHASE		PREPARE FOR PHASE SWITCHING LOGIC
05032	REF	4	LAST	804	31,3234	551617	1	TS	WC4PHOLD		
05033	REF	4	LAST	805	31,3235	251621	0	INCR	FLPASSO		INCREMENT PASS COUNTER
0504	REF	12	LAST	813	31,3236	511620	1	BRSPOT4	INDEX	WCHPHASE	
0505	REF	1			31,3237	12470	1	TCF	AFTRGUID		

R0506 *****
R0508 ERECT GUIDANCE-STABLE MEMBER TRANSFORMATION MATRIX
R0509 *****

0511	REF	122	LAST	810	31,3240	06036	1	CGCALC	TC	INTPRET
0512					31,3241	53575	0		VLOAD	UNIT
0513	REF	16	LAST	810	31,3242	03633	1			LAND

L LUNAR LANDING GUIDANCE EQUATIONS

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0514	REF	8	LAST	813	31,3243	26510	1	STOVL	CG	FIRST ROW
0515	REF	3	LAST	810	31,3244	02305	0		ANGTERM	
0516					31,3245	53361	0	VXSC	VAD	REMEMBER THAT ANGTERM IS DOUBLE-SIZED
0517	REF	12	LAST	812	31,3246	03641	1		TTF/8	
0518	REF	17	LAST	813	31,3247	03633	1		LAND	
0519					31,3250	47051	0	VSU	RTB	
0520	REF	13	LAST	810	31,3251	03517	1		R	
0521	REF	5	LAST	810	31,3252	21700	0		NORMUNIT	
0522					31,3253	47035	1	VXV	RTB	
0523	REF	18	LAST	814	31,3254	03633	1		LAND	
0524	REF	6	LAST	814	31,3255	21700	0		NORMUNIT	
0525	REF	9	LAST	814	31,3256	26516	1	STOVL	CG +6	SECOND ROW
0526	REF	10	LAST	814	31,3257	02510	1		CG	
0527					31,3260	76435	1	VXV	VSL1	
0528	REF	11	LAST	814	31,3261	02516	1		CG +6	
0529	REF	12	LAST	814	31,3262	02524	0	STORE	CG +14	
0530					31,3263	77776	1	EXIT		

A0531

(CONTINUE TO EXTLOGIC)

R0532 *****
 R0534 PREPARE TO EXIT
 R0535 *****

R0537 DECIDE (1) HOW TO EXIT, AND (2) WHETHER TO SWITCH PHASES

0538	REF	13	LAST	813	31,3264	11'620	0	EXTLOGIC	CGS	WCHPHASE				
0539	REF	235	LAST	805	31,3265	50 000	1		INDEX	A	WCHPHASE = +2	APPRQUAD	A = 1	
0540	REF	3	LAST	287	31,3266	3 1425	0		CA	TENDBRAK	WCHPHASE = +0	BRKQUAD	A = 0	
0541	REF	1			31,3267	1 3271	1		TCF	EXSPOT1 -1	WCHPHASE = -1	IGNALG	A = 0	
0542	REF	1			31,3270	3 3727	0	LINXLOGC	CA	3SEC*17				
0543	REF	13	LAST	814	31,3271	6 1640	1		AD	TTF/8				
0551					31,3272	0 0006	1	EXSPOT1	EXTEND					
0552	REF	14	LAST	814	31,3273	5 1620	1		INDEX	WCHPHASE				
0553	REF	1			31,3274	6 2476	0		BZMF	WHATEXIT				
0554	REF	9	LAST	813	31,3275	0 3721	0		TC	FASTCHNG				
0555	REF	5	LAST	813	31,3276	3 1617	0		CA	WCHPHOLD				
0556	REF	88	LAST	800	31,3277	6 4753	1		AD	ONE				
0557					31,3300	22 007	0		ZL		+0			
0558	REF	15	LAST	814	31,3301	53'621	1		DXCH	WCHPHASE	ADVANCING WCHPHASE AND RESETTNG FLPASSO			
0559	REF	6	LAST	814	31,3302	51'617	0		INDEX	WCHPHOLD				
0560	REF	2	LAST	814	31,3303	1 2476	1		TCF	WHATEXIT				

R0561 *****
 R0563 ROUTINES FOR EXITING FROM LANDING GUIDANCE

L LUNAR LANDING GUIDANCE EQUATIONS

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R0564 *****

R0566 1. EXGSUB IS THE RETURN WHEN GUIDSUB IS CALLED BY THE IGNITION ALGORITHM.

R0568 2. EXBRAK IN THE EXIT USED DURING THE BRAKING PHASE. IN THIS CASE UNIT(R) IS THE WINDOW POINTING VECTOR.

R0570 3. EXNORM IS THE EXIT USED AT OTHER TIMES DURING THE BURN.

R0571 (EXOVFLOW IS A SUBROUTINE OF EXBRAK AND EXNORM CALLED WHEN OVERFLOW OCCURRED ANYWHERE IN GUIDANCE.)

0573	REF 123	LAST 813	31,3304	0 6036 1	EXGSUB	TC	INTPRET	COMPUTE TRIM VELOCITY CORRECTION TERM
05731			31,3305	47175 1		VLOAD	RTB	
05732	REF 13	LAST 813	31,3306	03252 1			JNFC/2	
05733	REF 7	LAST 814	31,3307	21700 0			NORMUNIT	
05734			31,3310	74361 0		VXSC	VXSC	
05735	REF 5	LAST 792	31,3311	03425 1			ZOOMTIME	
05736	REF 1		31,3312	22001 0			TRIMACCL	
05737	REF 14	LAST 815	31,3313	03252 1		STORE	UNFC/2	
05738			31,3314	77776 1		EXIT		

05739	REF 3	LAST 803	31,3315	11'645 0		CCS	NGUIDSUB	
0574	REF 1		31,3316	1 2520 0		TCF	GUIDSUB	
0575	REF 3	LAST 791	31,3317	11'644 1		CCS	NIGNLOOP	
0576			31,3320	1 3323 1		TCF	+3	
0577	REF 31	LAST 779	31,3321	0 5567 0		TC	ALARM	
0578			31,3322	01412 1		OCT	01412	

0579	REF 44	LAST 793	31,3323	0 4635 0	+3	TC	POSTJUMP	
0580	REF 1		31,3324	65075 0		CADR	DOUMCALC	

0585	REF 124	LAST 815	31,3325	0 6036 1	EXBRAK	TC	INTPRET	
0586			31,3326	77775 1		VLOAD		
0587	REF 2	LAST 162	31,3327	03535 1			UNIT/R/	
0588	REF 2	LAST 151	31,3330	03260 0		STORE	UNWC/2	
0589			31,3331	77776 1		EXIT		
0590	REF 1		31,3332	1 3405 1		TCF	STEER?	

0591	REF 125	LAST 815	31,3333	0 6036 1	EXNORM	TC	INTPRET	
0592			31,3334	52375 1		VLOAD	VSU	
0593	REF 19	LAST 814	31,3335	03633 1			LAND	
0594	REF 14	LAST 814	31,3336	03517 1			R	
0595			31,3337	77634 0		RTB		
0596	REF 8	LAST 815	31,3340	21700 0			NORMUNIT	
0597	REF 3	LAST 815	31,3341	03260 0		STORE	UNWC/2	
0598			31,3342	50235 0		VXV	OCT	
0599	REF 3	LAST 810	31,3343	02146 0			XNBPIP	
0600	REF 13	LAST 814	31,3344	02516 1			CG +6	
0601			31,3345	77776 1		EXIT		

UNIT(LAND - R) IS TENTATIVE CHOICE

WITH PROJ IN MPAC 1/8 REAL SIZE

0602 REF 291 LAST 812 31,3346 4 0154 0

CS MPAC

GET COEFFICIENT FOR CG +14

L LUNAR LANDING GUIDANCE EQUATIONS

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0603	REF	1		31,3347	6 3763 0	AD	PROJMAX	
0604	REF	16	LAST	800	31,3350	6 4733 1	AD	POSMAX
0605	REF	50	LAST	800	31,3351	54 130 1	TS	BUF
0606	REF	51	LAST	816	31,3352	4 0130 1	CS	BUF
0607	REF	52	LAST	816	31,3353	26 130 1	ADS	BUF
RESULT IS 0 IF PROJMAX - PROJ NEGATIVE								
0608	REF	1		31,3354	4 3764 0	CS	PROJMIN	GET COEFFICIENT FOR UNIT(LAND - R)
0609	REF	292	LAST	815	31,3355	6 0154 1	AD	MPAC
0610	RFF	17	LAST	816	31,3356	6 4733 1	AD	POSMAX
0611	REF	53	LAST	816	31,3357	54 131 0	TS	BUF +1
0612	RFF	54	LAST	816	31,3360	4 0131 0	CS	BUF +1
0613	REF	55	LAST	816	31,3361	26 131 0	ADS	BUF +1
RESULT IS 0 IF PROJ - PROJMIN NEGATIVE								
0614	REF	15	LAST	804	31,3362	3 4751 0	CAF	FOUR
0615	REF	16	LAST	733	31,3363	7 6241 1	UNWCLOOP MASK	SIX
0616	REF	158	LAST	800	31,3364	54 002 1	TS	Q
0617	REF	6	LAST	797	31,3365	3 5014 1	CA	EBANK5
0618	REF	22	LAST	798	31,3366	54 003 0	TS	EBANK
0619	REF	14	LAST	815	E5,1507		EBANK=	CG
0620	REF	56	LAST	816	31,3367	3 0130 0	CA	BUF
0621					31,3370	0 0006 1	EXTEND	
0622	REF	199	LAST	816	31,3371	5 0002 0	INDEX	Q
0623	REF	15	LAST	816	31,3372	7 1523 0	MP	CG +14
0624	REF	19	LAST	757	31,3373	24 006 1	INCR	BBANK
0625	REF	4	LAST	815	F6,1657		EBANK=	UNWC/2
0626	REF	200	LAST	816	31,3374	50 002 0	INDEX	Q
0627	REF	5	LAST	816	31,3375	53'660 1	DXCH	UNWC/2
0628					31,3376	0 0006 1	EXTEND	
0629	REF	57	LAST	816	31,3377	7 0131 0	MP	BUF +1
0630	REF	201	LAST	816	31,3400	50 002 0	INDEX	Q
0631	REF	6	LAST	816	31,3401	21'660 1	DAS	UNWC/2
0632	REF	202	LAST	816	31,3402	10 002 1	CCS	Q
0633	REF	1			31,3403	1 3363 0	TCF	UNWCLOOP
0634	REF	20	LAST	816	31,3404	24 006 1	INCR	BBANK
0635	REF	11	LAST	800	F7,1610		EBANK=	PIF
0636	REF	19	LAST	768	31,3405	3 0076 0	STEER?	CA FLAGWRD2
0637	REF	1			31,3406	7 4741 0	MASK	STEERBIT
0638					31,3407	0 0006 1	EXTEND	
0639	REF	1			31,3410	1 3416 0	BZF	RATESTOP
0640	REF	1			31,3411	3 0121 0	EXVERT	CA OVFLND
0641					31,3412	0 0006 1	EXTEND	
0642					31,3413	1 3421 1	BZF	+6
0643	REF	32	LAST	815	31,3414	0 5567 0	EXOVFLOW	TC ALARM
0644					31,3415	01410 0	OCT	01410
0645	REF	221	LAST	810	31,3416	0 4616 1	RATESTOP	TC BANKCALL
CLEAN UP AFTER LAST FINDCDUW								

L LUNAR LANDING GUIDANCE EQUATIONS

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0646	REF	5	LAST	804	31,3417	40165	1		CADR	STOPRATE
0647	REF	1			31,3420	1 3426	0		TCF	DISPEXIT
0648	REF	1			31,3421	0 2247	1	GDUMP1	TC	THROTTLE
0649	REF	126	LAST	815	31,3422	0 6036	1		TC	INTPRET
0650					31,3423	77624	1		CALL	
0651	REF	3	LAST	779	31,3424	61062	1			FINDCDUW -2
0652					31,3425	77776	1		EXIT	

A0653

(CONTINUE TO DISPEXIT)

R0654 *****
 R0656 GUIDANCE LCOP DISPLAYS
 R0657 *****

0659					31,3426	0 0006	1	DISPEXIT	EXTEND	KILL GROUP 3: DISPLAYS WILL BE
06591	REF	13	LAST	752	31,3427	3 4755	1		DCA	RESTORED BY NEXT GUIDANCE CYCLE
06592	REF	2	LAST	229	31,3430	52 757	0		DXCH	NEGO -PHASE3
0660	REF	9	LAST	746	31,3431	4 0104	0		CS	IF FLUNDISP SET, NO DISPLAY THIS PASS
0661	REF	2	LAST	746	31,3432	7 4742	0		MASK	FLUNDBIT
0662					31,3433	0 0006	1		EXTEND	
0663	REF	1			31,3434	1 3444	1		BZF	ENDLLJOB TO PICK UP THE TAG
0664	REF	7	LAST	814	31,3435	51'617	0		INDEX	WCHPHOLD
0665	REF	1			31,3436	1 2502	0		TCF	WHATDISP
06651	REF	57	LAST	804	31,3437	0 5353	1	-2	TC	PHASCHNG
06652					31,3440	00035	1		OCT	00035 KILL GROUP 5
0666	REF	1			31,3441	3 3765	0	P63DISPS	CAF	V06N63
0667	REF	222	LAST	816	31,3442	0 4616	1	DISPCOMN	TC	BANKCALL
0668	REF	1			31,3443	20346	1		CADR	REGQDSPR
0669	REF	128	LAST	792	31,3444	1 5155	1	ENDLLJOB	TCF	ENDOFJOB
0670	REF	2	LAST	808	31,3445	3 1664	1	P64DISPS	CA	TREDES HAS TREDES REACHED ZERO?
0671					31,3446	0 0006	1		EXTEND	
0672	REF	1			31,3447	1 3471	1		BZF	RED- OVER YES: CLEAR REDESIGNATION FLAG
0673	REF	6	LAST	808	31,3450	4 0102	0		CS	NO: IS REDFLAG SET?
0674	REF	2	LAST	808	31,3451	7 4746	1		MASK	REDFLBIT
0675					31,3452	0 0006	1		EXTEND	
0676	REF	1			31,3453	1 3473	0		BZF	REDES-OK YES: DO STATIC DISPLAY
0677	REF	1			31,3454	3 3766	0		CAF	V06N64
0678	REF	223	LAST	817	31,3455	0 4616	1		TC	BANKCALL OTHERWISE USE FLASHING DISPLAY

L LUNAR LANDING GUIDANCE EQUATIONS

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0679	REF	2	LAST	762	31,3456	20340	1	CADR	REFLASHR	
0680	REF	36	LAST	796	31,3457	1 6001	1	TCF	GOTOPOOH	TERMINATE
0681	REF	1			31,3460	1 3463	1	TCF	P64CEED	PROCEED PERMIT REDESIGNATIONS
0682	REF	3	LAST	803	31,3461	1 3445	0	TCF	P64DISPS	RECYCLE
0683	REF	2	LAST	817	31,3462	1 3444	1	TCF	ENDLLJOB	TO PICK UP THE TAG
0684	REF	146	LAST	808	31,3463	3 4755	1	P64CEED	CAF	ZERO
0685	REF	5	LAST	808	31,3464	55'642	1	TS	ELINCRI	
0686	REF	4	LAST	808	31,3465	55'643	0	TS	AZINCRI	
0687	REF	46	LAST	812	31,3466	0 5504	0	TC	UPFLAG	ENABLE REDESIGNATION LOGIC
0688	REF	4	LAST	806	31,3467	00143	1	ADRES	REDFLAG	
0689	REF	129	LAST	817	31,3470	1 5155	1	TCF	ENDOFJOB	
0690	REF	72	LAST	806	31,3471	0 5516	0	RED-OVER	TC	DOWNFLAG
0691	REF	5	LAST	818	31,3472	00143	1	ADRES	REDFLAG	
0692	REF	2	LAST	817	31,3473	3 3766	0	REDES-OK	CAF	V06N64
0693	REF	1			31,3474	1 3442	1	TCF	DISPCOMN	
0694	REF	1			31,3475	3 3767	1	VERTDISP	CAF	V06N60
0695	REF	2	LAST	818	31,3476	1 3442	1	TCF	DISPCOMN	

R0696 *****
 R0698 GUIDANCE FOR VERTICAL DESCENT
 R0699 *****

0701	REF	3	LAST	805	31,3477	11'645	0	VERTGUID	CCS	WCHVERT	
0702	REF	2	LAST	817	31,3500	1 3426	0	TCF	DISPEXIT	POSITIVE P67, WHICH SKIPS ALL GUIDANCE	
0703	REF	1			31,3501	1 3516	1	TCF	P66VERT	+0	

R0704 THE P65 GUIDANCE EQUATION IS AS FOLLOWS:-

R0705
 R0706
 R0707
 R0708

$$ACG = \frac{-VDGVERT - VGU}{TAUVERT}, \text{ WHERE } VDGVERT = \{-3FPS, 0, 0\}$$

0709					31,3502	0 0006	1	P65VERT	EXTEND	NEGATIVE
0710	REF	1			31,3503	4 3760	1	DCS	+3FPS	
0711	REF	2	LAST	804	31,3504	53'643	0	DXCH	VDGVERT	
0712	REF	127	LAST	817	31,3505	0 6036	1	TC	INTPRET	
0713					31,3506	65375	0	VLOAD	PDDL	
0714	REF	16	LAST	813	31,3507	06424	0		ZEROVECS	
0715	REF	3	LAST	818	31,3510	03643	0		VDGVERT	
0716					31,3511	52266	1	VDEF	VSU	FORM (VDGVERT,0,0), LEAVING DP 0 IN PDL
0717	REF	10	LAST	812	31,3512	03625	0		VGU	

L LUNAR LANDING GUIDANCE EQUATIONS

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0718				31,3513	52141 1	V/SC	GOTO
0719	REF	1		31,3514	23745 0		TAUVERT
0720	REF	1		31,3515	63174 0		AFCCALC1

R0721 THE R.O.D. EQUATION IS AS FOLLOWS:-

R0722 {VDGVERTX - VGUX}/TAUVERT - GMOON
 R0723 /AFC/ = -----
 R0724 UNIT/R/ . XNB

0725	REF	2	LAST	804	31,3516	571644 0	P66VERT	XCH	RODCOUNT	RESTART COULD CAUSE RODCOUNTS TO BE LOST
0726					31,3517	0 0006 1		EXTEND		
0727	REF	1			31,3520	7 3756 1		MP	+IFPS	
0728	REF	4	LAST	818	31,3521	211643 0		DAS	VDGVERT	
0729	REF	10	LAST	814	31,3522	0 3721 0		TC	FASTCHNG	
0730	REF	128	LAST	818	31,3523	0 6036 1		TC	INTPPET	
0731					31,3524	45345 1		DLOAD	DSU	
0732	REF	5	LAST	819	31,3525	03643 0			VDGVERT	
0733	REF	11	LAST	818	31,3526	03625 0			VGU	
0734					31,3527	45271 1		DDV	DSU	
0735	REF	1			31,3530	23747 1			TAUROD	
0736	REF	1			31,3531	22010 0			MOONG	
0737					31,3532	50315 0		PDVL	DOT	HAVE ACC IN UNITS OF 2(-2) M/CS/CS
0738	REF	4	LAST	815	31,3533	02146 0			XNBPIP	
0739	REF	3	LAST	815	31,3534	03535 1			UNIT/R/	
0740					31,3535	45465 1		BDDV	STADP	
0741	REF	3	LAST	813	31,3536	74203 0		STORE	/AFC/	
0742					31,3537	77404 1		BOVB	EXIT	
0743	REF	1			31,3540	63414 0			EXCVFLOW	
0744	REF	2	LAST	817	31,3541	0 2247 1		TC	THROTTLE	
0745	REF	3	LAST	818	31,3542	1 3426 0		TCF	DISPFIT	

R0746 *****
 R0748 REDESIGNATOR TRAP
 R0749 *****

0751				21,2006		BANK	21
0752	REF	1		21,2000		SETLOC	F2DPS*21
0753				21,2006		BANK	

0754	REF	1				COUNT*	\$/F2DPS
------	-----	---	--	--	--	--------	----------

0755	REF	4	LAST	566	21,2006	56 016 0	PITFALL	XCH	BANKRUPT
0756					21,2007	0 0006 1		EXTEND	
0757	REF	4	LAST	566	21,2010	22 012 1		QXCH	QRUPT

0758	REF	7	LAST	805	21,2011	0 5321 1	TC	CHECKMM	IF NOT IN P64, NO REASON TO CONTINUE
0759					21,2012	00100 0	DFC	64	

L LUNAR LANDING GUIDANCE EQUATIONS

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0760	REF	18	LAST	568	21,2013	1 5270 0	TCF	RESUME
0761					21,2014	0 0006 1	EXTEND	
0762	REF	5	LAST	805	21,2015	00 031 0	READ	CHAN31
0763					21,2016	4 0000 0	COM	
0764	REF	1			21,2017	7 2077 1	MASK	ALL 4 BITS
0765	REF	5	LAST	169	21,2020	55*645 0	TS	FLVIRA
0766	REF	48	LAST	811	21,2021	3 4752 0	CAF	TWO
0767	REF	4	LAST	165	21,2022	55*644 1	TS	ZERLINA
0768	REF	15	LAST	732	21,2023	3 4756 1	CAF	FIVE
0769	REF	23	LAST	785	21,2024	0 5173 1	TC	TWIDDLE
0770	REF	1			21,2025	02032 1	ADRES	REDESOMON
0771	REF	19	LAST	820	21,2026	1 5270 0	TCF	RESUME

R0772 REDESIGNATION MONITOR (INITIATED BY PITFALL)

0773	REF	5	LAST	820	21,2027	55*644 1	PREMON1	TS	ZEPLINA
0774	REF	9	LAST	566	21,2030	3 4757 0	PREMON2	CAF	SEVEN
0775	REF	7	LAST	786	21,2031	0 5224 0	TC		VARDELAY
0776					21,2032	0 0006 1	REDESOMON	EXTEND	
0777					21,2033	00 031 0	READ		31
0778					21,2034	4 0000 0	COM		
0779	REF	2	LAST	820	21,2035	7 2077 1	MASK		ALL 4 BITS
0780	REF	6	LAST	820	21,2036	57*645 1	XCH		ELVIRA
0781	REF	110	LAST	811	21,2037	54 001 1	TS		L
0782	REF	7	LAST	820	21,2040	11*645 0	CCS		ELVIRA
0783	REF	1			21,2041	1 2030 1	TCF		PREMON2

DO ANY BITS APPEAR THIS PASS?
Y: CONTINUE MONITOR

0784	REF	111	LAST	820	21,2042	10 001 1	CCS		L
0785	REF	1			21,2043	1 2052 0	TCF		COUNT*EM
0786	REF	6	LAST	820	21,2044	11*644 1	CCS		ZERLINA
0787	REF	1			21,2045	1 2027 1	TCF		PRFMON1
0788	REF	39	LAST	806	21,2046	3 4740 0	RESETRPT	CAF	BIT12
0789					21,2047	0 0006 1	EXTEND		
0790	REF	16	LAST	806	21,2050	05 013 0	WOR		CHAN13
0791	REF	53	LAST	786	21,2051	1 5261 0	TCF		TASKOVER

N: ANY LAST PASS?
Y: COUNT *EM, RESET RUPT, TERMINATE
N: HAS ZERLINA REACHED ZERO YET?
N: DIMINISH ZERLINA, CONTINUE
Y: RESET RUPT, TERMINATE

0792	REF	112	LAST	820	21,2052	3 0001 0	COUNT*EM	CA	L
0793	REF	1			21,2053	7 4746 1	MASK		-AZBIT
0794	REF	236	LAST	814	21,2054	10 000 0	CCS		A
0795	REF	1			21,2055	4 2100 0	-AZ	CS	AZEACH
0796	REF	5	LAST	818	21,2056	27*643 0	ADS		AZINCR1
0797	REF	113	LAST	820	21,2057	3 0001 0	CA		L
0798	REF	1			21,2060	7 4747 0	MASK		+AZBIT
0799	REF	237	LAST	820	21,2061	10 000 0	CCS		A
0800	REF	2	LAST	820	21,2062	3 2100 1	+AZ	CA	AZEACH
0801	REF	6	LAST	820	21,2063	27*643 0	ADS		AZINCR1
0802	REF	114	LAST	820	21,2064	3 0001 0	CA		L

L LUNAR LANDING GUIDANCE EQUATIONS

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0803	REF	1		21,2065	7 4753	0		MASK	-ELBIT
0804	REF	238	LAST	820	21,2066	10 000	0		CCS
0805	REF	1		21,2067	4 2101	1		-EL	CS
0806	REF	6	LAST	818	21,2070	27'642	1		ADS
0807	REF	115	LAST	820	21,2071	3 0001	0		CA
0808	REF	1		21,2072	7 4752	1		MASK	+ELBIT
0809	REF	239	LAST	821	21,2073	10 000	0		CCS
0810	REF	2	LAST	821	21,2074	3 2101	0	+EL	CA
0811	REF	7	LAST	821	21,2075	27'642	1		ADS
0812	REF	1		21,2076	1 2046	0		TCF	RESETRPT

R0813 THESE EQUIVALENCIES ARE BASED ON GSDP CHAPTER 4, REVISION 16 OF P64LM

0814 REF 43 LAST 723 4752 +EL8IT = 8IT2 -PITCH

0815 REF 41 LAST 767 4753 -EL8IT = 8IT1 +PITCH

0816 REF 36 LAST 804 4747 +AZ8IT = 8IT5

0817 REF 41 LAST 793 4746 -AZ8IT = 8IT6

0818 21,2077 00063 1 ALL4BITS OCT 00063

0819 21,2100 01074 0 AZEACH DEC .03491 2 DEGREES

0820 21,2101 00217 0 ELEACH DEC .00873 1/2 DEGREE

R0821 *****

R0823 R.C.D. TRAP

R0824 *****

08242				20,2115				BANK	20
08244	REF	1		20,2000				SETLOC	RODTRAP
08246				20,2115				BANK	
08248	REF	1						COUNT*	\$/F 2DPS

0826	REF	32	LAST	574	20,2115	7 4745	1	DESCRITS	MASK	8IT7	COME HERE FROM MARKRUPT CODING WITH BIT 7 OR 6 OF CHANNEL 16 IN A: 8IT 7 MEANS - RATE INCREMENT, 8IT 6 + INCREMENT
0827	REF	240	LAST	821	20,2116	10 000	0		CCS	A	
0828	REF	49	LAST	820	20,2117	4 4752	1		CS	TWO	
0829	REF	89	LAST	814	20,2120	6 4753	1		AD	ONE	
0830	REF	3	LAST	819	20,2121	27'644	1		ADS	RODCOUNT	

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0831 REF 20 LAST 820 20,2122 1 5270 0 TCF RESUME TRAP IS RESET WHEN SWITCH IS RELEASED

0832 31,3543 BANK 31
 0833 REF 4 LAST 795 31,2000 SETLOC F2DPS*31
 0834 31,3543 BANK

0835 REF 5 LAST 805 TO 819: 483 537* COUNT* \$\$/F2DPS

R0836 *****
 R0838 DOUBLE PRECISION ROOT FINDER SUBROUTINE (BY ALLAN KLUMPP)
 R0839 *****

R0841
$$N \quad N-1$$

 R0842 RCOTPSRS FINDS ONE ROOT OF THE POWER SERIES $A X^N + A X^{N-1} + \dots + A X + A$
 R0844
$$N \quad N-1 \quad 1 \quad 0$$

R0846 USING NEWTON'S METHOD STARTING WITH AN INITIAL GUESS FOR THE ROOT. THE ENTERING DATA MUST BE AS FOLLOWS:

A0848	A	SP	LOC-3	ADRES FOR REFERENCING PWR COF TABL
A0849	L	SP	N-1	N IS THE DEGREE OF THE POWER SERIES
A0850	MPAC	DP	X	INITIAL GUESS FOR ROOT
A0851	LOC-2N	DP	A(0)	
A0852		...		
A0853	LOC	DP	A(N)	
A0854	LOC+2	SP	PRECROOT	PREC RQD OF ROOT (AS FRACT OF 1ST GUESS)

R0855 THE DP RESULT IS LEFT IN MPAC UPON EXIT, AND A SP COUNT OF THE ITERATIONS TO CONVERGENCE IS LEFT IN MPAC+2.
 R0857 RETURN IS NORMALLY TO LOC(TC ROOTPSRS)+3. IF ROOTPSRS FAILS TO CONVERGE IN 32 PASSES, RETURN IS TO LOC+1 AND
 R0859 OUTPUTS ARE NOT TO BE TRUSTED.

R0860 PRECAUTION: ROOTPSRS MAKES NO CHECKS FOR OVERFLOW OR FOR IMPROPER USAGE. IMPROPER USAGE COULD
 R0862 PRECLUDE CONVERGENCE OR REQUIRE EXCESSIVE ITERATIONS. AS A SPECIFIC EXAMPLE, ROOTPSRS FORMS A DERIVATIVE
 R0864 COEFFICIENT TABLE BY MULTIPLYING EACH A(I) BY I, WHERE I RANGES FROM 1 TO N. IF AN ELEMENT OF THE DEPRIVATIVE
 R0866 COEFFICIENT TABLE = 1 OR > 1 IN MAGNITUDE, ONLY THE EXCESS IS RETAINED. ROOTPSRS MAY CONVERGE ON THE CORRECT
 R0868 ROOT NONETHELESS, BUT IT MAY TAKE AN EXCESSIVE NUMBER OF ITERATIONS. THEREFORE THE USER SHOULD RECOGNIZE:

R0870 1. USER'S RESPONSIBILITY TO ASSURE THAT $I \times A(I) < 1$ IN MAGNITUDE FOR ALL I.

R0872 2. USER'S RESPONSIBILITY TO ASSURE OVERFLOW WILL NOT OCCUR IN EVALUATING EITHER THE RESIDUAL OR THE DERIVATIVE
 R0874 POWER SERIES. THIS OVERFLOW WOULD BE PRODUCED BY SUBROUTINE POWRSRS, CALLED BY ROOTPSRS, AND MIGHT NOT
 R0876 PRECLUDE EVENTUAL CONVERGENCE.

R0877 3. AT PRESENT, ERASABLE LOCATIONS ARE RESERVED ONLY FOR N UP TO 5. AN N IN EXCESS OF 5 WILL PRODUCE CHAOS.
 R0879 ALL ERASABLES USED BY ROOTPSRS ARE UNSWITCHED LOCATED IN THE REGION FROM MPAC-33 OCT TO MPAC+7.

R0881 4. THE ITERATION COUNT RETURNED IN MPAC+2 MAY BE USED TO DETECT ABNORMAL PERFORMANCE.

A0883 STORE ENTERING DATA, INITLIZE ERASABLES

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0884				31,3543	0 0006	1	ROOTPSRS	EXTEND			
0885	REF	1		31,3544	22 132	1		QXCH	RETRCOT	RETURN ADRES	
0886	REF	1		31,3545	54 117	1		TS	PWRPTR	PWR TABL POINTER	
0887	REF	293	LAST	31,3546	52 160	1		DXCH	MPAC	+3	PWR TABL ADRES, N-1
0888	REF	1		31,3547	3 3666	1		CA	DERTABLL		
0889	REF	1		31,3550	54 141	1		TS	DERPTR	DER TABL POINTER	
0890	REF	294	LAST	31,3551	54 161	0		TS	MPAC	+5	DER TABL ADRES
0891	REF	295	LAST	31,3552	10 160	1		CCS	MPAC	+4	NO POWER SERIES OF DEGREE 1 OR LESS
0892	REF	296	LAST	31,3553	54 162	0		TS	MPAC	+6	N-2
0893	REF	147	LAST	31,3554	3 4755	1		CA	ZERO		MODE USED AS ITERATION COUNTER. MODE
0894	REF	8	LAST	31,3555	54 163	1		TS	MODE		MUST BE POS SO ABS WON'T COMP MPAC+3 ETC

A0895

COMPUTE CRITERION TO STOP ITEPATING

0896				31,3556	0 0006	1		EXTEND		
0897	REF	297	LAST	31,3557	3 0155	0		DCA	MPAC	
0898	REF	1		31,3560	52 127	1		DXCH	ROOTPS	
0899	REF	298	LAST	31,3561	50 157	1		INDEX	MPAC	+3
0900				31,3562	3 0005	1		CA	5	
0901	REF	7	LAST	31,3563	0 7306	0		TC	SHORTMP	
0902	REF	2	LAST	31,3564	0 4713	0		TC	USP3CADR	
0903	REF	1		31,3565	01226	0		CADR	ABS	
0904	REF	299	LAST	31,3566	52 155	1		DXCH	MPAC	
0905	REF	1		31,3567	52 125	0		DXCH	DXCRIT	

FETCH ROOT GUESS, KEEPING IT IN MPAC
AND IN ROOTPS
PWR TABL ADRES
PRECROOT TO A
YIELDS DP PRODUCT IN MPAC
YIELDS ABVAL OF CRITERION ON DX IN MPAC
CRITERION

A0906

SET UP DER COF TABL

0907				31,3570	0 0006	1		EXTEND		
0908	REF	2	LAST	31,3571	5 0117	0		INDEX	PWRPTR	
0909				31,3572	3 0004	0		DCA	3	
0910	REF	300	LAST	31,3573	52 155	1		DXCH	MPAC	
0911	REF	301	LAST	31,3574	3 0160	0		CA	MPAC	+4
0912	REF	1		31,3575	54 140	0	DERCLOOP	TS	PWRCNT	
0913	REF	90	LAST	31,3576	6 4753	1		AD	ONE	
0914	REF	1		31,3577	0 7315	1		TC	DMPNSUB	
0915				31,3600	0 0006	1		EXTEND		
0916	REF	3	LAST	31,3601	5 0117	0		INDEX	PWRPTR	
0917				31,3602	3 0002	0		DCA	1	
0918	REF	302	LAST	31,3603	52 155	1		DXCH	MPAC	
0919	REF	2	LAST	31,3604	50 141	0		INDEX	DERPTR	
0920				31,3605	52 004	1		DXCH	3	
0921	REF	50	LAST	31,3606	4 4752	1		CS	TWO	
0922	REF	4	LAST	31,3607	26 117	1		ADS	PWRPTR	
0923	REF	51	LAST	31,3610	4 4752	1		CS	TWO	
0924	REF	3	LAST	31,3611	26 141	1		ADS	DERPTR	
0925	REF	2	LAST	31,3612	10 140	0		CCS	PWRCNT	
0926	REF	1		31,3613	1 3575	1		TCF	DERCLOOP	

A(N) TO MPAC
N-1 TO A
LOOP COUNTER
YIELDS DERCOF = I X A(I) IN MPAC
A(I-1) TO MPAC, FETCHING DERCOF
DERCOF TO DER TABL
DECREMENT PWR POINTER
DECREMENT DER POINTER

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A0927

CONVERGE ON ROOT

0928				31,3614	0 0006 1	ROOTLOOP	EXTEND		
0929	REF 2	LAST	823	31,3615	3 0127 0		DCA	ROOTPS	FETCH CURRENT ROOT
0930	REF 303	LAST	823	31,3616	52 155 1		DXCH	MPAC	LEAVE IN MPAC
0931				31,3617	0 0006 1		EXTEND		
0932	REF 304	LAST	824	31,3620	3 0162 1		DCA	MPAC	+5 LOAD A, L WITH DER TABL ADRES, N-2
0933	REF 1			31,3621	0 7214 1		TC	POWRSERS	YIELDS DERIVATIVE IN MPAC
0934				31,3622	0 0006 1		EXTEND		
0935	REF 3	LAST	824	31,3623	3 0127 0		DCA	ROOTPS	
0936	REF 305	LAST	824	31,3624	52 155 1		DXCH	MPAC	CURRENT ROOT TO MPAC, FETCHING DERIVATIVE
0937	REF 58	LAST	816	31,3625	52 131 0		DXCH	BUF	LEAVE DERIVATIVE IN BUF AS DIVISOR
0938				31,3626	0 0006 1		EXTEND		
0939	REF 306	LAST	824	31,3627	3 0160 0		DCA	MPAC	+3 LOAD A, L WITH PWR TABL ADRES, N-1
0940	REF 2	LAST	824	31,3630	0 7214 1		TC	POWRSERS	YIELDS RESIDUAL IN MPAC
0941	REF 3	LAST	823	31,3631	0 4713 0		TC	USPRCADR	
0942	REF 1			31,3632	00353 1		CADR	DDV/BDDV	YIELDS -DX IN MPAC
0943				31,3633	0 0006 1		EXTEND		
0944	REF 307	LAST	824	31,3634	4 0155 1		DCA	MPAC	FETCH DX, LEAVING -DX IN MPAC
0945	REF 4	LAST	824	31,3635	20 127 1		DAS	ROOTPS	CORRECTED ROOT NOW IN ROOTPS
0946	REF 4	LAST	824	31,3636	0 4713 0		TC	USPRCADR	
0947	REF 2	LAST	823	31,3637	01226 0		CADR	ABS	YIELDS ABS(DX) IN MPAC
0948				31,3640	0 0006 1		EXTEND		
0949	REF 2	LAST	823	31,3641	4 0125 0		DCA	DXCRIT	
0950	REF 308	LAST	824	31,3642	20 155 1		DAS	MPAC	ABS(DX)-ABS(DXCRIT) IN MPAC
0951	REF 9	LAST	823	31,3643	24 163 0		INCR	MODE	INCREMENT ITERATION COUNTER
0952	REF 10	LAST	824	31,3644	3 0163 0		CA	MODE	
0953	REF 33	LAST	799	31,3645	7 4750 0		MASK	BIT4	KLUMPP SAYS GIVE UP AFTER EIGHT PASSES
0954	REF 241	LAST	821	31,3646	10 000 0		CCS	A	
0955	REF 2	LAST	823	31,3647	0 0132 1	BADROOT	TC	RETROOT	
0956	REF 309	LAST	824	31,3650	10 154 0		CCS	MPAC	TEST HI ORDER DX
0957	REF 1			31,3651	1 3614 0		TCF	ROOTLOOP	
0958	REF 1			31,3652	1 3654 1		TCF	TESTLODX	
0959	REF 1			31,3653	1 3660 0		TCF	ROOTSTOP	
0960	REF 310	LAST	824	31,3654	10 155 1	TESTLODX	CCS	MPAC	+1 TEST LO ORDER DX
0961	REF 2	LAST	824	31,3655	1 3614 0		TCF	ROOTLOOP	
0962	REF 2	LAST	824	31,3656	1 3660 0		TCF	ROOTSTOP	
0963	REF 3	LAST	824	31,3657	1 3660 0		TCF	ROOTSTOP	
0964	REF 5	LAST	824	31,3660	52 127 1	ROOTSTOP	DXCH	ROOTPS	
0965	REF 311	LAST	824	31,3661	52 155 1		DXCH	MPAC	
0966	REF 11	LAST	824	31,3662	3 0163 0		CA	MODE	
0967	REF 312	LAST	824	31,3663	54 156 1		TS	MPAC	+2 STORE SP ITERATION COUNT IN MPAC+2
0968	REF 3	LAST	824	31,3664	50 132 1		INDEX	RETROOT	
0969				31,3665	1 0002 1		TCF	?	

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0970 REF 1 31,3666 00147 0 DERTABLL ADRES DERCOFN -3

R0971 *****
R0973 TRASHY LITTLF SUBROUTINF5
R0974 *****

09751	RFF	16	LAST	814	31,3667	51'620	1	INTPRETX	INDEX	WCHPHASE	SET X1 ON THE WAY TO THE INTERPRETER
09752	RFF	1			31,3670	4 2510	0		CS	TARGETDEX	
09753	REF	21	LAST	810	31,3671	50 120	1		INDEX	FIXLOC	
09754	REF	17	LAST	734	31,3672	54 046	1		TS	X1	
09755	REF	129	LAST	819	31,3673	1 6036	0		TCF	INTPRET	

0976	REF	14	LAST	814	31,3674	3 1640	1	TDISPSET	CA	TTF/8	
0977					31,3675	0 0006	1		EXTEND		
0978	REF	1			31,3676	7 4750	0		MP	TSCALINV	
0979	REF	4	LAST	330	31,3677	53'474	0		DXCH	TTFDISP	

0980	REF	15	LAST	825	31,3700	3 1640	1		CA	TTF/8	
0981					31,3701	0 0006	1		EXTEND		
0982	REF	1			31,3702	7 3740	0		MP	SCITFDSP	
0983	RFF	116	LAST	821	31,3703	54 001	1		TS	L	
0984	REF	1			31,3704	6 3736	0		AD	99+LINT	
0985					31,3705	0 0006	1		EXTEND		
0986					31,3706	6 3717	0		BZMF	+11	
0987	REF	117	LAST	825	31,3707	4 0001	1		CS	L	
0988	REF	1			31,3710	6 3737	1		AD	-LINT	
0989					31,3711	0 0006	1		EXTEND		
0990					31,3712	6 3715	1		BZMF	+3	
0991	REF	3	LAST	817	31,3713	55'664	0		TS	TRFDES	
0992	REF	203	LAST	816	31,3714	0 0002	0		TC	Q	

0993	REF	148	LAST	823	31,3715	3 4755	1		CA	ZERO	
0994					31,3716	1 3713	0		TCF	-3	

0995	REF	2	LAST	825	31,3717	3 3736	0		CA	99+LINT	
0996					31,3720	1 3710	0		TCF	-10	

R0997 *****
R0999 SPECIALIZED "PHASCHNG" SUBROUTINE
R1000 *****

1002	REF	1			E3,1440			EBANK=	PHSNAME2	
1003	REF	2	LAST	238	31,3721	3 5007	0	FASTCHNG	CA	EBANK3
1004	REF	23	LAST	816	31,3722	56 003	1		XCH	EBANK
1005	REF	118	LAST	825	31,3723	52 002	1		DXCH	L
1006	REF	1			31,3724	55'442	0		TS	PHSNAME3
1007	RFF	24	LAST	825	31,3725	22 003	1		LXCH	EBANK

SPECIALIZED 'PHASCHNG' ROUTINE

L LUNAR LANDING GUIDANCE EQUATIONS

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1008 REF 3 LAST 802 E7,1617 EBANK= E2DPS
 1009 REF 242 LAST 824 31,3726 0 0000 1 TC A

R1010 *****
 R1012 PARAMETER TABLE INDIRECT ADDRESSES
 R1013 *****

1015 REF 2 LAST 137 E5,1402 RDG = 2BRFG
 1016 REF 2 LAST 137 E5,1410 VDG = VBRFG
 1017 REF 2 LAST 137 E5,1416 ADG = ABRFG
 1018 REF 2 LAST 137 E5,1424 VDG2TTF = VBRFG*
 1019 REF 2 LAST 137 E5,1426 ADG2TTF = ABRFG*
 1020 REF 2 LAST 137 E5,1430 JDG2TTF = JBRFG*

R1021 *****
 R1023 LUNAR LANDING CONSTANTS
 R1024 *****

1027 31,3727 00046 0 3SEC*17 DEC +3 F2 B-17

1028 31,3730 00175 1 10SEC*17 DEC +10 E2 B-17

1029 31,3731 00372 1 20SEC*17 DEC +20 E2 B-17

1030 31,3732 00567 0 30SEC*17 DEC +30 E2 B-17

1034 REF 8 LAST 811 31,3733 01563 0 TABLTTF ADRES TABLTTF +3 ADDRESS FOR REFERENCING TTF TABLE

1038 31,3734 00021 1 HIGHESTF 2DEC +43245 E-4 B-12 THRUST FOR RADIAL CONTROL
 1038 31,3735 11422 0

1041 REF 40 LAST 820 4740 TTFSCALE = BIT12

1042 REF 34 LAST 824 4750 TSCALINV = BIT4

1044 31,3736 00167 1 99+LINT DEC +119

1045 31,3737 77753 0 -LINT DEC -20

1046 31,3740 02437 0 SCTTFDSP DEC +.08 RESCALES FROM 2(-17) CS TO WHOLE SECONDS

L LUNAR LANDING GUIDANCE EQUATIONS

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1047	31,3741	00264 1	180DEGS	DEC	+180	
1048	31,3742	00056 1	1/2DEG	DEC	+0.00278	
1049	31,3743	74110 1	DELTTFAP	DEC	-158 E2 B-17	
1050	31,3744	01130 1	TAUVERT	2DEC	600 B-14	
1050	31,3745	00000 1				
1051	31,3746	02260 1	TAUROD	2DEC	300 B-12	
1051	31,3747	00000 1				
1052	31,3750	01440 0	GSCALE	2DEC	100 B-11	
1052	31,3751	00000 1				
1053	31,3752	14000 1	3/8DP	2DEC	.375000000	
1053	31,3753	00000 1				
1054	31,3754	30000 1	3/4DP	2DEC	.750000000	
1054	31,3755	00000 1				
1058	31,3756	01437 0	+1FPS	DEC	+0.3048 E-2 B+4	
1059	31,3757	00000 1	+3FPS	2DEC	+0.9144 E-2 B-10	
1059	31,3760	04535 0				
1060	31,3761	77656 1	DEPRCRIT	2DEC	-.02 B-2	DEPRESSION ANGLE CRITERION
1060	31,3762	42436 0				
1063	31,3763	01542 0	PROJMAX	DEC	.42262 B-3	SIN(25')/8 TO COMPARE WITH PROJ
1064	31,3764	01022 0	PROJMIN	DEC	.25882 B-3	SIN(15')/8 TO COMPARE WITH PROJ
1067	31,3765	01477 1	V06N63	VN	0663	P63
1068	31,3766	01500 0	V06N64	VN	0664	P64
1069	31,3767	01474 1	V06N60	VN	0660	P65, P66, P67

L LUNAR LANDING GUIDANCE EQUATIONS

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R1070 *****
R1072 *****

L P70-P71

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0001				21,2102				BANK	21		
0002	REF	1		21,2000				SETLOC	R11		
0003				21,2102				BANK			
0004	REF	27	LAST	789	E7,1513			EBANK=	DVCNTP		
0005	REF	1						COUNT*	\$\$/F11		
0006	REF	15	LAST	769	21,2102	4 0103 1	R10,R11	CS	FLAGWRD7	IS SERVICER STILL RUNNING?	
0007	REF	2	LAST	201	21,2103	7 4747 0		MASK	AVEGFBIT		
0008	REF	243	LAST	826	21,2104	10 000 0		CCS	A		
0009	REF	54	LAST	820	21,2105	1 5261 0		TCF	TASKOVEP	LET AVGEND TAKE CARE OF GROUP 2.	
0010	REF	3	LAST	615	21,2106	11 056 1		CCS	PIPCTR		
0011					21,2107	1 2111 0		TCF	+2		
0012	REF	1			21,2110	1 2314 1		TCF	L2+TASK	LAST PASS. CALL LRHTASK.	
0013	REF	1			21,2111	55 712 0	+2	TS	PIPCTR1		
0014	REF	2	LAST	166	E7,1712			PIPCTR1	=	LADQSAVE	
0015	REF	3	LAST	518	1056			PIPCTR	=	PHSPFDT2	
0016	REF	3	LAST	449	21,2112	3 6010 0		CAF	CT31		
0017	REF	24	LAST	820	21,2113	0 5173 1		TC	TWIDDLE		
0018	REF	2	LAST	255	21,2114	02102 0		ADRES	R10,R11		
0019	REF	28	LAST	622	21,2115	4 1303 1	R10,R11A	CS	IMODES33	IF LAMP TEST, DO NOT CHANGE LR LITES.	
0020	REF	42	LAST	821	21,2116	7 4753 0		MASK	BIT1		
0021					21,2117	0 0006 1		EXTEND			
0022	REF	1			21,2120	1 2136 0		BZF	10,11		
0023	REF	12	LAST	623	21,2121	7 0107 0	FLASHH?	MASK	FLGWRD11	C(A) = 1 = HFLASH BIT	
0024					21,2122	0 0006 1		EXTEND			
0025	REF	1			21,2123	1 2127 0		BZF	FLASHV?	H FLASH OFF, SO LEAVE ALONE	
0026	REF	2	LAST	622	21,2124	3 4747 1		CA	HLITE		
0027	REF	119	LAST	825	21,2125	54 001 1		TS	L		
0028	REF	1			21,2126	0 4606 0		TC	FLIP	FLIP H LITE	
0029	REF	1			21,2127	3 4752 0	FLASHV?	CA	VFLASHBIT	VFLASHBIT MUST BE BIT 2.	
0030	REF	13	LAST	829	21,2130	7 0107 0		MASK	FLGWRD11		
0031					21,2131	0 0006 1		EXTEND			
0032	REF	2	LAST	829	21,2132	1 2136 0		BZF	10,11	V FLASH OFF	
0033	REF	2	LAST	623	21,2133	3 4751 0		CA	VLITE		
0034	REF	120	LAST	829	21,2134	54 001 1		TS	L		
0035	REF	2	LAST	829	21,2135	0 4606 0		TC	FLIP	FLIP V LITE	
0036	REF	3	LAST	746	21,2136	3 0105 0	10,11	CA	FLAGWRD9	IS THE LETABORT FLAG SET ?	
0037	REF	2	LAST	746	21,2137	7 4743 1		MASK	LETABBIT		
0038					21,2140	0 0006 1		EXTEND			
0039	REF	1			21,2141	1 2340 0		BZF	LANDISP	NO. PROCEED TO R10.	
0040	REF	12	LAST	692	21,2142	4 1011 1	P71NOW?	CS	MODREG	YES. ARE WE IN P71 NOW?	

L P70-P71

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0041 REF 1 21,2143 6 2272 1
 0042 21,2144 0 0006 1
 0043 REE 2 LAST 829 21,2145 1 2340 0

AD MODE71
 EXTEND
 BZF LANDISP

YES. PROCEED TO R10.

0044 21,2146 0 0006 1
 0045 REF 7 LAST 804 21,2147 00 030 1
 0046 21,2150 4 0000 0
 0047 REF 121 LAST 829 21,2151 54 001 1
 0048 REF 35 LAST 826 21,2152 7 4750 0
 0049 REF 244 LAST 829 21,2153 10 000 0
 0050 REF 2 LAST 256 21,2154 1 2172 0

EXTEND
 READ CHAN30
 COM
 TS L
 MASK BIT4
 CCS A
 TCF P71A

NO. IS AN ABORT STAGE COMMANDED?

YES.

0051 REE 13 LAST 829 21,2155 4 1011 1
 0052 REF 1 21,2156 6 2270 0
 0053 21,2157 0 0006 1
 0054 REE 3 LAST 830 21,2160 1 2340 0

P70NOW?

CS MODREG
 AD MODE70
 EXTEND
 BZF LANDISP

NO. ARE WE IN P70 NOW?

YES. PROCEED TO R10.

0055 REE 122 LAST 830 21,2161 3 0001 0
 0056 REE 43 LAST 829 21,2162 7 4753 0
 0057 REF 245 LAST 830 21,2163 10 000 0
 0058 REE 2 LAST 256 21,2164 1 2167 1
 0059 REE 4 LAST 830 21,2165 1 2340 0

CA L
 MASK BIT1
 CCS A
 TCF P70A
 TCF LANDISP

NO. IS AN ABORT COMMANDED?

YES.

NO. PROCEED TO R10.

0060 REF 1

COUNT* \$\$/P70

0061 REE 1 21,2166 0 2274 1
 0062 *REF 149 LAST 825 21,2167 4 4755 0
 0063 21,2170 1 2173 1
 0064 REF 2 LAST 830 21,2171 0 2274 1
 0065 REE 52 LAST 823 21,2172 3 4752 0
 0066 REE 204 LAST 825 21,2173 54 002 1
 0067 21,2174 0 0004 0
 0068 REF 1 21,2175 3 2200 1
 0069 REF 1 21,2176 54 017 0
 0070 21,2177 5 0017 1

P70

P70A

P71

P71A

+3

TC LEGAL?
 CS ZERO
 TCF +3
 TC LEGAL?
 CAF TWO
 TS Q
 INHINT
 CAF ABRT JADR
 TS BRUP T
 RESUME

0071 REE 1 21,2200 1 2201 1
 0072 REF 1 21,2201 3 2271 1
 0073 REF 205 LAST 830 21,2202 6 0002 0
 0074 REF 123 LAST 830 21,2203 54 001 1
 0075 21,2204 4 0000 0
 0076 REF 6 LAST 755 21,2205 52 761 0
 0077 REF 206 LAST 830 21,2206 50 002 0
 0078 REF 2 LAST 830 21,2207 3 2270 0
 0079 REF 14 LAST 830 21,2210 55 011 1

ABRT JADR

ABRT JASK

TCF ABRT JASK
 CAF OCTAL27
 AD Q
 TS L
 COM
 DXCH -PHASE4
 INDEX Q
 CAF MODE70
 TS MODREG

0080 REF 23 LAST 764 21,2211 55 163 0
 0081 *REF 207 LAST 830 21,2212 10 002 1

TS DISPDEx
 CCS Q

INSURE DISPDEx IS POSITIVE.

SET APSFLAG IF P71.

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0082 REF 14 LAST 764 21,2213 4 0106 1
 0083 REF 10 LAST 764 21,2214 7 4737 1
 0084 *REF 15 LAST 831 21,2215 26 106 1
 0085 *REF 1 21,2216 4 2273 1
 0086 REF 27 LAST 767 21,2217 7 0111 1
 0087 REF 28 LAST 831 21,2220 54 111 1

CS FLGWRD10
 MASK APSFL8IT
 ADS FLGWRD10
 CS DAPBIT5
 MASK DAP800LS
 TS DAPBOOLS

SET APSFLAG PRIOR TO THE ENFMA.

DAPBITS = OCT 640 = BITS 6, 8, 9
 (TURN OFF: ULLAGE, DRIFT, AND XOVINH18)

0088 REF 22 LAST 767 21,2221 4 0101 0
 0089 REF 5 LAST 767 21,2222 7 4745 1
 0090 REF 23 LAST 831 21,2223 26 101 0

CS FLAGWRD5
 MASK ENGONBIT
 ADS FLAGWRD5

SET ENGONFLG.

0091 REF 8 LAST 767 21,2224 4 4355 1
 0092 21,2225 0 0006 1
 0093 REF 26 LAST 767 21,2226 02 011 0
 0094 REF 36 LAST 805 21,2227 6 4737 0
 0095 21,2230 0 0006 1
 0096 REF 27 LAST 831 21,2231 01 011 0

CS PRI030
 EXTEND
 RAND DSALMOUT
 AD 8IT13
 EXTEND
 WRITE DSALMOUT

INSURE THAT THE ENGINE IS ON, IF ARMED.

0097 REF 4 LAST 566 21,2232 3 4735 1
 0098 REF 14 LAST 829 21,2233 54 107 0

CAF LRBYBIT
 TS FLGWPD11

TERMINATE R12.

0099 REF 24 LAST 602 21,2234 4 0074 0
 0100 REF 1 21,2235 7 4752 1
 0101 REF 25 LAST 831 21,2236 26 074 0
 A0102
 A0103

CS FLAGWRD0
 MASK RIOFL8IT
 ADS FLAGWRD0

SET RIOFLAG TO SUPPRESS OUTPUTS TO THE
 CROSS-POINTER DISPLAY.
 THE FOLLOWING ENEMA WILL REMOVE THE
 DISPLAY INERTIAL DATA OUTBIT AND
 DISABLE THE RR ERROR CTRS FOR US.

0104 21,2237 0 0006 1
 0105 REF 24 LAST 769 21,2240 3 0025 0
 0106 REF 6 LAST 767 21,2241 53 345 0

EXTEND
 DCA TIME2
 DXCH TEVENT

LOAD TEVENT FOR THE DOWNLINK.

0107 21,2242 0 0006 1
 0108 REF 1 21,2243 3 2267 0
 0109 REF 3 LAST 747 21,2244 53 253 0

EXTEND
 DCA SVEXITAD
 DXCH AVGEXIT

0110 21,2245 0 0006 1
 0111 REF 14 LAST 817 21,2246 3 4755 1
 0112 REF 4 LAST 744 21,2247 52 753 1

EXTEND
 DCA NEG0
 DXCH -PHASE1

0113 21,2250 0 0006 1
 0114 REF 15 LAST 831 21,2251 3 4755 1
 0115 REF 3 LAST 817 21,2252 52 757 0

EXTEND
 DCA NEG0
 DXCH -PHASE3

0116 21,2253 0 0006 1
 0117 REF 16 LAST 831 21,2254 3 4755 1
 0118 REF 3 LAST 752 21,2255 52 765 1

EXTEND
 DCA NEG0
 DXCH -PHASE6

0119 REF 26 LAST 744 21,2256 3 6244 0
 0120 REF 124 LAST 830 21,2257 54 001 1
 0121 21,2260 4 0000 0

CAF THREE
 TS L
 COM

SET UP 4.3SPOT FOR GOABORT

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0122	REF	7	LAST	830	21,2261	52 761 0		DXCH	-PHASE4	
0123	REF	1			21,2262	3 7727 1		CAF	OCT3 7774	SET T5RUPT TO CALL DAPIDLER IN
0124	REF	2	LAST	234	21,2263	54 030 0		TS	TIME5	40 MILLISECONDS.
0125	REF	45	LAST	815	21,2264	0 4635 0		TC	POSTJUMP	
0126	REF	1			21,2265	12766 0		CADR	ENEMA	
0127	REF	28	LAST	829	E7,1513			EBANK=	DVCNTR	
0128	REF	6	LAST	769	21,2266	03525 0	SVEXITAD	2CADR	SERVEXIT	
0128					21,2267	76067 1				
0129					21,2270	00106 0	MODE70	DEC	70	
0130					21,2271	00027 1	OCTAL27	OCT	27	
0131					21,2272	00107 1	MODE71	DEC	71	
0132					21,2273	00640 0	DAPBITS	OCT	00640	
0133					32,3257			BANK	32	
0134	REF	2	LAST	53	32,2000			SETLOC	ABORTS	
0135					32,3257			BANK		
0136	REF	2	LAST	53 TO	54:	8 8*		COUNT*	\$/P70	
0137	REF	130	LAST	825	32,3257	0 6036 1	GOABORT	TC	INTPRET	
0138					32,3260	77624 1		CALL		
0139	REF	2	LAST	742	32,3261	61055 0			INITCDUW	
0140					32,3262	77776 1		EXIT		
0141	REF	16	LAST	816	32,3263	3 4751 0		CAF	FOUR	
0142	REF	29	LAST	832	32,3264	55*513 0		TS	DVCNTR	
0143	REF	1			32,3265	3 3607 0		CAF	WHICHADR	
0144	REF	27	LAST	789	32,3266	55*453 0		TS	WHICH	
0145	REF	73	LAST	818	32,3267	0 5516 0		TC	DOWNFLAG	
0146	REF	1			32,3270	00214 0		ADRES	FLRCS	
0147	REF	74	LAST	832	32,3271	0 5516 0		TC	DOWNFLAG	
0148	REF	4	LAST	754	32,3272	00175 1		ADRES	FLUNDISP	
0149	REF	75	LAST	832	32,3273	0 5516 0		TC	DOWNFLAG	
0150	REF	5	LAST	769	32,3274	00161 1		ADRES	IDLEFLAG	
0151	REF	47	LAST	818	32,3275	0 5504 0		TC	UPFLAG	INSURE 4-JET TRANSLATION CAPABILITY.
0152	REF	1			32,3276	00307 0		ADRES	ACC4-2FL	
0153	REF	8	LAST	819	32,3277	0 5321 1		TC	CHECKMM	
0154					32,3300	00106 0	70DEC	DEC	70	
0155	REF	1			32,3301	1 3525 1		TCF	P71RET	
0156	REF	131	LAST	832	32,3302	0 6036 1	P70INIT	TC	INTPRET	

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0157				32,3303	77624	1	CALL		
0158	RFF	1		32,3304	65555	1		TGCCMP	
0159				32,3305	54345	1	DLOAD	SL	
0160	RFF	1		32,3306	34003	0		MDDTDPS	
0161				32,3307	20205	1		4D	
0162				32,3310	77665	1	BDDV		
0163	RFF	7	LAST	32,3311	01245	0		MASS	
0164	REF	2	LAST	32,3312	16265	1	STODL	TBUP	
0165	RFF	8	LAST	32,3313	01245	0		MASS	
0166				32,3314	70471	1	DDV	SR1	
0167	REF	1		32,3315	24003	1		K(1/DV)	
0168	RFF	2	LAST	32,3316	03633	1	STORE	1/DV1	
0169	REF	2	LAST	32,3317	03635	1	STDRF	1/DV2	
0170	RFF	2	LAST	32,3320	03637	0	STDRF	1/DV3	
0171				32,3321	77665	1	BDDV		
0172	REF	1		32,3322	25606	0		K(AT)	
0173	REF	3	LAST	32,3323	16257	0	STDDL	AT	
0174	REF	1		32,3324	34005	0		DTDECAY	
0175				32,3325	54276	0	DCOMP	SL	
0176				32,3326	20214	1		IID	
0177	RFF	2	LAST	32,3327	02263	1	STORE	TTO	
0178				32,3330	57535	0	SLOAD	DCCMP	
0179	REF	2	LAST	32,3331	26002	1		DPSVEX	
0180				32,3332	77702	1	SR2		
0181	REF	2	LAST	32,3333	02261	0	STDRE	VE	INITIALIZE DPS EXHAUST VELOCITY
0182				32,3334	45014	0	SET	CALL	
0183	REF	1		32,3335	04467	0		FLAP	
0184	RFF	1		32,3336	60230	0		CDMMINIT	
0185				32,3337	77650	1	INJTARG	GDTD	*** BYPASS ZONE 0 ***
0186	RFF	1		32,3340	65371	1		UPTHROT	*** BYPASS ZONE 0 ***
A0187							DLDD	DSU	
A0188								TGO	
A0189								50SECS	
A0190							BPL	EXIT	
A0191								UPTHRDT	
0192	REF	9	LAST	32,3341	0 5321	1	TC	CHFCMM	
0193				32,3342	00106	0	DEC	70	
0194	REF	1		32,3343	3 3572	1	CAF	DEC299	P71. DELAY 3 SECONDS.
0195	REF	44	LAST	32,3344	6 4753	1	AD	BIT1	P70. DELAY 1 CENTISECOND.
0196	REF	2	LAST	32,3345	55'644	1	TS	ENGDFDFT	
0197	REF	25	LAST	32,3346	0 5173	1	TC	TWIDDLF	
0198	REF	1		32,3347	03356	1	ADRES	ZDNE ZERO	
0199	REF	58	LAST	32,3350	0 5353	1	TC	PHASCHNG	
0200				32,3351	47014	1	DCT	47014	
0201	REF	3	LAST	32,3352	76133	1	-GENADP	ENGDFDFT	
0202	REF	30	LAST	E7,1513			EBANK=	DVCNTR	
0203	REF	2	LAST	32,3353	03356	1	2CADR	ZONF ZERO	
0203				32,3354	64067	1			

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0204 REF 130 LAST 818 32,3355 1 5155 1 TCF ENDOFJOB

0205 REF 37 LAST 792 32,3356 0 4674 0 ZONEZERO TC IBNKCALL
0206 REF 1 32,3357 75551 1 CADR ENGINOF20207 REF 1 32,3360 3 3407 1 CAF ZERETAD
0208 REF 2 LAST 243 32,3361 55'260 0 TS OUTRCUTE0209 REF 76 LAST 832 32,3362 0 5516 0 TC DOWNFLAG
0210 REF 5 LAST 721 32,3363 00163 0 ADRES AVEGFLAG0211 REF 77 LAST 834 32,3364 0 5516 0 TC DOWNFLAG
0212 REF 1 32,3365 00162 1 ADRES V37FLAG0213 REF 59 LAST 833 32,3366 0 5353 1 TC PHASCHNG
0214 32,3367 00004 0 OCT 00004

0215 REF 55 LAST 829 32,3370 1 5261 0 TCF TASKOVER

0216 32,3371 77414 0 UPTHROT SET EXIT
0217 REF 1 32,3372 04461 0 FLVR

0218 *REF 1 32,3373 0 3564 0 TC THROTUP

0219 REF 60 LAST 834 32,3374 0 5353 1 TC PHASCHNG
0220 32,3375 04024 0 OCT 040240221 *REF 224 LAST 817 32,3376 0 4616 1 -3 TC BANKCALL
0222 REF 2 LAST 741 32,3377 73707 0 CADR P40AUTOVERIFY THAT THE PANEL SWITCHES
ARE PROPERLY SET.

0223 *REF 2 LAST 834 32,3400 0 3564 0 TC THROTUP

0224 32,3401 0 0006 1 UPTHROT1 EXTEND
0225 REF 1 32,3402 3 3611 1 DCA ATMAGAD
0226 REF 4 LAST 831 32,3403 53'253 0 DXCH AVGEXIT

SET SERVICER TO CALL ASCENT GUIDANCE.

0227 REF 61 LAST 834 32,3404 0 5353 1 GRP4OFF TC PHASCHNG
0228 32,3405 00004 0 OCT 00004

TERMINATE USE OF GROUP 4.

0229 REF 131 LAST 834 32,3406 1 5155 1 TCF ENDOFJOB

0230 REF 1 32,3407 65410 1 ZERETAD CADR ZONEORET
0231 REF 11 LAST 769 32,3410 0 5327 1 ZONEORET TC 2PHSCHNG
0232 32,3411 00002 0 OCT 00002
0233 32,3412 05024 1 OCT 05024
0234 32,3413 25000 0 OCT 250000235 REF 132 LAST 832 32,3414 0 6036 1 TC INTPRET
0236 32,3415 43234 0 RTB DAD

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0237	REF	19	LAST	737	32,3416	21462	1		LOADTIME	
0238	REF	1			32,3417	25576	1		90SEC	
0239	REF	8	LAST	805	32,3420	03557	0	STORE	PIPTIME1	STORE TEMPORARILY IN PIPTIME1.
0240	REF	50	LAST	792	32,3421	34041	0	STCALL	TDEC1	
0241	REF	10	LAST	790	32,3422	27057	0		LEMPREC	
0242					32,3423	77775	1	VLOAD		
0243	REF	22	LAST	773	32,3424	00007	0		VATT	
0244	REF	3	LAST	743	32,3425	03551	0	STORE	VN1	STORE VTIG TEMPORARILY IN VN1.
0245					32,3426	76521	0	MXV	VSL1	
0246	REF	26	LAST	810	32,3427	01734	0		REFSMAT	
0247	REF	6	LAST	810	32,3430	27525	0	STOVL	V	
0248	REF	28	LAST	773	32,3431	00001	0		RATT	
0249	REF	3	LAST	164	32,3432	03543	0	STORE	RNI	STORE RTIG TEMPORARILY IN RNI.
0250					32,3433	52521	0	MXV	VSL6	
0251	REF	27	LAST	835	32,3434	01734	0		REFSMAT	
0252	REF	15	LAST	815	32,3435	37517	0	STCALL	R	
0253	REF	3	LAST	790	32,3436	67162	0		MUNGRAV	
0254					32,3437	45014	0	SET	CALL	
0255	REF	1			32,3440	04471	1		FLZONEO	
0256	REF	1			32,3441	60313	0		ASCENT	
0257					32,3442	77776	1	PREBRETI	EXIT	
0258	REF	62	LAST	834	32,3443	05353	1	TC	PHASCHNG	
0259					32,3444	04024	0	OCT	04024	
0260	REF	133	LAST	834	32,3445	06036	1	TC	INTPRET	
0261					32,3446	77214	0	CLEAR	VLDAD	
0262	REF	2	LAST	835	32,3447	04671	0		FLZONEO	
0263	REF	3	LAST	215	32,3450	03646	0		VGVECT	
0264					32,3451	76505	0	VXM	VSL1	
0265	REF	28	LAST	835	32,3452	01734	0		REFSMAT	
0266	REF	16	LAST	772	32,3453	03654	0	STORE	DELVSIN	
0267					32,3454	77646	0	ABVAL		
0268	REF	5	LAST	772	32,3455	27662	0	STOVL	DELVSAB	
0269	REF	4	LAST	835	32,3456	03543	0		RNI	
0270	REF	12	LAST	776	32,3457	27640	0	STOVL	RTIG	
0271	REF	4	LAST	835	32,3460	03551	0		VN1	
0272	REF	9	LAST	776	32,3461	17646	0	STODL	VTIG	
0273	REF	9	LAST	835	32,3462	03557	0		PIPTIME1	
0274	REF	39	LAST	792	32,3463	03440	1	STORE	TIG	
0275					32,3464	43014	0	SET	CLEAR	
0276	REF	9	LAST	778	32,3465	01067	1		XDELVFLG	
0277	REF	2	LAST	795	32,3466	04666	0		LETABORT	
0278					32,3467	77776	1	EXIT		
0279	REF	17	LAST	816	32,3470	36241	0	CAF	SIX	SET UP R60 FOR A 10 DEG/SEC MANUV. RATE.
0280	REF	4	LAST	377	32,3471	55325	0	TS	RATEINDX	
0281	REF	2	LAST	753	32,3472	35023	0	CAF	PRI013	REDUCE PRIORITY TO LEVEL EXPECTED BY
0282	REF	11	LAST	764	32,3473	05146	1	TC	PRI0CHNG	P40 AND P42.
0283	REF	1			32,3474	33612	1	CAF	ORBMAN	INITIALIZE FOR ORBITAL MANEUVERS LIST.
0284	REF	7	LAST	244	32,3475	54332	1	TS	DNLS TCOD	

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0285	REF	5	LAST	244	32,3476	55'324 1		TS	AGSWCRD	
0286	REF	10	LAST	833	32,3477	0 5321 1		TC	CHECKMM	
0287					32,3500	00106 0		DEC	70	FOR MODE=70,USE P40,OTHERWISE P42
0288	RFF	1			32,3501	1 3515 1		TCF	42SET	
0289	REF	1			32,3502	3 3521 1	40SET	CAF	P40CADR	
0290	REF	1			32,3503	55'566 1		TS	CADR SAVE	
0291	REF	1			32,3504	3 3523 0		CAF	DEC40	
0292	RFF	1			32,3505	55'567 0	COMMSET	TS	MMSAVE	
0293	REF	63	LAST	835	32,3506	0 5353 1		TC	PHASCHNG	
0294					32,3507	05024 1		OCT	05024	
0295					32,3510	13000 0		OCT	13000	
0296	REF	2	LAST	836	32,3511	3 1567 1		CA	MMSAVE	
0297	REF	3	LAST	390	32,3512	0 5314 1		TC	NEWMCDEA	
0298	REF	2	LAST	836	32,3513	3 1566 0		CA	CADR SAVE	
0299	REF	14	LAST	755	32,3514	0 4640 1		TC	BANK JUMP	
0300	REF	1			32,3515	3 3522 1	42SET	CAF	P42CADR	
0301	REF	3	LAST	836	32,3516	55'566 1		TS	CADR SAVE	
0302	REF	1			32,3517	3 3524 1		CAF	DEC42	
0303	REF	1			32,3520	1 3505 0		TCF	COMMSET	
0304	REF	2	LAST	248	32,3521	75147 1	P40CADR	CADR	P40LM	
0305	REF	2	LAST	248	32,3522	75410 0	P42CADR	CADR	P42LM	
0306	REF	2	LAST	162	E7,1566		CADRSAVE	=	MASS1	
0307	REF	3	LAST	836	E7,1567		MMSAVE	=	MASS1 +1	
0308					32,3523	00050 1	DEC40	DEC	40	
0309					32,3524	00052 0	DEC42	DEC	42	
0310	REF	78	LAST	834	32,3525	0 5516 0	P71RET	TC	DOWNFLAG	
0311	REF	3	LAST	835	32,3526	00215 1		ADRES	LETABORT	
0312	RFF	2	LAST	765	32,3527	3 6000 1		CAF	THRESH2	SET DYMON THRESHOLD TO THE ASCENT VALUE.
0313	REF	5	LAST	789	32,3530	55'251 1		TS	DVTHRUSH	
0314	REF	134	LAST	835	32,3531	0 6036 1		TC	INTPRET	
0315					32,3532	45014 0		BDN	CALL	
0316	REF	2	LAST	833	32,3533	04707 0			FLAP	
0317	REF	1			32,3534	65542 1			OLDTIME	
0318	REF	2	LAST	833	32,3535	65555 1			TGDCMP	IF FLAP=0, TGO=T-TIG
0319					32,3536	52131 0		SSP	GOTO	
0320	REF	7	LAST	779	32,3537	00053 1			QPRET	
0321	REF	1			32,3540	65337 0		CADR	INJTARG	
0322	REF	1			32,3541	60204 1			P12INIT	WILL EXIT P12INIT TO INJTARG
0323					32,3542	72545 0	OLDTIME	DLOAD	SL1	IF FLAP=1, TGO=2 TGO
0324	REF	15	LAST	782	32,3543	03515 0			TGO	
0325	REF	1			32,3544	37643 1		STCALL	TGO1	
0326	RFF	2	LAST	836	32,3545	60204 1			P12INIT	

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0327					32,3546	77776	1		EXIT	
0328	REF	64	LAST	836	32,3547	0 5353	1		TC	PHASCHNG
0329					32,3550	04024	0		OCT	04024
0330					32,3551	0 0006	1		EXTEND	
0331	REF	2	LAST	836	32,3552	3 1643	1		DCA	TG01
0332	REF	16	LAST	836	32,3553	53'515	0		DXCH	TGO
0333	*REF	1			32,3554	1 3376	1		TCF	JPTHROT1 -3
0334	REF	3	LAST	331	E7,1642			TG01	=	APD

R0335 *****

0336					21,2274				BANK	21
0337	REF	2	LAST	829	21,2000				SETLOC	R11
0338					21,2274				BANK	
0339	REF	2	LAST	830 TO	832:	70	70*		COUNT*	\$/P70
0340	REF	10	LAST	246	21,2274	4 0775	0	LEGAL?	CS	MMNUMBER
0341	REF	15	LAST	830	21,2275	6 1011	0		AD	MCDREG
0342					21,2276	0 0006	1		EXTEND	
0343	REF	1			21,2277	1 2310	0		BZF	ABORTALM
0344	REF	4	LAST	829	21,2300	4 0105	1		CS	FLAGWRD9
0345	REF	3	LAST	829	21,2301	7 4743	1		MASK	LETABBIT
0346	REF	246	LAST	830	21,2302	10 000	0		CCS	A
0347	REF	2	LAST	837	21,2303	1 2310	0		TCF	ABORTALM
0348	REF	16	LAST	829	21,2304	3 0103	0		CA	FLAGWRD7
0349	REF	3	LAST	829	21,2305	7 4747	0		MASK	AVEGFBIT
0350	REF	247	LAST	837	21,2306	10 000	0		CCS	A
0351	REF	208	LAST	830	21,2307	0 0002	0		TC	Q
0352	REF	7	LAST	509	21,2310	0 4364	1	ABORTALM	TC	FALTON
0353	REF	10	LAST	471	21,2311	0 4457	0		TC	RELDSP
0354	REF	46	LAST	832	21,2312	0 4635	0		TC	POSTJUMP
0355	REF	5	LAST	463	21,2313	20723	0		CADR	PINBRNCH
0356					32,3555				BANK	32
0357	REF	3	LAST	832	32,2000				SETLOC	ABORTS
0358					32,3555				BANK	
0359	REF	3	LAST	832 TO	837:	190	198*		COUNT*	\$/P70

R0360 *****

0361					32,3555	45234	0	TGOCOMP	RTB	DSU
0362	REF	20	LAST	835	32,3556	21462	1			LOADTIME
0363	REF	40	LAST	835	32,3557	03440	1			TIG
0364					32,3560	77661	0		SL	

L P7C-P71

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0365				32,3561	20214	1			11D
0366	REF	17	LAST	837	32,3562	03515	0	STORE	TGO
0367				32,3563	77616	0		RVQ	

R0368 *****

0369	*REF	37	LAST	831	32,3564	3 4737	0	THROTUP	CAF	3IT13
0370	*REF	5	LAST	799	32,3565	54 055	0		TS	THRUST
0371	*REF	36	LAST	830	32,3566	3 4750	1		CAF	BIT4
0372	*				32,3567	0 0006	1		EXTEND	
0373	*REF	11	LAST	799	32,3570	05 014	1		WOR	CHAN14
0374	*REF	209	LAST	837	32,3571	0 0002	0		TC	Q

R0375 *****

0376					32,3572	00453	0	DEC299	DEC	299	
0377					32,3573	00000	1	10SECS	2DEC	1000	
0377					32,3574	01750	1				
0378					32,3575	00000	1	90SEC	2DEC	9000	
0378					32,3576	21450	0				
0379					32,3577	01161	0	50SECS	2DEC	5000	B-17
0379					32,3600	00000	1				
0380					32,3601	00021	1	HINJECT	2DEC	18288	B-24
0380					32,3602	33400	0				60,000 FEET EXPRESSED IN METERS.
0381					32,3603	11021	1	(TGO)A	2DEC	37000	B-17
0381					32,3604	00000	1				
0382					32,3605	00507	0	K(AT)	2DEC	.02	SCALING CONSTANT
0382					32,3606	25605	0				
0383	REF	1			32,3607	02110	0	WHICHADR	REMADR	ABFTABLE	

R0384 *****

0385	REF	31	LAST	833	E7,1513				EBANK=	DVCNTR
0386	REF	2	LAST	756	32,3610	03637	0	ATMAGAD	2CADR	ATMAG
0386					32,3611	70067	1			
0387	REF	5	LAST	250	32,3612	00003	1	ORBMANAD	ADRES	OREMANUV

L P12

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0001					24,3504				BANK	24		
0002	REF	2	LAST	59	30,2000				SETLOC	P12		
0003					30,2006				BANK			
0004	REF	32	LAST	838	E7,1513				EBANK=	DVCNTR		
0005	REF	2	LAST	59 TO	59:	4	4*		COUNT*	\$/P12		
0006	REF	65	LAST	837	30,2006	0 5353	1	P12LM	TC	PHASCHNG		
00062					30,2007	04024	0		OCT	04024		
00064	REF	225	LAST	834	30,2010	0 4616	1		TC	BANKCALL		
0007	REF	10	LAST	789	30,2011	11175	1		CADR	R02BOTH	CHECK THE STATUS OF THE IMU.	
0008	REF	48	LAST	832	30,2012	0 5504	0		TC	UPFLAG		
0009	REF	3	LAST	789	30,2013	00141	0		ADRES	MUNFLAG		
0010	REF	49	LAST	839	30,2014	0 5504	0		TC	UPFLAG	INSURE 4-JET TRANSLATION CAPABILITY.	
0011	REF	2	LAST	832	30,2015	00307	0		ADRES	ACC4-2FL		
00112	REF	50	LAST	839	30,2016	0 5504	0		TC	UPFLAG	PREVENT R10 FROM ISSUING CROSS-POINTER	
00114	REF	1			30,2017	00015	0		ADRES	R10FLAG	OUTPUTS.	
0012	REF	79	LAST	836	30,2020	0 5516	0		TC	DOWNFLAG	CLEAR RENDEZVOUS FLAG FOR P22	
0013	REF	5	LAST	789	30,2021	00010	0		ADRES	RNDVZFLG		
001301	REF	3	LAST	836	30,2022	3 6000	1		CAF	THRESH2	INITIALIZE DVMON	
001302	REF	6	LAST	836	30,2023	55*251	1		TS	DVTHRUSH		
001303	REF	17	LAST	832	30,2024	3 4751	0		CAF	FOUR		
001304	REF	33	LAST	839	30,2025	55*513	0		TS	DVCNTR		
00131	REF	150	LAST	830	30,2026	3 4755	1		CA	ZFRD		
00132	REF	10	LAST	767	30,2027	55*460	0		TS	TRKMKCNT	SHOW THAT R29 DOWNLINK DATA ISN'T READY.	
0014	REF	1			30,2030	3 3044	1		CAF	V06N33A		
0015	REF	226	LAST	839	30,2031	0 4616	1		TC	BANKCALL	FLASH TIG	
0016	REF	22	LAST	795	30,2032	20351	1		CADR	G0FLASH		
0017	REF	37	LAST	818	30,2033	1 6001	1		TCF	G0T0POOH		
0018					30,2034	1 2036	1		TCF	+2	PROCEED	
0019					30,2035	1 2030	1		TCF	-5	ENTER	
00192	REF	66	LAST	839	30,2036	0 5353	1		TC	PHASCHNG		
00194					30,2037	04024	0		OCT	04024		
0020	REF	135	LAST	836	30,2040	0 6036	1		TC	INTPRET		
0021					30,2041	77624	1		CALL		INITIALIZE WM AND /LAND/	
0022	REF	2	LAST	790	30,2042	60264	1					
0023					30,2043	45014	0		SET	CALL		
00235	REF	1			30,2044	04464	0			FLPI		
0024	RFF	3	LAST	836	30,2045	60204	1			P12INIT		
0025					30,2046	77745	1	P12LMB	DLOAD			
0026	REF	1			30,2047	25604	1			(TGO)A	SET TGO TO AN INITIAL NOMINAL VALUE.	

L

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0027 REF 18 LAST 838 30,2050 17515 0
 0028 REF 41 LAST 837 30,2051 03440 1
 0029 REF 51 LAST 835 30,2052 34041 0
 0030 REF 11 LAST 835 30,2053 27057 0
 0031 30,2054 64375 1
 0032 REF 23 LAST 835 30,2055 00007 0
 0033 REF 29 LAST 835 30,2056 01734 0
 0034 30,2057 77772 0
 0035 REF 2 LAST 162 30,2060 27577 1
 0036 REF 29 LAST 835 30,2061 00001 0
 0037 30,2062 52521 0
 0038 REF 30 LAST 840 30,2063 01734 0
 0039 REF 16 LAST 835 30,2064 37517 0
 0040 REF 4 LAST 835 30,2065 67162 0
 0041 30,2066 53575 0
 0042 REF 17 LAST 840 30,2067 03517 1
 0043 REF 4 LAST 819 30,2070 37535 0
 0044 REF 1 30,2071 57316 1
 0045 30,2072 57461 0
 0046 30,2073 20606 0
 0047 REF 3 LAST 331 30,2074 17641 1
 0048 REF 1 30,2075 20312 0
 0049 REF 4 LAST 837 30,2076 03643 0
 0050 30,2077 77776 1

STODL TGO
 TIG
 STCALL TDEC1
 LEMPREC
 VLOAD MXV
 VATT
 REFSMMAT
 VSL1
 STOVL V1S
 RATT
 VSL6
 REFSMMAT
 STCALL R
 MUNGRAV
 VLOAD UNIT
 R
 STCALL UNIT/R/
 YCOMP
 SR DCOMP
 SD
 STODL XRANGE
 (APO)
 STORF APO
 EXIT

ROTATE THE STATE VECTORS TO THE
 IGNITION TIME.

COMPUTE V1S = VEL(TIG)*2(-7)M/CS.

COMPUTE R = POS(TIG)*2(-24)M.
 COMPUTE GDT1/2(TIG)*2(-7)M/CS.

COMPUTE UNIT/R/ FOR YCOMP.

INITIALIZE XRANGE FOR NOUN 76.

INITIALIZE APO FOR NOUN 76.

0051 REF 67 LAST 839 30,2100 0 5353 1
 0052 30,2101 04024 0

TC PHASCHNG
 OCT 04024

0053 REF 1 30,2102 3 3043 0
 0054 REF 227 LAST 839 30,2103 0 4616 1
 0055 REF 23 LAST 839 30,2104 20351 1
 0056 REF 38 LAST 839 30,2105 1 6001 1
 0057 30,2106 1 2110 1
 0058 REF 1 30,2107 1 2102 1

NEWLOAD CAF V06N76
 TC BANKCALL
 CADR GDFLASH
 TCF GOTOPOOH
 TCF +2
 TCF NEWLOAD

FLASH CROSS-RANGE AND APO LUNE VALUES.

PROCEED
 ENTER NEW DATA.

0059 REE 1 30,2110 3 2306 0
 0060 REF 28 LAST 832 30,2111 55453 0

CAF P12ADRES
 TS WHICH

00602 REF 68 LAST 840 30,2112 0 5353 1
 00604 30,2113 04024 0

TC PHASCHNG
 OCT 04024

0061 REF 136 LAST 839 30,2114 0 6036 1
 0062 30,2115 54345 1
 0063 REF 4 LAST 840 30,2116 03641 1
 0064 30,2117 20206 1
 0065 30,2120 77615 0
 0066 REF 2 LAST 136 30,2121 02341 0
 0067 REF 2 LAST 167 30,2122 17631 0
 0068 REF 5 LAST 840 30,2123 03643 0
 0069 30,2124 77661 0

TC INTPRET
 DLOAD SL
 XRANGE
 SD
 DAD
 Y
 STODL YCO
 APO
 SL

RA = APO + /LAND/

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0070				30,2125	20206 1		5D	
0071				30,2126	41415 1	DAD	PUSH	RA*2(-24) IN MPAC AND PDL
0072	REF	5	LAST	809	30,2127		/LAND/	
0073					30,2130	DMP	PDDL	2 RA MU*2(-62) IN PDL, LOAD RA
0074	REF	1			30,2131		MUM(-37)	
0075					30,2132	DAD	DMP	(RA+RP)*2(-24)
0076	REF	2	LAST	167	30,2133		RCO	RP(RA+RP)*2(-48)
0077	RFF	3	LAST	841	30,2134		RCO	
0078					30,2135	BDDV	SQRT	2 MU RA/RP(RA+RP)*2(-14)=ZDOTD(2)
0079					30,2136	STADR		
0080	REF	2	LAST	135	30,2137	STOVL	ZDOTD	
0081	REF	5	LAST	840	30,2140		UNIT/R/	
0082					30,2141	VXSC	VAD	
0083	REF	1			30,2142		49FPS	
0084	REF	3	LAST	840	30,2143		VIS	
0085	REF	7	LAST	835	30,2144	STORE	V	V(TIPOVER) = V(IGN) + 57FPS (UNIT/R/)
0087					30,2145	SETGO		
0088	REF	2	LAST	834	30,2146		FLVR	
0089	RFF	2	LAST	835	30,2147		ASCENT	
0090					30,2150	P12RET DLOAD		
0091	REF	2	LAST	136	30,2151		ATP	ATP(2)*2(18)
0092					30,2152	DSQ	PDDL	
0093	REF	2	LAST	136	30,2153		ATY	ATY(2)*2(18)
0094					30,2154	DSQ	DAD	
0095					30,2155	BZE	SORT	
0096	REF	1			30,2156		YAWDUN	
0097					30,2157	SL1	BDDV	
0098	REF	3	LAST	841	30,2160		ATY	
0099					30,2161	ARCSIN		
0100	REF	3	LAST	331	30,2162	YAWDUN STOVL	YAW	
0101	REF	15	LAST	815	30,2163		UNFC/2	
0102					30,2164	UNIT	DOT	
0103	REF	6	LAST	841	30,2165		UNIT/R/	
0104					30,2166	SL1	ARCCOS	
0105					30,2167	DCOMP		
0106	REF	2	LAST	331	30,2170	STORE	PITCH	
0107					30,2171	EXIT		
0108	REF	69	LAST	840	30,2172	TC	PHASCHNG	
0109					30,2173	OCT	04024	
0110	REF	80	LAST	839	30,2174	TC	DOWNFLAG	
0111	REF	2	LAST	839	30,2175	ADRES	ELPI	
0112					30,2176	INHINT		
0113	REF	38	LAST	834	30,2177	TC	IBNKCALL	
0114	REF	3	LAST	792	30,2200	CADR	PFLITEDB	
0115					30,2201	RFLINT		
0116	REF	47	LAST	837	30,2202	TC	POSTJUMP	
0117	REF	3	LAST	793	30,2203	CADR	BURNBABY	

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0118				30,2204	77745	1	P12INIT	DLOAD		INITIALIZE ENGINE DATA. USED FOR P12 AND P71.
0119	REF	1		30,2205	24001	0			(1/DV)A	
0120	REF	3	LAST	833	30,2206	03637	0		STORE	1/DV3
0121	REF	3	LAST	833	30,2207	03635	1		STORE	1/DV2
0122	REF	3	LAST	833	30,2210	17633	1		STODL	1/DV1
0123	REF	1		30,2211	24005	1				(AT)A
0124	REE	4	LAST	833	30,2212	16257	0		STODL	AT
0125	REF	1		30,2213	24007	0				(TBUP)A
0126	REE	3	LAST	833	30,2214	16265	1		STODL	TBUP
0127	REE	1		30,2215	34013	1				ATDECAY
0128				30,2216	54276	0			DCOMP	SL
0129				30,2217	20214	1				IID
0130	REF	3	LAST	833	30,2220	02263	1		STORE	TTO
0131				30,2221	57535	0			SLOAD	DCOMP
0132	REF	2	LAST	765	30,2222	26001	1			APSVEX
0133				30,2223	77702	1			SR2	
0134	REF	3	LAST	833	30,2224	02261	0		STORE	VE
0135				30,2225	43414	1			BOFF	RVQ
0136	REE	3	LAST	836	30,2226	04747	1			FLAP
0137	REE	2	LAST	833	30,2227	60230	0			COMMINIT
0138				30,2230	43345	1		COMMINIT	DLOAD	DAD
0139	REF	1		30,2231	25602	1				HINJECT
0140	REF	6	LAST	841	30,2232	02337	1			/LAND/
0141	REE	4	LAST	841	30,2233	17627	1		STODL	RCD
0142	REF	9	LAST	790	30,2234	06424	0			H16Z EROS
0143	REF	2	LAST	167	30,2235	03654	0		STORE	TXO
0144	REE	3	LAST	840	30,2236	03631	0		STORE	YCO
0145	REF	2	LAST	135	30,2237	02267	0		STORE	RDOTD
0146	REF	2	LAST	135	30,2240	26271	1		STOVL	YDOTD
0147	REF	1		30,2241	01563	0				VRECTCSM
0148				30,2242	64235	1			VXV	MXV
0149	REF	5	LAST	255	30,2243	01555	0			RRECTCSM
0150	REE	31	LAST	840	30,2244	01734	0			REESPMAT
0151				30,2245	77656	1			UNIT	
0152	REE	1		30,2246	17716	1			STODL	QAXIS
0153	REF	2	LAST	138	30,2247	02506	0			ABTIVNJ2
0154	REF	3	LAST	841	30,2250	02273	0		STORE	ZDOTD
0155				30,2251	77614	1			BON	
0156	REE	3	LAST	841	30,2252	04704	0			FLPI
0157	REF	1		30,2253	60263	0				LOVEL
0158				30,2254	45335	0			SLOAD	DSU
0159	REE	2	LAST	138	30,2255	02503	0			TBRKPNT
0160	REF	19	LAST	840	30,2256	03515	0			TGO
0161				30,2257	71240	1			BMN	DLOAD
0162	REF	2	LAST	842	30,2260	60263	0			LOVEL
0163	REF	2	LAST	138	30,2261	02504	1			ABTIVNJ1
0164	REF	4	LAST	842	30,2262	02273	0		STORE	ZDOTD
0165				30,2263	77616	0			LOVEL	RVQ
0166				30,2264	40220	0		GUIDINIT	STQ	SETPD
0167	REE	6	LAST	755	30,2265	01164	0			TEMPR60

TENTATIVELY STORE LOW INJECTION VELOCITY

IE TGO>TBRKPNT,LOW VINJECT IS OK;RETURN FOR TGO.TBRKPNT USE H1 VELOCITY.

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0168				30,2266	00001 0		OD	
0169				30,2267	41575 0	VLOAD	PUSH	
0170	REF	7	LAST	790	30,2270	06416 1	UNITZ	
0171				30,2271	41434 1	RTB	PUSH	
0172	REF	21	LAST	837	30,2272	21462 1	LOADTIME	
0173				30,2273	45135 1	SLOAD	CALL	
0174	REF	2	LAST	840	30,2274	20312 0	{APO}	
0175	REF	2	LAST	790	30,2275	51504 1	RP-TC-R	
0176				30,2276	74321 1	MXV	VXSC	
0177	REF	32	LAST	842	30,2277	01734 0	REFSMMAT	
0178	REF	1			30,2300	20005 0	MOONRATE	
0179	REF	4	LAST	810	30,2301	26331 1	STOVL	WM
0180	REF	7	LAST	795	30,2302	02023 1	RLS	
0181					30,2303	52446 0	ABVAL	SL3
0182	REF	7	LAST	842	30,2304	36337 0	STCALL	/LAND/
0183	REF	7	LAST	842	30,2305	01164 0		TEMPR60
0184	REF	1			30,2306	02022 0	P12ADRES REMADR	P12TABLE
0185					30,2307	00046 0	49FPS	2DEC .149352 B-6
0185					30,2310	07374 0		
0186					30,2311	00001 0	{APO}	2DEC 55597.5 B-29
0186					30,2312	26227 1		30 N.M. EXPRESSED IN METERS.

L ASCENT GUIDANCE

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0001				34,3637				BANK 34
0002	REF	1		34,2000				SETLOC ASCFILT
0003				34,3637				BANK
0004	REF	34	LAST	839	E7,1513			EBANK= DVCNTR
0005	REF	1						COUNT* \$\$/ASENT
0006	REF	70	LAST	841	34,3637	0 5353	1	ATMAG TC PHASCHNG
0007					34,3640	00035	1	OCT 00035
0008	REF	71	LAST	844	34,3641	0 5353	1	TC PHASCHNG
0009					34,3642	05023	0	OCT 05023
0010					34,3643	21000	1	OCT 21000
0011	REF	137	LAST	840	34,3644	0 6036	1	TC INTPPET
0012					34,3645	77614	1	BON
0014	REF	2	LAST	832	34,3646	04705	1	FLRCS
0015	REF	3	LAST	841	34,3647	60313	0	ASCENT
0016					34,3650	45345	1	DLOAD DSU
0017	REF	2	LAST	162	34,3651	03512	1	ABDV CONV
0018	REF	1			34,3652	21054	0	MINABDV
0019					34,3653	43040	1	BMN CLEAR
0020	REF	1			34,3654	60767	1	ASCTERM4
0021	REF	14	LAST	795	34,3655	04267	0	SURFFLAG
0022					34,3656	67214	1	CLEAR SLOAD
0023	REF	10	LAST	620	34,3657	02676	1	RENDWFLG
0024	REF	1			34,3660	17224	0	BIT3H
0025					34,3661	77471	0	DDV EXIT
0026	REF	3	LAST	844	34,3662	03512	1	ABDV CONV
0027	REF	313	LAST	824	34,3663	52 155	1	DXCH MPAC
0028	REF	4	LAST	842	34,3664	53'637	0	DXCH 1/DV3
0029	REF	4	LAST	842	34,3665	53'635	1	DXCH 1/DV2
0030	REF	4	LAST	842	34,3666	53'633	1	DXCH 1/DV1
0031	REF	1			34,3667	53'567	0	DXCH 1/DV0
0032	REF	72	LAST	844	34,3670	0 5353	1	TC PHASCHNG
0033					34,3671	04023	1	OCT 04023
0034	REF	138	LAST	844	34,3672	0 6036	1	TC INTPRET
0035					34,3673	43345	1	DLOAD DAD
0036	REF	2	LAST	844	34,3674	03567	0	1/DV0
0037	REF	5	LAST	844	34,3675	03633	1	1/DV1
0038					34,3676	43215	0	DAD DAD
0039	REF	5	LAST	844	34,3677	03635	1	1/DV2
0040	REF	5	LAST	844	34,3700	03637	0	1/DV3
0041					34,3701	41205	0	DMP DMP
0042	REF	4	LAST	842	34,3702	02261	0	VF
0043	REF	1			34,3703	21041	1	2SEC (9)
0044					34,3704	65252	1	SL3 PDDL
0045	REF	4	LAST	842	34,3705	02265	1	TBUP
0046					34,3706	43342	0	SR1 DAD
0047					34,3707	77625	0	DSU
0048	REF	1			34,3710	21036	1	6SEC (18)

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0049	REF	5	LAST	844	34,3711	16265	1
0050	REF	5	LAST	844	34,3712	02261	0
0051					34,3713	56342	1
0052	REF	6	LAST	845	34,3714	02265	1
0053	REF	5	LAST	842	34,3715	36257	1
0054	REF	4	LAST	844	34,3716	60313	0

STODL	TBUP
	VE
SR1	DDV
	TBUP
STCALL	AT
	ASCENT

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P0055

0056					30,2313				BANK 30
0057	REF	2	LAST	54	30,2000				SETLOC ASENT
0058					30,2313				BANK
0059	REF	2	LAST	54 TO	54:	2	2*		COUNT* \$\$/ASENT
0060					30,2313	51575	1	ASCENT	VLOAD ABVAL
0061	REF	18	LAST	840	30,2314	03517	1		R
0062	REF	2	LAST	135	30,2315	26275	0		STOVL /R/MAG
0063	REF	7	LAST	841	30,2316	03535	1		UNIT/R/
0064					30,2317	53435	0		UNIT
0065	REF	2	LAST	842	30,2320	03716	1		QAXIS
0066	REF	2	LAST	136	30,2321	02305	0		STORF ZAXIS1
0067					30,2322	72441	0		DOT SL1
0068	REF	8	LAST	841	30,2323	03525	0		V
0069	REF	2	LAST	136	30,2324	26317	0		STOVL ZDOT
0070	REF	3	LAST	846	30,2325	02305	0		ZAXIS1
0071					30,2326	76435	1		VXV VSL1
0072	REF	8	LAST	846	30,2327	03535	1		UNIT/P/
0073	REF	2	LAST	136	30,2330	02277	1		STORE LAXIS
0074					30,2331	72441	0		DOT SL1
0075	REF	9	LAST	846	30,2332	03525	0		V
0076	REF	3	LAST	331	30,2333	26315	1		STOVL YDOT
0077	REF	9	LAST	846	30,2334	03535	1		UNIT/R/
0078					30,2335	72441	0		DOT SL1
0079	REF	10	LAST	846	30,2336	03525	0		V
0080	REF	2	LAST	136	30,2337	36313	0		STCALL RDOT
0081	REF	2	LAST	840	30,2340	57316	1		YCOMP
0082					30,2341	77775	1		VLOAD
0083	REF	2	LAST	162	30,2342	03561	0		GDT1/2
0084					30,2343	50341	1		V/SC DOT
0085	REF	1			30,2344	27201	1		2SFC(18)
0086	REF	10	LAST	846	30,2345	03535	1		UNIT/R/
0087					30,2346	47315	0		PDVL VXV
0088	REF	11	LAST	846	30,2347	03535	1		UNIT/R/
0089	REF	11	LAST	846	30,2350	03525	0		V
0090					30,2351	56236	0		VSQ DDV
0091	REF	3	LAST	846	30,2352	02275	0		/R/MAG
0092					30,2353	43352	1		SL1 DAD
0093					30,2354	77626	0		STADR
0094	REF	2	LAST	136	30,2355	61456	1		STODL GEFF
0095	REF	5	LAST	842	30,2356	02273	0		ZDOTD
0096					30,2357	77625	0		DSU
0097	REF	3	LAST	846	30,2360	02317	0		ZDOT
0098	REF	2	LAST	136	30,2361	02347	0		STORE DZDOT
0099					30,2362	65361	0		VXSC PDDL
0100	REF	4	LAST	846	30,2363	02305	0		ZAXIS1

UR*2(-1)

Z.V = ZDOT*2(-8).

ZDOT*2(-7)

Z X UR = LAXIS*2(-2)

LAXIS*2(-1)

L.V = YDOT*2(-8).

YDOT*2(-7)

RDOT*2(-7)

LOAD GDT1/2*2(-7)M/CS.

G.UR*2(9) = GR*2(9).

STORE IN PDL(0)

LOAD UNIT/R/*2(-1).

UR*2(-1) X V*2(-7) = H/R*2(-8).

H(2)/R(2)*2(-16).

H(2)/R(3)*2(9).

GEFF*2(10)M/CS/CS.

DZDOT = (ZDOTD - ZDOT)*2(7)M/CS.

(2)

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0101	REF	3	LAST	842	30,2364	02271 1	DSU	YDOTD	
0102					30,2365	77625 0			
0103	REF	4	LAST	846	30,2366	02315 1		YDOT	
0104	REF	2	LAST	136	30,2367	02345 1	STORE	DYDOT	DYDOT = (YDOTD - YDOT)*2(7)M/CS.
0105					30,2370	65361 0	VXSC	PDDL	
0106	REF	3	LAST	846	30,2371	02277 1		LAXIS	
0107	REF	3	LAST	842	30,2372	02267 0		RDOTD	
0108					30,2373	77625 0	DSU		
0109	REF	3	LAST	846	30,2374	02313 1		RDOT	
0110	REF	2	LAST	136	30,2375	02343 1	STORE	DRDOT	DRDOT = (RDOTD - RDOT)*2(7)M/CS.
0111					30,2376	53361 0	VXSC	VAD	
0112	REF	12	LAST	846	30,2377	03535 1		UNIT/R/	
0113					30,2400	76455 1	VAD	VSL1	
0114					30,2401	77626 0	STADR		
0115	REF	4	LAST	835	30,2402	74131 1	STORE	VGVECT	VG = (DRDOT)R + (DYDOT)L + (DZDOT)Z.
0116					30,2403	77614 1	BON		
0117	REF	3	LAST	835	30,2404	04711 1		FLZONEO	
0118	REF	1			30,2405	65442 0		PREBRET1	
0119					30,2406	77624 1	CALL		
0120	REF	1			30,2407	61011 0		ASCRSTR1	
0121					30,2410	41345 0	DLOAD	DMP	LOAD TGO
0122	REF	20	LAST	842	30,2411	03515 0		TGO	TGO GEFF
0123	REF	3	LAST	846	30,2412	02321 0		GEFF	
0124					30,2413	76561 1	VXSC	VSL1	
0125	REF	13	LAST	847	30,2414	03535 1		UNIT/R/	TGO GEFF UR
0126					30,2415	77645 0	BVSU		
0127	REF	5	LAST	847	30,2416	03646 0		VGVECT	COMPENSATED FOR GEFF
0128	REF	6	LAST	847	30,2417	03646 0	STORE	VGVECT	STORE FOR DOWNLINK
0129					30,2420	76521 0	MXV	VSL1	GET VGBODY FOR N85 DISPLAY
0130	REF	5	LAST	819	30,2421	02146 0		XNBPIP	
0131	REF	9	LAST	764	30,2422	27500 1	STOVL	VGBODY	
0132	REF	7	LAST	847	30,2423	03646 0		VGVECT	
0133					30,2424	43046 1	ABVAL	BOFF	MAGNITUDE OF VGVECT
0134	REF	3	LAST	844	30,2425	04745 0		FLRCS	IF FLRCS=0, DO NORMAL GUIDANCE
0135	REF	1			30,2426	60433 0		MAINENG	
0136					30,2427	77671 1	DDV		USE TGO=VG/AT WITH RCS
0137	REF	1			30,2430	20001 1		AT/RCS	
0138	REF	21	LAST	847	30,2431	37515 1	STCALL	TGO	THIS WILL BE USED ON NEXT CYCLE
0139	REF	1			30,2432	60763 0		ASCTERM2	
0140					30,2433	41471 0	MAINENG	DDV	VG/VE IN PDL(0)
0141	REF	6	LAST	845	30,2434	02261 0		VE	(2)
0142					30,2435	44205 0	DMP	BDSU	1-KT VG/VE
0143	REF	1			30,2436	21046 0		KT1	
0144	REF	1			30,2437	17743 1		NEARONE	
0145					30,2440	41205 0	DMP	DMP	TBUP VG(1-KT VG/VE)/VE
0146	REF	7	LAST	845	30,2441	02265 1		TBUP	= TGO
0147					30,2442	77625 0	DSU		COMPENSATE FOR TAILOFF
0148	REF	4	LAST	842	30,2443	02263 1		TTO	
0149	REF	22	LAST	847	30,2444	03515 0	STORE	TGO	
0150					30,2445	57461 0	SR	DCOMP	

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0151				30,2446	20614 0		11D	
0152	REF	22	LAST	754	30,2447	17452 1	STODL	TTOGC TGO*2(-28)CS
0153	REF	23	LAST	847	30,2450	03515 0		TGO
0154				30,2451	45214 1		8DN	DSU
0155	REF	6	LAST	832	30,2452	03710 1		IDLE FLAG
0156	REF	1			30,2453	60457 1		T2TEST
0157	REF	1			30,2454	21026 0		4SEC(17) (TGO - 4) * 2 (-17) CS.
0158					30,2455	77640 0	8MN	
0159	REF	1			30,2456	57212 1		ENGOFF
0160					30,2457	77745 1	T2TEST	DLAD
0161	REF	24	LAST	848	30,2460	03515 0		TGO
0162					30,2461	50025 0	DSU	3MN IF TGO - T2 NEG., GO TO COMPONENT
0163	REF	1			30,2462	21030 1		T2A
0164	REF	1			30,2463	60620 0		COMPONENT
0165					30,2464	45345 1	DLOAD	DSU
0166	REF	8	LAST	847	30,2465	02265 1		TBUP
0167	REF	25	LAST	848	30,2466	03515 0		TGO
0168					30,2467	45071 0	DDV	CALL 1-TGO/TBUP
0169	REF	9	LAST	848	30,2470	02265 1		TBUP
0170	REF	1			30,2471	65613 0		LOGSU8
0171					30,2472	41461 1	SL	PUSH -L IN PDL(0) (2)
0172					30,2473	20206 1		5
0173					30,2474	44265 0	8DDV	8DSU -TGO/L*2(-17)
0174	REF	26	LAST	848	30,2475	03515 0		TGO
0175	REF	10	LAST	848	30,2476	02265 1		TBUP TBUP + TGO/L = D12*2(-17)
0176					30,2477	43006 0	PUSH	8DN STORE IN PDL(2) (4)
0177	REF	1			30,2500	04703 1		FLPC IF FLPC = 1, GO TO CONST
0178	REF	1			30,2501	60510 0		NORATES
0179					30,2502	45345 1	DLOAD	DSU
0180	REF	27	LAST	848	30,2503	03515 0		TGO
0181	REF	1			30,2504	21032 0		T3
0182					30,2505	43044 0	BPL	SET FLPC=1
0183	REF	1			30,2506	60516 0		RATES
0184	REF	2	LAST	848	30,2507	04463 1		FLPC
0185					30,2510	77745 1	NORATES	DLOAD
0186	REF	10	LAST	842	30,2511	06424 0		HI6ZEROS
0187	REF	2	LAST	136	30,2512	02355 0	STORF	PRATE 8 = 0
0188	REF	2	LAST	136	30,2513	02357 1	STORE	YRATE 0 = 0
0189					30,2514	77650 1	GOTO	
0190	REF	1			30,2515	60600 1		CONST GO TO CONST
0191					30,2516	45345 1	RATES	DLOAD
0192	REF	28	LAST	848	30,2517	03515 0		DSU
0193					30,2520	00003 1		TGO
0194					30,2521	72406 0	PUSH	SL1 TGO - D12 = D21*2(-17)
0195					30,2522	52421 1		SL3 IN PDL(4) (6)
0196	REF	29	LAST	848	30,2523	03515 0	BDSU	SL3 (1/2TGO - D21)*2(-13) = E * 2(-13) (8)
0197					30,2524	41325 0		TGO
0198	REF	30	LAST	848	30,2525	03515 0	PDDL	DMP IN PDL(6)
0199	REF	4	LAST	847	30,2526	02313 1		TGO
0200					30,2527	45215 0	DAD	DDT RDOT TGO * 2(-24)
							DSU	R + RDOT TGO

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0201	REE	4	LAST	846	30,2530	02275 0	/R/MAG	R + RDOT TGO - RCO
0202	REE	5	LAST	842	30,2531	03627 1	RCO	MPAC = - DR*2(-24).
0203					30,2532	41325 0	PDDL	-DR IN PDL(8) (10)
0204	REE	3	LAST	847	30,2533	02343 1		
0205					30,2534	00005 1		
0206					30,2535	62415 0	OAO	D21 ORDOT*2(-24) (8)
0207					30,2536	56271 0	DOV	
0208					30,2537	00007 0		
0209	REE	31	LAST	848	30,2540	03515 0		(D21 DROOT-DR)/E*2(-9)
0210	REE	3	LAST	848	30,2541	02355 0	STORE	
0211					30,2542	71240 1	BMN	B * 2(8)
0212	REF	1			30,2543	60547 1		R>0 NOT PERMITTED
0213	REE	11	LAST	848	30,2544	06424 0		
0214	REF	4	LAST	849	30,2545	36355 1	STCALL	
0215	REE	1			30,2546	60561 0		
0216					30,2547	56202 1	CHKBAG SR4	B*2(4)
0217	REF	11	LAST	848	30,2550	02265 1		(B / TAU) * 2(21)
0218					30,2551	51025 1	DSU	
0219	REE	1			30,2552	21050 1		(B / TAU) * 2(21) MAX.
0220	REF	2	LAST	849	30,2553	60561 0		
0221					30,2554	41345 0	DLOAD	
0222	REF	2	LAST	849	30,2555	21050 1		
0223	REF	12	LAST	849	30,2556	02265 1		
0224					30,2557	77612 1	SL4	B MAX. * 2(4)
0225	REF	5	LAST	849	30,2560	02355 0	STORE	BMAX*2(8)
0226					30,2561	77745 1	PROK	
0227	REE	32	LAST	849	30,2562	03515 0		
0228					30,2563	43205 1	DMP	YDOT TGO
0229	REF	5	LAST	847	30,2564	02315 1		
0230	REE	3	LAST	840	30,2565	02341 0		
0231					30,2566	65225 1	DSU	Y + YDOT TGO
0232	REE	4	LAST	842	30,2567	03631 0		Y + YDOT TGO - YCO
0233	REF	3	LAST	847	30,2570	02345 1		MPAC = - DY*2(-24.) IN PDL(8) (10)
0234					30,2571	43205 1	DMP	DYDOT
0235					30,2572	00005 1		021 DYDOT - DY (8)
0236					30,2573	56271 0	DDV	
0237	REF	33	LAST	849	30,2574	03515 0		
0238					30,2575	40312 0	SL2	(D21 OYDOT - OY)/ F TGO*2(6) (6)
0239					30,2576	00005 1		MPAC = D*2(8)
0240	REF	3	LAST	848	30,2577	02357 1	STORE	
0241					30,2600	41345 0	DLOAD	
0242	REE	6	LAST	849	30,2601	02355 0		LOAD B*2(8)
0243					30,2602	00003 1		B D12*2(-9)
0244					30,2603	56325 0	PDDL	
0245	REE	4	LAST	849	30,2604	02343 1		D12 B IN PDL(4) (6)
0246					30,2605	00001 0		LOAD DRDOT*2(-7)
0247					30,2606	45302 1	SR2	-DRDOT/L*2(-7)
0248					30,2607	77626 0	STADR	(-DRDOT/L-D12 B)=A*2(-9) (4)
0249	REE	2	LAST	136	30,2610	61426 0	STODL	
0250	REF	4	LAST	849	30,2611	02357 1		D*2(8)

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0251				30,2612	65205 0	DMP	PDDL	D12 D,EXCH WITH -L IN PDL(0)	(2,2)
0252				30,2613	60465 0	BDDV	SR2	-DYDOT/L*2(-9)	
0253	REF	4	LAST	849	30,2614		DYDOT		
0254					30,2615	77625 0	DSU	(-DYDOT/L-D12 D)=C*2(-9)	
0255					30,2616	00001 0		000	
0256	REF	2	LAST	136	30,2617	02353 0	STORE	YCONS	
0257					30,2620	77624 1	CMPOONENT	CALL	
0258	REF	2	LAST	847	30,2621	61011 0		ASCRSTRT	
0259					30,2622	71201 1	SETPD	DLOAD	
0260					30,2623	00001 0		000	
0261	REF	1			30,2624	27201 1		100C S	
0262					30,2625	77605 1	DMP		
0263	REF	7	LAST	849	30,2626	02355 0		PRAT F	B(T-T0)*2(-9)
0264					30,2627	56215 1	DAD	DDV	(A+B(T-T0))*2(-9)
0265	REF	3	LAST	849	30,2630	02351 1		PCONS	(A+B(T-T0))/TBUP*2(8)
0266	REF	13	LAST	849	30,2631	02265 1		T8UP	
0267					30,2632	45352 1	SL1	DSU	
0268	REF	4	LAST	847	30,2633	02321 0		GEFF	ATR*2(9)
0269	REF	2	LAST	136	30,2634	16363 0	STODL	ATR	
0270	REF	2	LAST	850	30,2635	27201 1		100C S	
0271					30,2636	43205 1	DMP	DAD	
0272	REF	5	LAST	849	30,2637	02357 1		YRATE	
0273	REF	3	LAST	850	30,2640	02353 0		YCONS	(C+D(T-T0))*2(-9)
0274					30,2641	72471 0	DDV	SL1	
0275	REF	14	LAST	850	30,2642	02265 1		T8UP	
0276	REF	4	LAST	841	30,2643	02361 1	STORE	ATY	ATY*2(9)
0277					30,2644	65361 0	VXSC	PDDL	ATY UY*2(8)
0278	REF	4	LAST	847	30,2645	02277 1		LAXIS	(6)
0279	REF	3	LAST	850	30,2646	02363 0		ATR	
0280					30,2647	53361 0	VXSC	VAD	(0)
0281	REF	14	LAST	847	30,2650	03535 1		UNIT/R/	
0282					30,2651	41572 1	VSL1	PUSH	AH*2(9) IN PDL(0)
0283					30,2652	65246 1	A8VAL	PDDL	AH(2) IN PDL(34)
0284	REF	6	LAST	845	30,2653	02257 0		AT	AHMAG IN PDL(6)
0285					30,2654	45316 1	DSQ	DSU	(AT(2)-AH(2))*2(18)
0286					30,2655	00043 0		340	=ATP2*2(18)
0287					30,2656	41525 0	PDDL	PUSH	(12)
0288	REF	7	LAST	850	30,2657	02257 0		AT	
0289					30,2660	45316 1	DSQ	DSU	(AT(2)KR(2)-AH(2))*2(18)
0290					30,2661	00043 0		340	=ATP3*2(18)
0291					30,2662	71240 1	8MN	DLOAD	IF ATP3 NEG,GO TO NO-ATP
0292	REF	1			30,2663	60667 0		NO-ATP	LOAD ATP2,IF ATP3 POS
0293					30,2664	00011 1		80	
0294					30,2665	52166 1	SQRT	GOTO	ATP*2(9)
0295	REF	1			30,2666	60675 0		AIMER	
0296					30,2667	55345 0	NO-ATP	DLOAD	8DDV
0297					30,2670	00007 0		60	
0298					30,2671	77761 1	VXSC		KH AH*2(9)
0299					30,2672	00001 0		000	
0300					30,2673	14001 0	STODL	000	STORE NEW AH IN PDL(0)

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0301	REF	12	LAST	849	30,2674	06424 0			HI6ZEROS	
0302					30,2675	77765 0	AIMER	SIGN		
0303	REF	3	LAST	846	30,2676	02347 0			DZDOT	
0304	REF	3	LAST	841	30,2677	02365 0		STORE	ATP	
0305					30,2700	77761 1		VXSC		
0306	REF	5	LAST	846	30,2701	02305 0			ZAXIS1	ATP ZAXIS *2(8).
0307					30,2702	53372 1		VSL1	VAD	AT*2(9)
0308					30,2703	00001 0			OOD	
0310	REF	16	LAST	841	30,2704	03252 1		STORE	JNFC/2	WILL BE OVERWRITTEN IF IN VERT. RISE.
0311					30,2705	43001 1		SETPD	BON	
0312					30,2706	00001 0			OOD	
0313	REF	4	LAST	842	30,2707	04704 0			FLPI	
0314	REF	1			30,2710	60150 0			P12RET	
0315					30,2711	77624 1		CALL		
0316	REF	3	LAST	850	30,2712	61011 0			ASCRSTRT	
0317					30,2713	77614 1		BON		
0318	REF	3	LAST	841	30,2714	04701 0			FLVR	
0319	REF	1			30,2715	60774 0			CHECKALT	
0335					30,2716	57575 1	MAINLINE	VLOAD	VCOMP	
0336	REF	15	LAST	850	30,2717	03535 1			UNIT/R/	
0337	REF	7	LAST	816	30,2720	17260 0		STODL	UNWC/2	
0338	REF	3	LAST	842	30,2721	03654 0			TXD	
0339					30,2722	51025 1		DSU	BPL	
0340	REF	12	LAST	799	30,2723	01235 1			PIPTIME	
0341	REF	1			30,2724	60730 0			ASCTERM	
0342					30,2725	43014 0	CLRFLAG	CLEAR		
0343	REF	1			30,2726	01664 1			NOR29FLG	START R29 IN ASCENT PHASE.
0344	REF	5	LAST	805	30,2727	06666 1			XOVINFLG	ALLOW X-AXIS OVERRIDE
0345					30,2730	77776 1	ASCTERM	EXIT		
0346					30,2731	0 0006 1		EXTEND		
03465	REF	17	LAST	831	30,2732	3 4755 1		DCA	NEG0	
0347	REF	4	LAST	831	30,2733	52 757 0		DXCH	-PHASE3	
0348	REF	5	LAST	837	30,2734	3 0105 0		CA	FLAGWRD9	
0349	REF	1			30,2735	7 4742 0		MASK	FLRCSBIT	
0350	REF	248	LAST	837	30,2736	10 000 0		CCS	A	
0351	REF	1			30,2737	1 2766 0		ICF	ASCTERM3	
0352	REF	139	LAST	844	30,2740	0 6036 1		TC	INTPRET	
0353					30,2741	77624 1		CALL		
0354	REF	4	LAST	817	30,2742	61062 1			FINDCOUW -2	
0355					30,2743	77776 1	ASCTERM1	EXIT		
0356					30,2744	0 0006 1	+1	EXTEND		
03565	REF	18	LAST	851	30,2745	3 4755 1		DCA	NEG0	
0357	REF	5	LAST	851	30,2746	52 757 0		DXCH	-PHASE3	
0358	REF	6	LAST	851	30,2747	3 0105 0	ABRTDISP	CA	FLAGWRD9	INSURE THAT THE NOUN 63 DISPLAY IS
0359	REF	2	LAST	851	30,2750	7 4742 0		MASK	FLRCSBIT	BYPASSED IF WE ARE IN THE RCS TRIMMING
0360	REF	249	LAST	851	30,2751	10 000 0		CCS	A	MODE OF OPERATION
0361	REF	2	LAST	851	30,2752	1 2766 0		TCF	ASCTERM3	
0362	REF	10	LAST	817	30,2753	3 0104 1		CA	FLAGWRD8	BYPASS DISPLAYS IF ENGINE FAILURE IS
0363	REF	3	LAST	817	30,2754	7 4742 0		MASK	FLUNDBIT	INDICATED.
0364	REF	250	LAST	851	30,2755	10 000 0		CCS	A	

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0365	REF	3	LAST	851	30,2756	1 2766	0	TCE	ASCTERM3
0366	REE	1			30,2757	3 3042	1	CAE	V06N63*
0367	REE	228	LAST	840	30,2760	0 4616	1	TC	BANKCALL
0368	REE	2	LAST	487	30,2761	20327	0	CADP	GODSPR
0369	REF	4	LAST	852	30,2762	1 2766	0	TCF	ASCTERM3
0370					30,2763	77776	1	ASCTERM2	EXIT
0371	REE	73	LAST	844	30,2764	0 5353	1	TC	PHASCHNG
0372					30,2765	00003	1	OCT	00003
0373	REE	132	LAST	834	30,2766	1 5155	1	ASCTERM3	TCF
0374					30,2767	77776	1	ASCTERM4	EXIT
0375					30,2770	0 0004	0	INHINT	
0376	REF	39	LAST	841	30,2771	0 4674	0	TC	IBNKCALL
0377	REF	7	LAST	795	30,2772	40153	1	CADP	ZATTEROR
0378	REE	1			30,2773	1 2744	0	TCF	ASCTERM1 +1

NO GUIDANCE THIS CYCLE -- HENCE ZERO
THE GAP ATTITUDE ERRORS.

0379					30,2774	45345	1	CHECKALT	DLOAD
0380	REF	5	LAST	849	30,2775	02275	0		DSU
0381	REE	8	LAST	843	30,2776	02337	1		/R/MAG
0382					30,2777	50025	0		/LAND/
0383	REE	1			30,3000	26732	0	DSU	BMN
0384	REF	1			30,3001	57162	0		25KFT
0385					30,3002	43345	1	EXITVR	CHECKYAW
0386	REF	13	LAST	851	30,3003	01235	1		DAD
0387	REF	1			30,3004	25574	0		PIPTIME
0388	REE	4	LAST	851	30,3005	03654	0	STORE	10SECS
0389					30,3006	77614	1	CLRGD	TX0
0390	REE	4	LAST	851	30,3007	04621	0		FLVR
0391	REF	1			30,3010	60716	1		MAINLINE

IF H LT 25K CHECK Z AXIS ORIENTATION.

0392					30,3011	77420	1	ASCRSTRT	STQ
0393	REF	8	LAST	843	30,3012	01164	0		EXIT
0394	REF	1			30,3013	3 4741	1	CA	TEMPR60
0395	REF	1			30,3014	6 4746	0	AD	ELPIBIT
0396	REE	7	LAST	851	30,3015	7 0105	1	MASK	FLZONBIT
0397	REE	251	LAST	851	30,3016	10 000	0	CCS	FLAGWRD9
0398					30,3017	1 3022	0	TCE	A
0399	REF	74	LAST	852	30,3020	0 5353	1	TC	+3
0400					30,3021	04023	1	TC	PHASCHNG
0401	REE	140	LAST	851	30,3022	0 6036	1	OCT	04023
0402					30,3023	77650	1	TC	INTPRET
0403	REE	9	LAST	852	30,3024	01164	0	GOTO	

0404					27,3162			BANK	27
0405	REF	1			27,2000			SFTLOC	ASENT1
0406					27,3162			BANK	

0407	REE	2	LAST	852	27,3162			SETXFLAG =	CHECKYAW
------	-----	---	------	-----	---------	--	--	------------	----------

0408					27,3162	77614	1	CHECKYAW	SET
0409	REF	6	LAST	851	27,3163	06466	0		XOVINFLG

PROHIBIT X-AXIS OVERRIDE

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0410				27,3164	74345 0		DLOAD	VXSC		
0411	REF	5	LAST	850	27,3165	02361 1		ATY		
0412	REF	5	LAST	850	27,3166	02277 1		LAXIS		
0413					27,3167	74325 0		PDDL	VXSC	
0414	REF	4	LAST	851	27,3170	02365 0		ATP		
0415	REF	6	LAST	851	27,3171	02305 0		ZAXIS1		
0416					27,3172	53455 0		VAD	UNIT	
0417					27,3173	50206 0		PUSH	DOT	
0418	REF	4	LAST	808	27,3174	02154 0			YNBP1P	
0419					27,3175	45246 0		ABS	DSJ	
0420	REF	1			27,3176	21052 0			SIN5DEG	
0421					27,3177	71244 0		BPL	DLOAD	
0422	REF	1			27,3200	57205 1			KEEPVR	
0423	REF	5	LAST	848	27,3201	02313 1			RDOT	
0424					27,3202	51025 1		DSU	BPL	
0425	REF	1			27,3203	21034 0			40FPS	
0426	REF	1			27,3204	61002 1			EXITVR	
0427					27,3205	45575 1	KEEPVR	VLOAD	STADR	RECALL LOSVEC FROM PUSHLIST
0428	REF	8	LAST	851	27,3206	50517 1		STOVL	JNWC/2	
0429	REF	16	LAST	851	27,3207	03535 1			UNIT/R/	
0430	REF	17	LAST	851	27,3210	37252 0		STCALL	JNFC/2	
0431	REF	2	LAST	851	27,3211	60730 0			ASCTERM	
0432					27,3212	77634 0	ENG OFF	RTB		
0433	REF	22	LAST	843	27,3213	21462 1			LOADTIME	
0434					27,3214	43225 0		DSU	DAD	
0435	REF	14	LAST	852	27,3215	01235 1			PIPTIME	
0436	REF	23	LAST	848	27,3216	03452 1			TTOGC	
0437					27,3217	77476 1		DCOMP	EXIT	
0438	REF	11	LAST	800	27,3220	0 7256 1		TC	TPAGREE	FORCE SIGN AGREEMENT ON MPAC, MPAC +1.
0439	REF	7	LAST	798	27,3221	3 5016 0		CAF	EBANK7	
0440	REF	25	LAST	825	27,3222	54 003 0		TS	EBANK	
0441	REF	34	LAST	849	E7,1514			EBANK=	TGO	
0442					27,3223	0 0004 0	BIT3H	INHINT		USED AS A CONSTANT
0443	REF	314	LAST	844	27,3224	10 155 1		CCS	MPAC +1	
0444					27,3225	1 3230 1		TCF	+3	C(A) = DT - 1 BIT
0445					27,3226	1 3230 1		TCF	+2	C(A) = 0
0446	REF	151	LAST	839	27,3227	3 4755 1		CAF	ZERO	C(A) = 0
0447	REF	45	LAST	833	27,3230	6 4753 1		AD	BIT1	C(A) = 1 BIT OR DT.
0448	REF	4	LAST	833	27,3231	55*644 1		TS	ENG OFFDT	
0449	REF	26	LAST	833	27,3232	0 5173 1		TC	TWIDDLF	
0450	REF	1			27,3233	03245 1		ADRES	ENG OFF1	
0451	REF	75	LAST	852	27,3234	0 5353 1		TC	PHASCHNG	
0452					27,3235	47014 1		OCT	47014	
0453	REF	5	LAST	853	27,3236	76133 1		-GENADR	ENG OFFDT	
0454	REF	35	LAST	853	E7,1514			EBANK=	TGO	
0455	REF	2	LAST	853	27,3237	03245 1		2CADR	ENG OFF1	
0455					27,3240	56067 0				

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0456	REF	141	LAST	852	27,3241	0 6036 1		TC	INTPRET	
0457					27,3242	52014 0		SET	GOTO	
0458	REF	7	LAST	848	27,3243	03470 1			IDLEFLAG	DISABLE DELTA-V MONITOR
0459	REF	2	LAST	848	27,3244	60457 1			T2TFST	
0460	REF	40	LAST	852	27,3245	0 4674 0	ENG OFF1	TC	IBNKCALL	SHUT OFF THE ENGINE.
0461	REF	2	LAST	834	27,3246	75551 1		CADR	ENGINE OF2	
0462	REF	4	LAST	754	27,3247	3 5027 1		CAF	PRI017	SET UP A JOB FOR THE ASCENT GUIDANCE
0463	REF	24	LAST	768	27,3250	0 5105 0		TC	FINDVAC	POSTBURN LOGIC.
0464	REF	29	LAST	840	E7,1453			EBANK=	WHICH	
0465	REF	3	LAST	754	27,3251	03261 1		2CADR	CUT OFF	
0465					27,3252	56067 0				
0466	REF	76	LAST	853	27,3253	0 5353 1		TC	PHASCHNG	
0467					27,3254	07024 0		OCT	07024	
0468					27,3255	17000 1		OCT	17000	
0469	REF	36	LAST	853	E7,1514			EBANK=	TGO	
0470	REF	4	LAST	854	27,3256	03261 1		2CADR	CUT OFF	
0470					27,3257	56067 0				
0471	REF	56	LAST	834	27,3260	1 5261 0		TCF	TASK OVER	
0472	REF	51	LAST	839	27,3261	0 5504 0	CUTOFF	TC	UPFLAG	SET FLRCS FLAG.
0473	REF	4	LAST	847	27,3262	00214 0		ADRES	FLRCS	
0474	REF	1			27,3263	3 3330 1	-5	CAF	V16N63	
0475	REF	229	LAST	852	27,3264	0 4616 1		TC	BANKCALL	
0476	REF	24	LAST	840	27,3265	20351 1		CADR	GOFLASH	
0477	REF	1			27,3266	1 3306 0		TCF	TERMASC	
0478	REF	1			27,3267	1 3271 1		TCF	CUTOFF1	
0479					27,3270	1 3263 1		TCF	-5	
0480					27,3271	0 0004 0	CUTOFF1	INHINT		
0481	REF	41	LAST	854	27,3272	0 4674 0		TC	IBNKCALL	ZERO ATTITUDE ERRORS BEFORE REDUCING DB.
0482	REF	8	LAST	852	27,3273	40153 1		CADR	ZATTFPOR	
0483	REF	42	LAST	854	27,3274	0 4674 0		TC	IBNKCALL	
0484	REF	5	LAST	763	27,3275	40140 0		CADR	SETMINDB	
0485	REF	77	LAST	854	27,3276	0 5353 1		TC	PHASCHNG	
0486					27,3277	04024 0		OCT	04024	
0487	REF	1			27,3300	3 3331 0	-5	CAF	V16N85C	
0488	REF	230	LAST	854	27,3301	0 4616 1		TC	BANKCALL	
0489	REF	25	LAST	854	27,3302	20351 1		CADR	GOFLASH	
0490	REF	2	LAST	854	27,3303	1 3306 0		TCF	TERMASC	
0491					27,3304	1 3306 0		TCF	+2	PROCEED
0492					27,3305	1 3300 0		TCF	-5	
0493	REF	78	LAST	854	27,3306	0 5353 1	TERMASC	TC	PHASCHNG	
0494					27,3307	04024 0		OCT	04024	
0495					27,3310	0 0004 0		INHINT		RESTORE DEADBAND DESIRED BY ASTRONAUT.

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0496	REF	43	LAST	854	27,3311	0 4674 0		TC	IBNKCALL
0497	REF	7	LAST	762	27,3312	40123 0		CADR	RESTORDB
0498	REF	81	LAST	841	27,3313	0 5516 0		TC	DOWNFLAG
0499	REF	4	LAST	836	27,3314	00215 1		ADRES	LETABORT
0500	REF	39	LAST	840	27,3315	1 6001 1		TCF	GOTOPOOH
0501					27,3316	50375 0	YCOMP	VLOAD	DCT
0502	REF	17	LAST	853	27,3317	03535 1			UNIT/R/
0503	REF	3	LAST	846	27,3320	03716 1			QAXIS
0504					27,3321	67552 1		SL1	ARCS IN
0505					27,3322	41205 0		DMP	DMP
0506	REF	6	LAST	849	27,3323	03627 1			RCD
0507	REF	3	LAST	593	27,3324	15404 0			2PI/8
0508					27,3325	77652 0		SL3	
0509	REF	4	LAST	849	27,3326	02341 0		STORE	Y
0510					27,3327	77616 0		RVQ	
0511					27,3330	04077 0	V16N63	VN	1663
0512					27,3331	04125 0	V16N85C	VN	1635
R0513									
0514					30,3025			BANK	30
0515	REF	3	LAST	846	30,2000			SETLOC	ASENT
0516					30,3025			BANK	

DISALLOW ABORTS AT THIS TIME.

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P0517 ASCENT GUIDANCE CONSTANTS

0518	REF	2	LAST	846	33,3200	100CS	EQUALS	2SEC(18)	
0519	REF	1			30,3027	T2A	EQUALS	2SEC(17)	
0520					30,3025	00062 0	4SEC(17)	2DEC	400 B-17
0520					30,3026	00000 1			
0521					30,3027	00031 0	2SEC(17)	2DEC	200 B-17
0521					30,3030	00000 1			
0522					30,3031	00175 1	T3	2DEC	1000 B-17
0522					30,3032	00000 1			
0523					30,3033	00017 1	40FPS	2DEC	.12192 B-7
0523					30,3034	23305 0			40 FT/SEC EXPRESSED IN M/CS.
0524					30,3035	00045 0	6SEC(18)	2DEC	600 B-18
0524					30,3036	20000 0			
0525					30,3037	00010 0	BIT4H	OCT	10
0526					30,3040	14400 0	2SEC(9)	2DEC	200 B-9
0526					30,3041	00000 1			
0527					30,3042	01477 1	V06N63*	VN	0663
0528					30,3043	01514 0	V06N76	VN	0676
0529					30,3044	01441 1	V06N33A	VN	0633
0530					30,3045	20000 0	KT1	2DEC	0.5000
0530					30,3046	00000 1			
0531					30,3047	75751 0	PRLIMIT	2DEC	-.0639
0531					30,3050	41775 1			(B/TBUP)MIN=-.1FT.SEC(-3)
0532					30,3051	00545 0	SIN5DEG	2DEC	0.08716 B-2
0532					30,3052	00171 0			
0533					30,3053	00022 1	MINABDV	2DEC	.0356 B-5
0533					30,3054	07212 1			10 PERCENT BIGGER THAN GRAVITY
0534	REF	4	LAST	836	E7,1566	1/DVO	=	MASS1	

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P0535 THE LOGARITHM SUBROUTINE

0536		24,3504	BANK	24
0537	REF 1	32,2000	SETLOC	FLOGSUB
0538		32,3613	BANK	

R0539 INPUT X IN MPAC
 R0540 OUTPUT -LOG(X) IN MPAC

0541			32,3613	44301 0	LOGSUB	NORM	BDSIJ
0542	REF 315	LAST 853	32,3614	00163 0			MPAC +6
0543	REF 2	LAST 847	32,3615	17743 1			NEARONE
0544			32,3616	77776 1		EXIT	
0545	REF 1		32,3617	0 7221 1		TC	POLY
0546			32,3620	00006 1		DEC	6
0547			32,3621	00000 1		2DEC	.0000000060
0547			32,3622	00002 0			
0548			32,3623	76777 1		2DEC	-.0312514377
0548			32,3624	77175 1			
0549			32,3625	77400 0		2DEC	-.0155686771
0549			32,3626	75416 0			
0550			32,3627	77507 0		2DEC	-.0112502068
0550			32,3630	65515 0			
0551			32,3631	77741 0		2DEC	-.0018545108
0551			32,3632	63547 1			
0552			32,3633	77052 0		2DEC	-.0286607906
0552			32,3634	55373 0			
0553			32,3635	01167 0		2DEC	.0385598563
0553			32,3636	30361 0			
0554			32,3637	76520 1		2DEC	-.0419361902
0554			32,3640	75267 0			
0555	REF 152	LAST 853	32,3641	3 4755 1		CAF	ZERO
0556	REF 316	LAST 857	32,3642	54 156 1		TS	MPAC +2
0557			32,3643	0 0006 1		EXTEND	
0558	REF 1		32,3644	3 3660 1		DCA	CLOG2/32
0559	REF 317	LAST 857	32,3645	52 155 1		DXCH	MPAC
0560	REF 59	LAST 824	32,3646	52 132 0		DXCH	BUF +1
0561	REF 318	LAST 857	32,3647	3 0162 1		CA	MPAC +6
0562	REF 8	LAST 823	32,3650	0 7306 0		TC	SHCRTMP
0563	REF 319	LAST 857	32,3651	52 156 1		DXCH	MPAC +1
0564	REF 320	LAST 857	32,3652	52 155 1		DXCH	MPAC
0565	REF 60	LAST 857	32,3653	52 132 0		DXCH	BUF +1
0566	REF 321	LAST 857	32,3654	20 155 1		DAS	MPAC
0567	REF 142	LAST 854	32,3655	0 6036 1		TC	INTPRET
0568			32,3656	43476 0		DCOMP	RVQ
0569			32,3657	00542 1	CLOG2/32	2DEC	.0216608494
0569			32,3660	34414 1			

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0001				37,3374			BANK 37		
0002	REF	1		37,2000			SETLOC SERV1		
0003				37,3374			BANK		
0004	REF	35	LAST	844	E7,1513		EBANK= DVCNTR		
R0005	***** PREREAD *****								
R0007									
0008	REF	1					COUNT* \$\$/SERV		
0009	REF	10	LAST	820	37,3374	3 4757 0	PREREAD CAF SEVEN	5.7 SPOT TO SKIP LASTBIAS AFTER	
0010	REF	1			37,3375	0 3515 0	TC GNUFAZE5	RESTART.	
0011	REF	4	LAST	610	37,3376	3 5031 0	CAF PRI021		
0012	REF	21	LAST	796	37,3377	0 5072 1	TC NOVAC		
0013	REF	5	LAST	347	E3,1460		EBANK= NBDX		
0014	REF	1			37,3400	03663 1	2CADR LASTBIAS	DO LAST GYRO COMPENSATION IN FREE FALL	
0014	REF	1			37,3401	14063 1			
0015	REF	2	LAST	347	37,3402	0 3533 1	BIBIBIAS TC PIPASR +3	CLEAR + READ PIPS LAST TIME IN FRES+F133	
A0016	DO NOT DESTROY VALUE OF PIPTIME1								
0017	REF	17	LAST	837	37,3403	4 0103 1	CS FLAGWRD7		
0018	REF	1			37,3404	7 4773 1	MASK SUPFR011	SET V37FLAG AND AVEGFLAG (BITS 5 AND 6	
0019	REF	18	LAST	858	37,3405	26 103 1	ADS FLAGWRD7	OF FLAGWRD7)	
0020	REF	2	LAST	180	37,3406	4 4735 0	CS DRFTBIT		
0021	REF	20	LAST	816	37,3407	7 0076 1	MASK FLAGWRD2	RESET DRIFTFLAG	
0022	REF	21	LAST	858	37,3410	54 076 1	TS FLAGWRD2		
0023	REF	18	LAST	839	37,3411	3 4751 0	CAF FOUR	INITIALIZE DV MONITOR	
0025	REF	3	LAST	123	37,3412	55'257 1	TS PIPAGE		
0026	REF	1			37,3413	3 3523 0	CAF ENDJBCAD	POINT OUTROUTE TO END-OF-JOB.	
0027	REF	3	LAST	834	37,3414	55'260 0	TS OUTROUTE		
0028	REF	3	LAST	545	37,3415	3 7707 0	CAF PRI022		
0029	REF	35	LAST	854	37,3416	0 5105 0	TC FINDVAC	TO FIRST ENTRY TO AVERAGE G.	
0030	REF	36	LAST	858	E7,1513		EBANK= DVCNTR		
0031	REF	2	LAST	257	37,3417	02421 1	2CADR NORMLIZE		
0031					37,3420	66067 0			
0032	REF	53	LAST	830	37,3421	3 4752 0	CA TWO	5.2SPOT FOR REREADAC AND NORMLIZE	
0033	REF	1			37,3422	0 3511 1	GOREADAC TC GNUFAZE5		
0034	REF	5	LAST	616	37,3423	3 5000 1	CA 2SECS	WAIT TWO SECONDS FOR READACCS	
0035	REF	8	LAST	820	37,3424	0 5224 0	TC VARDELAY		

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P0036 ***** READACCS *****
0038 REF 1 37,3425 4 3524 0 READACCS CS DCT37771 THIS PIECE OF CODING ATTEMPTS TO
0039 REF 3 LAST 832 37,3426 6 0030 1 AD TIME5 SYNCHRONIZE READACCS WITH THE DIGITAL
0040 REF 252 LAST 852 37,3427 10 000 0 CCS A AUTOPILOT SO THAT A PAXIS RUPT WILL
0041 REF 91 LAST 823 37,3430 4 4753 0 CS ONE OCCUR APPROXIMATELY 70 MILLISECONDS
0042 37,3431 1 3433 1 TCF +2 FOLLOWING THE READACCS RUPT. THE 70 MS
0043 REF 92 LAST 859 37,3432 3 4753 1 CA ONE OFFSET WAS CHOSEN SO THAT THE PAXIS
0044 REF 4 LAST 859 37,3433 26 030 0 +2 ADS TIME5 RUPT WOULD NOT OCCUR SIMULTANEOUSLY
A0045 WITH ANY OF THE 8 SUBSEQUENT R10,R11
A0046 INTERRUPTS -- THUS MINIMIZING THE POSS-
A0047 IBILITY OF LOSING DOWNRUPTS.

0048 REF 3 LAST 858 37,3434 0 3530 1 TC PIPASR READ THE PIPAS.

0049 REF 16 LAST 820 37,3435 3 4756 1 PIPSDONE CA FIVE
0050 REF 2 LAST 858 37,3436 0 3515 0 TC GNUFAZES
0051 REF 93 LAST 859 37,3437 3 4753 1 RE005.5 CAF ONE
0052 REF 4 LAST 858 37,3440 55'257 1 TS PIPAGE

0053 REF 7 LAST 767 37,3441 3 4736 1 CA PRID20
0054 REF 36 LAST 858 37,3442 0 5105 0 TC FINOVAC
0055 REF 37 LAST 858 37,1513 EBANK= DVCNTR
0056 REF 2 LAST 257 37,3443 02200 1 2CAOR SERVICFR SET UP SERVICER JOB
0056 37,3444 66067 0

0057 REF 22 LAST 753 37,3445 3 4743 0 CA BIT9
0058 37,3446 0 0006 1 EXTEND
0059 REF 28 LAST 831 37,3447 05 011 1 WOR OSALMOUT TURN ON TEST CONNECTOR OUTBIT

0060 REF 19 LAST 858 37,3450 3 0103 0 CA FLAGWRD7
0061 REF 4 LAST 837 37,3451 7 4747 0 MASK AVEGFBIT
0062 37,3452 0 0006 1 EXTEND
0063 REF 1 37,3453 1 3503 0 BZF AVEGOUT AVEGFLAG DOWN - SET UP FINAL EXIT

0064 REF 7 LAST 817 37,3454 3 0102 1 CA FLAGWRD6
0065 REF 2 LAST 201 37,3455 7 4744 0 MASK MUNFLBIT
0066 37,3456 0 0006 1 EXTEND
0067 REF 1 37,3457 1 3501 1 BZF MAKEACCS MUNFLAG CLEAR - BYPASS LR AND OISP.

0068 REF 2 LAST 768 37,3460 10 755 1 CCS PHASE2
0069 REF 2 LAST 859 37,3461 1 3501 1 TCF MAKEACCS PHASE 2 ACTIVATED - AVOID MULTIPLE R10.

0070 REF 11 LAST 858 37,3462 3 4757 0 CAF SEVEN
0071 REF 4 LAST 829 37,3463 55'056 1 TS PIPCTR SET PIPCTR FOR 4X/SEC RATE.

0072 REF 11 LAST 799 37,3464 4 0025 1 CS TIME1 SET TBASE2 .05 SECONOS IN THE PAST.
0073 REF 17 LAST 859 37,3465 6 4756 1 AO FIVF
0074 REF 2 LAST 235 37,3466 6 4734 0 AD NEG1/2
0075 REF 3 LAST 859 37,3467 6 4734 0 AD NEG1/2
0076 REF 3 LAST 488 37,3470 57'055 0 XCH TBASE2

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0077	REF	3	LAST	388	37,3471	3 4361 1	CAF	DEC17	2.21SPOT FOR R10,R11
0078	REF	125	LAST	831	37,3472	54 001 1	TS	L	
0079					37,3473	4 0000 0	COM		
0080	REF	5	LAST	744	37,3474	52 755 1	DXCH	-PHASE2	
0081	REF	6	LAST	509	37,3475	3 6007 0	CAF	OCT24	FIRST R10,R11 IN .200 SECONDS.
0082	REF	33	LAST	767	37,3476	0 5203 0	TC	WAITLIST	
0083	REF	18	LAST	855	E7,1534		EBANK=	UNIT/R/	
0084	REF	3	LAST	829	37,3477	02102 0	2CADR	R10,R11	
0084					37,3500	42067 0			
0085	REF	19	LAST	858	37,3501	3 4751 0	MAKEACCS CA	FOUP	
0086	REF	1			37,3502	1 3422 1	TCF	GCREADAC	DO PHASE CHANGE AND RECALL READACCS
0087					37,3503	0 0006 1	AVEGOUT	EXTEND	
0088	REF	1			37,3504	3 3522 1	DCA	AVOUTCAD	SET UP FINAL SERVICER EXIT
0089	REF	5	LAST	834	37,3505	53'253 0	DXCH	AVGEXIT	
0090	RFF	20	LAST	860	37,3506	3 4751 0	CA	FOUR	SET 5.4 SPOT FOR REREADAC AND SERVICER
0091	REF	2	LAST	858	37,3507	0 3511 1	TC	GNUTFAZ5	IF REREADAC IS CALLED, IT WILL EXIT
0092	REF	57	LAST	854	37,3510	0 5261 1	TC	TASKOVER	END TASK WITHOUT CALLING READACCS
0093	REF	126	LAST	860	37,3511	54 001 1	GNUTFAZ5 TS	L	SAVE INPUT IN L
0094	REF	12	LAST	859	37,3512	4 0025 1	CS	TIME1	
0095	REF	1			37,3513	55'063 1	TS	TBASE5	SET TBASE5
0096					37,3514	1 3516 1	TCF	+2	
0097	REF	127	LAST	860	37,3515	54 001 1	GNUTFAZ5 TS	L	SAVE INPUT IN L
0098	REF	128	LAST	860	37,3516	4 0001 1	CS	L	-PHASE IN A, PHASE IN L
0099	REF	2	LAST	229	37,3517	52 763 1	DXCH	-PHASE5	SET -PHASE5,PHASE5
0100	REF	210	LAST	838	37,3520	0 0002 0	TC	Q	
0101	REF	38	LAST	859	E7,1513		EBANK=	DVCNTR	
0102	REF	1			37,3521	03661 0	AVOUTCAD	2CADR	AVGEND
0102	REF	1			37,3522	64067 1			
0103	REF	7	LAST	832	37,3523	77527 1	ENDJBCAD	CADR	SERVEXIT +2
0104					37,3524	37771 1	OCT37771	OCT	37771
0105					33,2200		BANK	33	
0106	REF	4	LAST	59	33,2000		SETLOC	SERVICFS	
0107					33,2200		BANK		
0108	REF	4	LAST	59 TO	60:	12 37*	COUNT*	\$/SERV	

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P0109 *****
R0111 ***** SERVICER *****

0112 REF 79 LAST 854 33,2200 0 5353 1 SERVICER TC PHASCHNG RESTART REREADAC + SERVICER
0113 33,2201 16035 0 OCT 16035
0114 33,2202 20000 0 OCT 20000
0115 REF 39 LAST 860 E7,1513 EBANK= DVCNTR
0116 REF 1 33,2203 02211 1 2CADR GETA8VAL
0116 REF 1 33,2204 66067 0
0117 REF 3 LAST 801 33,2205 3 7715 0 CAF PRI031 INITIALIZE 1/PIPADT IN CASE RESTART HAS
0118 REF 7 LAST 349 33,2206 55'075 0 TS 1/PIPADT CAUSED LASTBIAS TO 8F SKIPPED.

0119 REF 231 LAST 854 33,2207 0 4616 1 TC BANKCALL PIPA COMPENSATION CALL
0120 REF 2 LAST 398 33,2210 15263 1 CADR 1/PIPA

0121 REF 143 LAST 857 33,2211 0 6036 1 GETA8VAL TC INTPRET
0122 33,2212 51575 1 VLOAD A8VAL
0123 REF 5 LAST 210 33,2213 00325 0 DELV
0124 33,2214 77776 1 EXIT
0125 REF 322 LAST 857 33,2215 3 0154 1 CA MPAC
0126 REF 4 LAST 797 33,2216 55'246 1 TS A8DELV ABDELV = CM/SEC*2(-14).
0127 33,2217 0 0006 1 EXTEND
0128 REF 1 33,2220 7 2020 0 MP KP1P
0129 REF 4 LAST 844 33,2221 53'512 1 DXCH A8DVCONV A8DVCONV = M/CS *2(-5).
01292 33,2222 0 0006 1 EXTEND
01294 REF 9 LAST 833 33,2223 3 1245 0 DCA MASS
01296 REF 5 LAST 856 33,2224 53'567 0 DXCH MASS1 INITIALIZE MASS1 IN CASE WE SKIP MASSMON
0130 REF 11 LAST 851 33,2225 4 0104 0 CS FLAGWRD8 ARE WE ON THE SURFACE?
0131 REF 6 LAST 550 33,2226 7 4744 0 MASK SURFFBIT
0132 33,2227 0 0006 1 EXTEND
0133 REF 1 33,2230 1 2251 1 BZE MOONSPOT YES: BYPASS MASS MESS

0134 REF 16 LAST 831 33,2231 3 0106 0 CA FLGWRD10 NO: WHICH VEX SHOULD BE USED?
0135 REF 11 LAST 831 33,2232 7 4737 1 MASK APSFL81T
0136 REF 253 LAST 859 33,2233 10 000 0 CCS A
0137 33,2234 0 0006 1 EXTEND IF EXTEND IS EXECUTED, APSVEX --> A,
0138 REF 3 LAST 842 33,2235 3 2001 1 DCA APSVEX OTHERWISE DPSVEX --> A
0139 REF 211 LAST 860 33,2236 54 002 1 TS Q

0140 33,2237 0 0006 1 EXTEND
0141 REF 5 LAST 861 33,2240 3 1512 0 DCA ABDVCONV
0142 33,2241 0 0006 1 EXTEND
0143 REF 212 LAST 861 33,2242 10 002 1 OCT10002 DV Q WHERE APPROPRIATE VEX RESIDES
0144 33,2243 0 0006 1 EXTEND
0145 REF 10 LAST 861 33,2244 7 1244 0 MP MASS
0146 REF 6 LAST 861 33,2245 53'567 0 DXCH MASS1
0147 33,2246 0 0006 1 EXTEND
0148 REF 11 LAST 861 33,2247 3 1245 0 DCA MASS
0149 REF 7 LAST 861 33,2250 21'567 0 DAS MASS1

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0150	REF	1		33,2251	3 2021 0	MOONSPOT	CA	KPIP1	TP MPAC = A8DELV AT 2(14) CM/SEC
0151	REF	9	LAST 857	33,2252	0 7306 0		TC	SHORTMP	MULTIPLY 8Y KPIP1 TO GFT
0152	REF	323	LAST 861	33,2253	52 155 1		DXCH	MPAC	ABDELV AT 2(7) M/CS
0153	REF	6	LAST 741	33,2254	21 506 1		DAS	DVTOTAL	UPDATE DVTOTAL FOR DISPLAY
0154	REF	1		33,2255	3 7711 1		CA	PRIQ24	PROTECT N8SM IN XN8NDX
0155	REF	12	LAST 835	33,2256	0 5146 1		TC	PRIOCHNG	
0156	REF	1		33,2257	0 2473 0		TC	TMPIOSPT	
0157	REF	232	LAST 861	33,2260	0 4616 1		TC	8ANKCALL	
0158	REF	2	LAST 612	33,2261	47521 1		CADR	QUICTRIG	
0159	REF	144	LAST 861	33,2262	0 6036 1		TC	INTPRET	
0160				33,2263	45160 1		AXC,1	CALL	
0161	RFF	6	LAST 847	33,2264	02145 0			XNBPIP	
0162	REF	1		33,2265	31271 1			XN8NDX	
0163				33,2266	77776 1		EXIT		
0164	REF	8	LAST 859	33,2267	3 4736 1		CA	PRIQ20	RESTORE PRIO 20
0165	REF	13	LAST 862	33,2270	0 5146 1		TC	PRIOCHNG	
0166	REF	145	LAST 862	33,2271	0 6036 1		TC	INTPRET	
0167				33,2272	45014 0	AVERAGEG	BON	CALL	
0168	REF	4	LAST 839	33,2273	03307 0			MUNFLAG	
0169	REF	1		33,2274	67064 1			RV80TH	
0170	REF	1		33,2275	67030 0			CALCRVG	
0171				33,2276	77776 1		EXIT		
0172	REF	1		33,2277	0 3535 1	GOSERV	TC	QUICKFAZ5	
0173	REF	1		33,2300	0 2456 1	COPYCYCL	TC	COPYCYC	
A0174							CA	ZERO	A IS ZERO ON RETURN FROM COPYCYC
0175	REF	1		33,2301	55 160 0		TS	PIPATMPX	STILL UNDER INHINT
0176	REF	1		33,2302	55 161 1		TS	PIPATMPY	
0177	REF	1		33,2303	55 162 1		TS	PIPATMPZ	
0178	REF	2	LAST 816	33,2304	4 4741 0		CS	STEFR8IT	CLEAR STEERSW PRIOR TO DVMON.
0179	REF	22	LAST 858	33,2305	7 0076 1		MASK	FLAGWRD2	
0180	RFF	23	LAST 862	33,2306	54 076 1		TS	FLAGWRD2	
0181	REF	3	LAST 769	33,2307	3 4745 0		CAF	IDLEF8IT	IS THE IDLE FLAG SET?
0182	REF	20	LAST 859	33,2310	7 0103 1		MASK	FLAGWRD7	
0183	REF	254	LAST 861	33,2311	10 000 0		CCS	A	
0184	REF	1		33,2312	1 2345 0		TCF	NODVMON1	IDLEFLAG = 1, HENCE SET AUXFLAG TO 0.
0185	REF	8	LAST 859	33,2313	4 0102 0		CS	FLAGWRD6	
0186	REF	1		33,2314	7 4752 1		MASK	AUXFLBIT	
0187	REF	255	LAST 862	33,2315	10 000 0		CCS	A	
0188	REF	1		33,2316	1 2351 0		TCF	NODVMON2	AUXFLAG = 0, HENCE SET AUXFLAG TO 1.

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0189	REF	7	LAST	839	33,2317	4	1251	1	DVMON	CS	DVTHRUSH
0190	REF	5	LAST	861	33,2320	6	1246	0		AD	A8DELV
0191					33,2321	0	0006	1		EXTEND	
0192	REF	1			33,2322	6	2355	0		8ZMF	LOTHRUST

0193	REF	24	LAST	862	33,2323	4	0076	1		CS	FLAGWRD2
0194	REF	3	LAST	862	33,2324	7	4741	0		MASK	STEER8IT
0195	REF	25	LAST	863	33,2325	26	076	1		ADS	FLAGWRD2

SET STEERSW.

0196	REF	94	LAST	859	33,2326	3	4753	1	DVCNTSET	CAF	JNE
0197	REF	40	LAST	861	33,2327	55	513	0		TS	DVCNTR

ALLOW TWO PASSES MAXIMUM NOW THAT
THRUST HAS BEEN DETECTED.

0198	REF	17	LAST	861	33,2330	3	0106	0		CA	FLGWRD10
0199	REF	12	LAST	861	33,2331	7	4737	1		MASK	APSFLBIT
0200	REF	256	LAST	862	33,2332	10	000	0		CCS	A
0201	REF	1			33,2333	1	2400	0		TCF	USEJETS

BRANCH IF APSFLAG IS SET.

0202	REF	23	LAST	859	33,2334	3	4743	0		CA	BIT9
0203					33,2335	0	0006	1		EXTEND	
0204	REF	3	LAST	206	33,2336	02	032	1		RAND	CHAN32
0205					33,2337	0	0006	1		EXTEND	
0206	REF	2	LAST	863	33,2340	1	2400	0		BZF	USEJETS

CHECK GIMBAL FAIL BIT

0207	REF	2	LAST	767	33,2341	4	4736	0	USEGTS	CS	USEQRJTS
0208	REF	29	LAST	831	33,2342	7	0111	1		MASK	DAP80OLS
0209	REF	30	LAST	863	33,2343	54	111	1		TS	DAP80OLS
0210	REF	1			33,2344	1	2403	0		TCF	SERVOUT

0211	REF	2	LAST	862	33,2345	4	4752	1	NODVMON1	CS	AUXFL8IT
0212	REF	9	LAST	862	33,2346	7	0102	0		MASK	FLAGWRD6
0213	REF	10	LAST	863	33,2347	54	102	0		TS	FLAGWRD6
0214	REF	3	LAST	863	33,2350	1	2400	0		TCF	USEJETS
0215	REF	11	LAST	863	33,2351	4	0102	0	NODVMON2	CS	FLAGWRD6
0216	REF	3	LAST	863	33,2352	7	4752	1		MASK	AUXFL8IT
0217	REF	12	LAST	863	33,2353	26	102	0		ADS	FLAGWRD6
0218	REF	4	LAST	863	33,2354	1	2400	0		TCF	USEJETS

SET AUXFLAG TO 0.

SET AUXFLAG TO 1.

0219	REF	2	LAST	862	33,2355	0	3535	1	LOTHRUST	TC	QUIKFAZ5
0220	REF	41	LAST	863	33,2356	11	513	0		CCS	DVCNTR
0221	REF	1			33,2357	1	2371	1		TCF	DECCNTR

0222	REF	1			33,2360	10	761	0		CCS	PHASE4
02222	REF	2	LAST	863	33,2361	1	2403	0		TCF	SERVOUT

COMFAIL JOB ACTIVE?
YES WON'T NEED ANOTHER.

02224	REF	80	LAST	861	33,2362	0	5353	1		TC	PHASCHNG
02226					33,2363	00374	1			OCT	00374

4.37SPDT FOR COMFAIL.

02228	REF	4	LAST	724	33,2364	3	7712	1		CAF	PRID25
0223	REF	22	LAST	858	33,2365	0	5072	1		TC	NOVAC
02232	REF	30	LAST	854	E7,1453					EBANK=	WHICH

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02234 REF 2 LAST 257 33,2366 02574 0
 02234 33,2367 74067 0
 02236 REF 3 LAST 863 33,2370 1 2403 0

2CADR COMFAIL
 TCF SERVCUT

0224 REF 1 33,2371 55*566 1
 0225 REF 3 LAST 863 33,2372 0 3535 1
 0226 REF 2 LAST 864 33,2373 3 1566 0
 0227 REF 42 LAST 863 33,2374 55*513 0
 0228 33,2375 0 0004 0
 0229 REF 4 LAST 855 33,2376 0 4674 0
 0230 REF 6 LAST 817 33,2377 40165 1
 0231 REF 31 LAST 863 33,2400 4 0111 1
 0232 REF 3 LAST 863 33,2401 7 4736 0
 0233 REF 32 LAST 864 33,2402 26 111 1
 0234 33,2403 0 0003 1
 0235 REF 233 LAST 862 33,2404 0 4616 1
 0236 REF 1 33,2405 40457 0

DECCNTR TS DVCNTR1
 TC QUIKFAZ5
 CA DVCNTR1
 TS DVCNTR
 INHINT
 TC IBNKCALL
 CADR STOPPRATE
 CS DAPBCOOLS
 MASK USEQRJTS
 ADS DAPBCOOLS
 RELINT
 TC BANKCALL
 CADR 1/ACCS

IF THRUST IS LOW, NO STEERING IS DONE
 AND THE DESIRED RATES ARE SET TO ZERO.

0237 REF 8 LAST 853 33,2406 3 5016 0
 0238 REF 26 LAST 853 33,2407 54 003 0
 0239 REF 11 LAST 284 33,2410 3 0167 1
 0240 REF 8 LAST 443 33,2411 7 5004 1
 0241 REF 8 LAST 810 33,2412 54 166 1
 0242 33,2413 22 007 0
 0243 REF 22 LAST 825 33,2414 52 121 1

CAF EBANK7
 TS EBANK
 CA PRIORITY
 MASK LOW9
 TS PUSHLOC
 ZL
 DXCH FIXLOC

RESTORE EBANK AFTER 1/ACCS.

0244 REF 4 LAST 864 33,2415 0 3535 1
 0245 33,2416 0 0006 1
 0246 REF 6 LAST 860 33,2417 3 1253 1
 0247 REF 21 LAST 762 33,2420 52 006 0

TC QUIKFAZ5
 EXTEND
 DCA AVGEXIT
 DXCH Z

EXIT TO SELECTED ROUTINE WHETHER THERE
 IS THRUST OR NOT. THE STATE OF STEERSW
 WILL CONVEY THIS INFORMATION.

0248 32,3661
 0249 REF 1 32,2000
 0250 32,3661
 0251 REF 1

BANK 32
 SETLOC SERV2
 BANK
 COUNT* \$\$ / SERV

0252 REF 15 LAST 853 32,3661 3 1235 1
 0253 REF 8 LAST 861 32,3662 55*075 0

AVGEND CA PIPTIME +1
 TS 1/PIPADT

FINAL AVERAGE G EXIT
 SET UP FREE FALL GYRO COMPENSATION.

0254 REF 52 LAST 854 32,3663 0 5504 0
 0255 REF 1 32,3664 00036 1

TC UPFLAG
 ADRES DRIFTFLG

SET DRIFT FLAG.

0256 REF 234 LAST 864 32,3665 0 4616 1
 0257 REF 1 32,3666 17263 0

TC BANKCALL
 CADR PIPFREE

0258 REF 24 LAST 863 32,3667 4 4743 1
 0259 32,3670 0 0006 1
 0260 REF 29 LAST 859 32,3671 03 011 1

CS BIT9
 EXTEND
 WAND DSALMOUT

0261 REF 12 LAST 834 32,3672 0 5327 1

TC 2PHSCHNG

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0262				32,3673	00005	1	OCT	5	GROUP 5 OFF
0263				32,3674	05022	1	OCT	05022	GROUP 2 ON
0264				32,3675	20000	0	OCT	20000	
0265	REF	146	LAST	862	32,3676	0 6036	1	TC	INTPRET
0266					32,3677	43014	0	SET	CLEAR
0267	REF	2	LAST	851	32,3700	01464	0		NOR29FLG
0268	REF	2	LAST	795	32,3701	03664	0		SWANDISP
0269					32,3702	45014	0	CLEAR	CALL
0270	REF	5	LAST	862	32,3703	03267	1		MUNFLAG
0271	REF	1			32,3704	27513	0		AVFTCMID
0272					32,3705	77414	0	CLEAR	EXIT
0273	REF	2	LAST	834	32,3706	03671	1		V37FLAG
0274	REF	4	LAST	858	32,3707	3 1260	1	AVERTRN CA	DUTRCUTE
0275	REF	15	LAST	836	32,3710	0 4640	1	TC	BANKJUMP
0276	REF	1			32,3707			OUTGOAVE =	AVERTRN
0277	REF	8	LAST	861	E7,1566			DVCNTRI =	MASS1

SHUT OFF R29 WHEN SERVICER ENDS.
 SHUT OFF R10 WHEN SERVICER ENDS.
 RESET MUNFLAG.

RETURN TO DESIRED POINT.

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P0278

0279					32,3711	0 0006 1	SERVICLE	EXTEND		DISCONNECT SERVICER FROM ALL GUIDANCE
0280	RFF	1			32,3712	3 3747 0		DCA	SVEXTADR	
0281	REF	7	LAST	864	32,3713	53 253 0		DXCH	AVGEXIT	
0282	REF	21	LAST	862	32,3714	4 0103 1		CS	FLAGWRD7	DISCONNECT THE DELTA-V MONITOR
0283	REF	4	LAST	862	32,3715	7 4745 1		MASK	IDLEFBIT	
0284	REF	22	LAST	866	32,3716	26 103 1		ADS	FLAGWRD7	
0285	REF	5	LAST	831	32,3717	3 4735 1		CAF	LRBYBIT	TERMINATE R12 IF RUNNING.
0286	REF	15	LAST	831	32,3720	54 107 0		TS	FLGWPD11	
0287					32,3721	0 0006 1		EXTEND		
0288	REF	19	LAST	851	32,3722	3 4755 1		DCA	NEGO	
0289	REF	5	LAST	831	32,3723	52 753 1		DXCH	-PHASE1	
0290	REF	13	LAST	863	32,3724	3 0102 1		CA	FLAGWRD6	DO NOT TURN OFF PHASE 2 IF MUNFLAG SET.
0291	REF	3	LAST	859	32,3725	7 4744 0		MASK	MUNFLBIT	
0292	REF	257	LAST	863	32,3726	10 000 0		CCS	A	
0293					32,3727	1 3733 1		TCF	+4	
0294					32,3730	0 0006 1		EXTEND		
0295	REF	20	LAST	866	32,3731	3 4755 1		DCA	NEGO	
0296	REF	6	LAST	860	32,3732	52 755 1		DXCH	-PHASE2	
0297					32,3733	0 0006 1	+4	EXTEND		
0298	REF	21	LAST	866	32,3734	3 4755 1		DCA	NEGO	
0299	REF	6	LAST	851	32,3735	52 757 0		DXCH	-PHASE3	
0300					32,3736	0 0006 1		EXTEND		
0301	REF	22	LAST	866	32,3737	3 4755 1		DCA	NEGO	
0302	REF	4	LAST	831	32,3740	52 765 1		DXCH	-PHASE6	
0303	REF	2	LAST	239	32,3741	3 4764 0		CAF	OCT33	4.33SPOT FOR GOTOPOOH
0304	REF	129	LAST	860	32,3742	54 001 1		TS	L	
0305					32,3743	4 0000 0		COM		
0306	REF	8	LAST	832	32,3744	52 761 0		DXCH	-PHASE4	
0307	REF	1			32,3745	1 5644 0		TCF	WHIMPER	PERFORM A SOFTWARE RESTART AND PROCEED TO GOTOPOOH WHILE SERVICER CONTINUES TO RUN, ALBEIT IN A GROUND STATE WHERE ONLY STATE-VECTOR DEPENDENT FUNCTIONS ARE MAINTAINED.
A0308										
A0309										
A0310										
A0311										
0312	REF	43	LAST	864	E7,1513			EBANK=	DVCNTR	
0313	REF	8	LAST	860	32,3746	03525 0	SVEXTADR	2CADR	SERVEXIT	
0313					32,3747	76067 1				
0314					37,3525			BANK	37	
0315	REF	2	LAST	858	37,2000			SETLOC	SERV1	

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0316					37,3525					BANK	
0317	REF	2	LAST	858 TO	860:	89	89*			COUNT*	\$\$/SERV
0318	REF	27	LAST	831	37,3525	3	6244 0	SERVEXIT	CA	THREE	
0319	REF	3	LAST	859	37,3526	0	3515 0		TC	GNUFAZE5	
0320	REF	133	LAST	852	37,3527	1	5155 1	+2	TCF	ENDOFJOB	
0321					33,2421					BANK	33
0322	REF	5	LAST	860	33,2000					SETLOC	SERVICES
0323					33,2421					BANK	
0324	REF	5	LAST	860 TO	864:	145	182*			COUNT*	\$\$/SFRV

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P0325 NCRMLIZE AND COPYCYCL

0326	REF 147	LAST 865	33,2421	0 6036 1	NORMLIZE TC	INTPRFT	
0327			33,2422	43175 0	VLOAD	BOFF	
0328	REF 5	LAST 835	33,2423	03543 0		RN1	
0329	REF 6	LAST 865	33,2424	03347 1		MUNFLAG	
0330	REF 1		33,2425	66450 0		NORMLIZ1	
0331			33,2426	64252 0	VSL6	MXV	
0332	REF 33	LAST 843	33,2427	01734 0		REFSMAT	
0333	REF 19	LAST 846	33,2430	37517 0	STCALL	R	
0334	REF 5	LAST 840	33,2431	67162 0		MUNGRAV	
0335			33,2432	76575 1	VLOAD	VSL1	
0336	REF 5	LAST 835	33,2433	03551 0		VNI	
0337			33,2434	77721 0	MXV		
0338	REF 34	LAST 868	33,2435	01734 0		REFSMAT	
0339	REF 12	LAST 846	33,2436	27525 0	STOVL	V	
0340	REF 3	LAST 742	33,2437	01726 0		V(CSM)	
0341			33,2440	53435 0	VXV	UNIT	
0342	REF 3	LAST 742	33,2441	01720 0		R(CSM)	
0343	REF 3	LAST 166	33,2442	03716 1	STORE	UHYP	
0344			33,2443	77776 1	ASCSPOT	EXIT	
0345			33,2444	0 0006 1		EXTEND	MAKE SURE GOUP 2 IS OFF.
0346	REF 23	LAST 866	33,2445	3 4755 1	DCA	NEGO	
0347	REF 7	LAST 866	33,2446	52 755 1	DXCH	-PHASE2	
0348	REF 1		33,2447	1 2453 0	TCF	NORMLIZ2	
0349			33,2450	77624 1	NORMLIZ1	CALL	
0350	REF 1		33,2451	66762 1		CALCGRV	
0351			33,2452	77776 1	EXIT		
0352	REF 1		33,2453	3 2472 1	NORMLIZ2	CA	EIGHTEEN
0353	REF 2	LAST 862	33,2454	0 2457 0	TC	COPYCYC +1	DO NOT COPY MASS IN NORMLIZE
0354	REF 134	LAST 867	33,2455	0 5155 0	TC	ENDOFJOP	
0355	REF 7	LAST 860	33,2456	3 6007 0	COPYCYC	CA	OCT24
0356			33,2457	0 0004 0	+1	INHINT	DEC 20
0357	REF 4	LAST 346	33,2460	7 7746 1	+2	MASK	NEG1
0358	REF 31	LAST 758	33,2461	54 061 1		TS	ITEMP1
0359			33,2462	0 0006 1		EXTEND	
0360	REF 32	LAST 868	33,2463	5 0061 0		INDEX	ITEMP1
0361	REF 6	LAST 868	33,2464	3 1543 1		DCA	RN1
0362	REF 33	LAST 868	33,2465	50 061 0		INDEX	ITEMP1
0363	REF 11	LAST 795	33,2466	53'221 0	DXCH	RN	
0364	REF 34	LAST 868	33,2467	10 061 1		CCS	ITEMP1
0365	REF 3	LAST 868	33,2470	1 2460 0	TCF	COPYCYC +2	
0366	REF 213	LAST 861	33,2471	0 0002 0	TC	Q	RETURN UNDER INHINT

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0367

33,2472 00022 1 EIGHTEEN DEC 18

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R0369 MOD NO. 00 BY D. LICKLY DEC.9 1966

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R0371 SUBROUTINE TO READ PIPA COUNTERS, TRYING TO BE VERY CAREFUL SO THAT IT WILL BE RESTARTABLE.
R0373 PIPA READINGS ARE STORED IN THE VECTOR DELV. THE HIGH ORDER PART OF EACH COMPONENT CONTAINS THE PIPA READING,
R0375 RESTARTS BEGIN AT REREADAC.
```

R0376 AT THE END OF THE PIPA READER THE CDUS ARE READ AND STORED AS A
R0377 VECTOR IN CDUTEMP. THE HIGH ORDER PART OF EACH COMPONENT CONTAINS
R0378 THE CDU READING IN 2S COMP IN THE ORDER CDUX,Y,Z. THE THRUST
R0379 VECTOR ESTIMATOR IN FINDCDU REQUIRES THE CDUS BE READ AT PIPTIME.

R0380 CALLING SEQUENCE AND EXIT

R0381 — CALL VIA TC, ISWCALL, ETC.

R0382 EXIT 15 VIA Q.

R 0383

R0384 INPUT

R0385 -----INPUT IS THRUUGH THE COUNTERS PIPAX, PIPAY, PIPAZ, AND TIME2.

R0386 — OUTPUT

R0387 HIGH ORDER COMPONENTS OF THE VECTOR DELV CONTAIN THE PIPA READINGS.
R0388 PIPTIME CONTAINS TIME OF PIPA READING.

R0389 DE8RIS (ERASABLE LOCATIONS DESTROYED BY PROGRAM)

R0390 TEMX TEMY TEMZ PIPAGE

0391					37,3530					BANK	37
0392	RFF	3	LAST	866	37,2000					SETLOC	SERV1
0393					37,3530					BANK	

0394 - REF - 3- LAST 867 TO 867: 3 - 92* COUNT* \$\$/SFRV

0395	37,3530	0 0006 1	PIPASR	EXTEND
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0396	REF	25	LAST	831	37,3531	3 0025 0		DCA	TIME2	
0397	REF	10	LAST	835	37,3532	53'557 0		DXCH	PIPTIME1	
0398	REF	153	LAST	857	37,3533	4 4755 0	+3	CS	ZERO	CURRENT TIME POSITIVE VALUE
0399	REF	2	LAST	121	37,3534	55'254 1		TS	TEMX	INITIALIZE THESE AT NEG. ZERO.
0400	REF	2	LAST	121	37,3535	55'255 0		TS	TEMY	
0401	REF	2	LAST	121	37,3536	55'256 0		TS	TEMZ	
0402	REF	154	LAST	871	37,3537	3 4755 1		CA	ZERO	
0403	REF	4	LAST	397	37,3540	54 330 0		TS	DELVZ	OTHER DELVS OK INCLUDING LOW ORDER
0404	REF	5	LAST	397	37,3541	54 326 1		TS	DELVY	
0405	REF	5	LAST	859	37,3542	55'257 1		TS	PIPAGE	SHOW PIPA READING IN PROGRESS
0406					37,3543	0 0006 1	REPIP1	EXTEND		
0407	REF	8	LAST	397	37,3544	4 0040 1		DCS	PIPAX	X AND Y PIPS READ
0408	REF	3	LAST	871	37,3545	53'255 0		DXCH	TEMX	
0409	REF	9	LAST	871	37,3546	52 040 1		DXCH	PIPAX	PIPAS SET TO NEG ZERO AS READ.
0410	REF	9	LAST	398	37,3547	54 324 0		TS	DFLVX	
0411	REF	6	LAST	871	37,3550	22 326 0		LXCH	DELVY	
0412	REF	3	LAST	397	37,3551	4 0041 0	REPIP3	CS	PIPAZ	REPEAT PROCESS FOR Z PIP
0413	REF	3	LAST	871	37,3552	57'256 1		XCH	TEMZ	
0414	REF	4	LAST	871	37,3553	56 041 1		XCH	PIPAZ	
0415	REF	5	LAST	871	37,3554	54 330 0	DODELVZ	TS	DELVZ	
0416					37,3555	0 0006 1	REPIP4	EXTEND		COMPUTE GUIDANCE PERIOD
0417	REF	11	LAST	871	37,3556	3 1557 1		DCA	PIPTIME1	
0418	REF	2	LAST	121	37,3557	53'250 0		DXCH	PGUIDE	
0419					37,3560	0 0006 1		EXTEND		
0420	REF	16	LAST	864	37,3561	4 1235 0		DCS	PIPTIME	
0421	REF	3	LAST	871	37,3562	21'250 0		DAS	PGUIDE	
0422	REF	13	LAST	617	37,3563	3 0032 0		CA	CDUX	READ CDUS INTO HIGH ORDER CDUTEMPS
0423	REF	1			37,3564	55'155 0		TS	CDUTEMPX	
0424	REF	5	LAST	617	37,3565	3 0033 1		CA	CDUY	
0425	REF	1			37,3566	55'156 0		TS	CDUTEMPY	
0426	REF	7	LAST	612	37,3567	3 0034 0		CA	CDUZ	
0427	REF	1			37,3570	55'157 1		TS	CDUTEMPZ	
0428	REF	10	LAST	871	37,3571	3 0324 1		CA	DELVX	
0429	REF	2	LAST	862	37,3572	55'160 0		TS	PIPATMPX	
0430	REF	7	LAST	871	37,3573	3 0326 0		CA	DELVY	
0431	REF	2	LAST	862	37,3574	55'161 1		TS	PIPATMPY	
0432	REF	6	LAST	871	37,3575	3 0330 1		CA	DELVZ	
0433	REF	2	LAST	862	37,3576	55'162 1		TS	PIPATMPZ	
0434	REF	214	LAST	868	37,3577	0 0002 0		TC	Q	
0435	REF	6	LAST	871	37,3600	11'257 1	REREADAC	CCS	PIPAGE	
0436	REF	1			37,3601	1 3425 0		TCF	READACCS	PIP READING NOT STARTED. GO TO BEGINNING

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0437	REF	1		37,3602	3 3640 0	CAF	DONEADR	SET UP RETURN FROM PIPASR
0438	REF	215	LAST	871	37,3603	54 002 1	TS	Q
0439	REF	7	LAST	871	37,3604	10 330 0	CCS	DELVZ
0440	REF	1			37,3605	1 3555 0	TCF	REPIP4
0441					37,3606	1 3611 0	TCF	+3
0442	REF	2	LAST	872	37,3607	1 3555 0	TCF	REPIP4
0443	REF	3	LAST	872	37,3610	1 3555 0	TCF	REPIP4
0444					37,3611	22 007 0	ZL	
0445	REF	8	LAST	871	37,3612	10 326 1	CCS	DELVY
0446					37,3613	1 3616 1	TCF	+3
0447	REF	1			37,3614	1 3625 1	TCF	CHKTEMX
0448					37,3615	1 3616 1	TCF	+1
0449	REF	5	LAST	871	37,3616	22 041 1	LXCH	PIPAZ
0450	REF	4	LAST	871	37,3617	11'256 0	CCS	TEMZ
0451	REF	5	LAST	872	37,3620	4 1256 0	CS	TEMZ
0452	REF	1			37,3621	1 3554 1	TCF	DODELVZ
0453					37,3622	1 3620 1	TCF	-2
0454	REF	8	LAST	872	37,3623	22 330 1	LXCH	DELVZ
0455	REF	4	LAST	872	37,3624	1 3555 0	TCF	REPIP4
0456	REF	4	LAST	871	37,3625	11'254 1	CHKTEMX	CCS
0457	REF	5	LAST	872	37,3626	4 1254 1		CS
0458					37,3627	1 3632 1		TCF
0459					37,3630	1 3626 1		TCF
0460	REF	1			37,3631	1 3543 1		TCF
0461	REF	11	LAST	871	37,3632	54 324 0		TS
0462	REF	3	LAST	871	37,3633	4 1255 0		CS
0463	REF	9	LAST	872	37,3634	54 326 1		TS
0464	REF	155	LAST	871	37,3635	4 4755 0		CS
0465	REF	10	LAST	871	37,3636	52 040 1		DXCH
0466	REF	1			37,3637	1 3551 1		TCF
0467	REF	1			37,3640	03435 0	DONEADR	GENADR PIPSDONE

Z DONE, GO DO CDUS
Z NOT DONE, CHECK Y.

Y NOT DONE, CHECK X.

Y DONE, ZERO Z PIP.

TEMZ NOT = -0, CONTAINS -PIPAZ VALUE.

TEMZ = -0, L HAS ZPIP VALUE.

HAS THIS CHANGED
YES
YES
YES
NOZERO X AND Y PIPS
L STILL ZERO FROM ABOVE

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0468					33,2473				BANK 33
0469	REF	6	LAST	867	33,2000				SETLOC SERVICES
0470					33,2473				BANK

0471	REF	6	LAST	867 TO	870:	42	224*		COUNT* \$\$/SERV
------	-----	---	------	--------	------	----	------	--	------------------

0472	REF	2	LAST	871	33,2473	3 1156 1	TMPTOSPT	CA	CDUTEMPY	THIS SUBROUTINE, CALLED BY AN RTB FROM INTERPRETIVE, LOADS THE CDUS CORRESPON- DING TO PIPTIME INTO THE CDUSPOT VECTOR.
0473	REF	1			33,2474	54 766 1		TS	CDUSPOTY	
0474	REF	2	LAST	871	33,2475	3 1157 0		CA	CDUTEMPZ	
0475	REF	1			33,2476	54 770 0		TS	CDUSPOTZ	
0476	REF	2	LAST	871	33,2477	3 1155 1		CA	CDUTEMPX	
0477	REF	1			33,2500	54 772 1		TS	CDUSPOTX	
0478	REF	216	LAST	872	33,2501	0 0002 0		TC	Q	

R0479 LRHTASK IS A WAITLIST TASK SET BY READACCS DURING THE DESCENT BRAKING
R0480 PHASE WHEN THE ALT TO THE LUNAR SURFACE IS LESS THAN 25,000 FT. THIS
R0481 TASK CLEARS THE ALTITUDE MEASUREMENT MADE DISCRETE AND INITIATES THE
R0482 LANDING RADAR MEASUREMENT JOB (LRHJOB) TO TAKE A ALTITUDE MEASUREMENT
R0483 50 MS PRIOR TO THE NEXT READACCS TASK.

0484					21,2314				BANK 21
0485	REF	2	LAST	57	21,2000				SETLOC R10
0486					21,2314				BANK

0487	REF	1							COUNT* \$\$/SERV
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0488	REF	16	LAST	866	21,2314	4 0107 0	LRHTASK	CS	FLGWRD11	
0489	REF	6	LAST	866	21,2315	7 4735 0		MASK	LRBYBIT	
0490					21,2316	0 0006 1		EXTEND		
0491	REF	1			21,2317	1 2334 0		BZF	GRP2OFF	LR BYPASS SET - BYPASS ALL LR READING.

0492	REF	1			21,2320	3 4746 0		CA	READLBIT	
0493	REF	17	LAST	873	21,2321	7 0107 0		MASK	FLGWRD11	IS READLR FLAG SET?
0494					21,2322	0 0006 1		EXTEND		
0495	REF	2	LAST	873	21,2323	1 2334 0		BZF	GRP2OFF	NO. BYPASS LR READ.

0496	REF	18	LAST	873	21,2324	4 0107 0		CS	FLGWRD11	
0497	REF	1			21,2325	7 4742 0		MASK	NOLRRBIT	IS LR READ INHIBITED?
0498					21,2326	0 0006 1		EXTEND		
0499	REF	3	LAST	873	21,2327	1 2334 0		BZF	GRP2OFF	YES. BYPASS LR READ.

0500	REF	1			21,2330	3 7717 1		CA	PRI032	LR READ OK SET JOB TO DO IT
0501	REF	23	LAST	863	21,2331	0 5072 1		TC	NOVAC	ABOUT 50 MS PRIOR TO PIPA READ
0502	REF	3	LAST	216	E7,1652			EBANK=	HMEAS	
0503	REF	1			21,2332	03717 0		2CAOR	LRHJOB	
0503	REF	1			21,2333	70067 1				
0504					21,2334	0 0006 1	GRP2OFF	EXTEND		
0505	REF	24	LAST	868	21,2335	3 4755 1		DCA	NEGO	
0506	REF	8	LAST	868	21,2336	52 755 1		DXCH	-PHASE2	
0507	REF	1			21,2337	1 2115 1		TCF	R10,R11A	

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0508				33,2502		BANK 33
0509	REF	7	LAST	873	33,2000	SETLOC SERVICES
0510				33,2502		BANK

0511	REF	7	LAST	873	TO 873:	7	231*	COUNT* \$\$ /SERV
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R0512 HIGATASK IS ENTERED APPROXIMATELY 6 SECS PRIOR TO HIGATF DURING THE
 R0513 DESCENT PHASE. HIGATASK SETS THE HIGATE FLAG (BIT11) AND THE LR INHIBIT
 R0514 FLAG (BIT10) IN LRSTAT. THE HIGATJOB IS SET UP TO REPOSITION THE LR
 R0515 ANTENNA FROM POSITION 1 TO POSITION 2. IF THE REPOSITIONING IS
 R0516 SUCCESSFUL THE ALT BEAM AND VELOCITY BEAMS ARE TRANSFORMED TO THE NEW
 R0517 ORIENTATION IN NB COORDINATES AND STORED IN ERASABLE.

0518				33,2502	0 0004 0	HIGATASK	INHINT	
0519	REF	10	LAST	712	33,2503	4 5015 1	CS	PRIC3
0520	REF	19	LAST	873	33,2504	7 0107 0	MASK	FLGWRD11
0521	REF	11	LAST	874	33,2505	6 5015 0	AD	PRI03
0522	REF	20	LAST	874	33,2506	54 107 0	TS	FLGWRD11
0523	REF	2	LAST	873	33,2507	3 7717 1	CAF	PRI032
0524	REF	37	LAST	859	33,2510	0 5105 0	TC	FINDVAC
0525	REF	4	LAST	873	F7,1652		EBANK=	HMEAS
0526	REF	1			33,2511	03653 1	2CADR	HIGATJOB
0526	REF	1			33,2512	66067 0		
0527	REF	1			33,2513	1 2573 0	TCF	CONTSERV

SET HIGATE AND LR INHIBIT FLAGS

SET LR POSITIONING JOB (POS2)

CONTINUE SERVICER

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P0528 MUNRETRN IS THE RETURN LOC FROM SPECIAL AVE G ROUTINE (MUNRVG)

0529					33,2514	77776	1	MUNRETRN	EXIT			
0530	REF	21	LAST	874	33,2515	4	0107	0	CS	FLGWRD11		
0531	REF	7	LAST	873	33,2516	7	4735	0	MASK	LRBYBIT		
0532					33,2517	0	0006	1	EXTEND			
0533	REF	1			33,2520	1	2601	0	BZF	COPYCYC1	BYPASS LR LOGIC IF BIT15 IS SET.	
0534	REF	2	LAST	873	33,2521	3	4746	0	CA	READLBIT	SEE IF ALT < 35000 FT LAST CYCLF	
0535	REF	22	LAST	875	33,2522	7	0107	0	MASK	FLGWRD11		
0536					33,2523	0	0006	1	EXTEND			
0537	REF	1			33,2524	1	2753	0	BZF	35KCHK	ALT WAS > 35000 FT LAST CYCLE CHK NOW	
0538	REF	1			33,2525	3	4743	0	CAF	XORFLBIT	WERE WE BELOW 30000 FT LAST PASS?	
0539	REF	23	LAST	875	33,2526	7	0107	0	MASK	FLGWRD11		
0540					33,2527	0	0006	1	EXTEND			
0541	REF	1			33,2530	1	2742	0	BZF	XORCHK	NO - TEST THIS PASS	
0542	REF	1			33,2531	3	4741	1	HITEST	CAF	PSTHIBIT	CHECK FOR HIGATE
0543	REF	24	LAST	875	33,2532	7	0107	0	MASK	FLGWRD11		
0544					33,2533	0	0006	1	EXTEND			
0545	REF	1			33,2534	1	2550	1	BZF	HIGATCHK	NOT AT HIGATE LAST CYCLE-CHK THIS CYCLE	
0546	REF	33	LAST	821	33,2535	3	4745	0	POS2CHK	CAF	BIT7	VERIFY LR IN POS2
0547					33,2536	0	0006	1	EXTEND			
0548	REF	22	LAST	793	33,2537	02	033	0	RAND	CHAN33		
0549					33,2540	0	0006	1	EXTEND			
0550	REF	1			33,2541	1	3205	1	BZF	UPDATCHK	IT IS-CHECK FOR LR UPDATE	
0551	REF	38	LAST	838	33,2542	3	4737	0	CAF	BIT13	NOT IN POS2-MAYBE REPOSITIONING	
0552					33,2543	0	0006	1	EXTEND			
0553	REF	50	LAST	789	33,2544	02	012	0	RAND	CHAN12		
0554					33,2545	0	0006	1	EXTEND			
0555	REF	1			33,2546	1	2571	1	BZF	LRPOSALM	LR NOT IN POS2 OR REPOSITIONING-BAD	
0556	REF	2	LAST	874	33,2547	1	2573	0	TCF	CONTSERV	LR BEING REPOSITIONED-CONTINUE SERV	
0557	REF	16	LAST	825	33,2550	3	1640	1	HIGATCHK	CA	TTF/8	IS TTF > CRITERION? (TTF IS NEGATIVE)
0558	REF	1			33,2551	6	1427	1	AD	RPCRTIME		
0559					33,2552	0	0006	1	EXTEND			
0560	REF	1			33,2553	6	2564	1	BZMF	POS1CHK	NO	
0561	REF	3	LAST	294	33,2554	3	4741	1	CA	EBANK4	MUST SWITCH EBANKS	
0562	REF	27	LAST	864	33,2555	56	003	1	XCH	EBANK		
0563	REF	130	LAST	866	33,2556	54	001	1	TS	L	SAVE IN L	
05635	REF	7	LAST	862	E4,1545				EBANK=	XNBPIP		
0564	REF	8	LAST	875	33,2557	4	1545	0	CS	XNBPIP	UXBXP IN GSOP CH5	
056405	REF	44	LAST	866	E7,1513				EBANK=	DVCNTR		
05641	REF	28	LAST	875	33,2560	22	003	1	LXCH	EBANK	RESTORE EBANK	
05642	REF	1			33,2561	6	1430	1	AD	RPCRTQSW	QSW - UXBXP	

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05643					33,2562	0 0006 1		EXTEND			
05644	REF	1			33,2563	6 2502 1		BZMF	HIGATASK	IF UXBXP > QSW, THEN REPOSITION	
0565	REF	42	LAST	821	33,2564	3 4746 0	POS1CHK	CAF	BIT6	HIGATE NOT IN SIGHT-DO POS1 CHK	
0566					33,2565	0 0006 1		EXTEND			
0567					33,2566	02 033 0		RAND	33		
0568					33,2567	0 0006 1		EXTEND			
0569	REF	2	LAST	875	33,2570	1 3205 1		BZF	UPDATCHK	LR IN POS1-CHECK FOR LR UPDATE	
0570	REF	33	LAST	816	33,2571	0 5567 0	LRPOSALM	TC	ALARM	LR NOT IN PROPER POS-ALARM-BYPASS UPDATE	
0571					33,2572	00511 1		OCT	511	AND CONTINUE SERVICER	
0572					33,2573	0 0004 0	CONTSERV	INHINT			
0573	REF	1			33,2574	4 3204 0		CS	BITS 4-7		
0574	REF	25	LAST	875	33,2575	7 0107 0		MASK	FLGWRD11	CLEAR LR MEASUREMENT MADE DISCRETES.	
0575	REF	26	LAST	876	33,2576	54 107 0		TS	FLGWRD11		
0576	REF	45	LAST	864	33,2577	0 4674 0		TC	IBNKCALL	SET LR LITES PROPERLY	
05761	REF	1			33,2600	53607 0		CADR	R12LITES		

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P0577
0578 REF 5 LAST 864 33,2601 0 3535 1 COPYCYC1 TC QUIKFAZ5

0579 REF 14 LAST 616 33,2602 3 0077 1 R29? CA FLAGWR03
0580 REF 1 33,2603 7 5014 0 NR29&ROR
0581 REF 258 LAST 866 33,2604 10 000 0 CCS A
0582 REF 1 33,2605 1 2617 1 TCF R29NODES

IS NOR29FLG OR READRFLG SET?
YES, SO DON'T DESIGNATE.

0583 REF 113 LAST 622 33,2606 3 0110 1 CA RADMODES
0584 REF 1 33,2607 7 2242 0 MASK OCT10002
0585 REF 259 LAST 877 33,2610 10 000 0 CCS A
0586 REF 2 LAST 877 33,2611 1 2617 1 TCF R29NODES

NO, SO R29 IS CALLED FOR.
IS THE RR NOT ZEROING ITS COUS, AND
IS THE RENDEZVOUS RADAR IN AUTO MODE?
NO, SO DON'T DESIGNATE.

0587 REF 114 LAST 877 33,2612 3 0110 1 CA RADMODES
0588 REF 4 LAST 858 33,2613 7 7707 1 MASK PPIQ22
0589 REF 260 LAST 877 33,2614 10 000 0 CCS A
0590 REF 6 LAST 609 33,2615 1 2623 0 TCF NOR29NOW

IS RR REPOSITIONING OR REMOING?
YES; COME BACK IN 2 SECONOS & TRY AGAIN.

0591 REF 2 LAST 608 33,2616 1 2045 0 TCF R29

0592 33,2617 0 0004 0 R29NODES INHINT
0593 REF 1 33,2620 4 4742 0 CS DESIGBIT
0594 REF 115 LAST 877 33,2621 7 0110 0 MASK RADMODES
0595 REF 116 LAST 877 33,2622 54 110 0 TS RADMODES

R29 NOT ALLOWED THIS CYCLE.
SHOW THAT DESIGNATION IS OFF.

0596 REF 148 LAST 868 33,2623 0 6036 1 NOR29NOW TC INTPRET
0597 33,2624 51575 1 VLOAD ABVAL
0598 REF 2 LAST 162 33,2625 03571 1 R1S
0599 33,2626 45206 1 PUSH OSU

INTPRET DOES A RELINT.
MPAC = ABVAL(NEW SM. POSITION VECTOR)

0600 REF 9 LAST 852 33,2627 02337 1 /LAND/
0601 REF 5 LAST 330 33,2630 03533 1 STORE HCALC
0602 33,2631 47075 0 OMPR RTB

NEW HCALC*2(24)M.

0603 REF 1 33,2632 26026 1 ALTCONV
0604 REF 3 LAST 711 33,2633 21516 0 SGNAGREE
0605 REF 2 LAST 166 33,2634 27740 1 STOVL ALTBITS
0606 REF 19 LAST 860 33,2635 03535 1 UNIT/R/

ALTITUDE FOR R10 IN BIT UNITS.

0607 33,2636 76435 1 VXV VSL1
0608 33,2637 03716 1 UHYP
0609 REF 2 LAST 166 33,2640 27724 0 STOVL UHZP
0610 REF 3 LAST 877 33,2641 03571 1 R1S

DOWNRANGE HALF-UNIT VECTOR FOR P10.

0611 33,2642 60505 1 VXM VSR4
0612 REF 35 LAST 868 33,2643 01734 0 REFSMMAT
0613 REF 7 LAST 868 33,2644 27543 0 STOVL RN1

TEMP. REF. POSITION VECTOR*2(29)M.

0614 REF 4 LAST 841 33,2645 03577 1 VIS
0615 33,2646 76505 0 VXM VSL1
0616 REF 36 LAST 877 33,2647 01734 0 REFSMMAT
0617 REF 6 LAST 868 33,2650 27551 0 STOVL VN1

TEMP. REF. VELOCITY VECTOR*2(7)M/CS.

0618 REF 20 LAST 877 33,2651 03535 1 JNIT/R/
0619 33,2652 51435 1 VXV ABVAL
0620 REF 5 LAST 877 33,2653 03577 1 VIS

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0621				33,2654	63552 0	SL1	DSQ	
0622				33,2655	77671 1	DOV		
0623				33,2656	47075 0	DMPR	RTB	
0624	REF	1		33,2657	26030 0		ARCONV1	
0625	REF	4	LAST	877	33,2660		SGNAGREE	
0626				33,2661	77776 1	COPYCYC2	EXIT	LEAVE ALTITUDE RATE COMPENSATION IN MPAC
0627				33,2662	0 0004 0		INHINT	
0628	REF	21	LAST	877	33,2663	3 1534 1	CA	UNIT/R/ UPDATE RUNIT FOR R10.
0629	REF	2	LAST	166	33,2664	55'741 0	TS	RUNIT
0630	REF	22	LAST	878	33,2665	3 1536 0	CA	UNIT/R/ +2
0631	REF	3	LAST	878	33,2666	55'742 0	TS	RUNIT +1
0632	REF	23	LAST	878	33,2667	3 1540 1	CA	UNIT/R/ +4
0633	REF	4	LAST	878	33,2670	55'743 1	TS	RUNIT +2
0634	REF	324	LAST	862	33,2671	3 0154 1	CA	MPAC LOAD NEW DALTRATE FOR R10.
0635	REF	2	LAST	166	33,2672	55'714 0	TS	DALTRATE
0636				33,2673	0 0006 1		EXTEND	
0637	REF	4	LAST	877	33,2674	3 1571 0	DCA	R1S
0638	REF	20	LAST	868	33,2675	53'517 1	DXCH	R
0639				33,2676	0 0006 1		EXTEND	
0640	REF	5	LAST	878	33,2677	3 1573 1	DCA	R1S +2
0641	REF	21	LAST	878	33,2700	53'521 1	DXCH	R +2
0642				33,2701	0 0006 1		EXTEND	
0643	REF	6	LAST	878	33,2702	3 1575 1	DCA	R1S +4
0644	REF	22	LAST	878	33,2703	53'523 0	DXCH	R +4
0645				33,2704	0 0006 1		EXTEND	
0646	REF	6	LAST	877	33,2705	3 1577 0	DCA	V1S
0647	REF	13	LAST	868	33,2706	53'525 0	DXCH	V
0648				33,2707	0 0006 1		EXTEND	
0649	REF	7	LAST	878	33,2710	3 1601 1	DCA	V1S +2
0650	REF	14	LAST	878	33,2711	53'527 1	DXCH	V +2
0651				33,2712	0 0006 1		EXTEND	
0652	REF	8	LAST	878	33,2713	3 1603 0	DCA	V1S +4
0653	REF	15	LAST	878	33,2714	53'531 0	DXCH	V +4
0654	REF	1			33,2715	1 2300 1	TCF	COPYCYCL COMPLETE THE COYPCYCL.

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R0655 ALTCHK COMPARES CURRENT ALTITUDE (IN HCALC) WITH A SPECIFIED ALTITUDE FROM A TABLE BEGINNING AT ALTCRIT.
 R0657 ITS CALLING SEQUENCE IS AS FOLLOWS:-

R0658 L CAF N
 R0659 L+1 TC BANKCALL
 R0660 L+2 CADR ALTCHK
 R0661 L+3 RETURN HERE IF HCALC STILL > SPECIFIED CRITERION. C(L) = +0.
 R0663 L+4 RETURN HERE IF HCALC < OR = SPECIFIED CRITERION. C(A) = C(L) = +0

R0665 ALTCHK MUST BE BANKCALLED EVEN FROM ITS OWN BANK. N IS THE LOCATION, RELATIVE TO THE TAG ALTCRIT,
 R0667 OF THE BEGINNING OF THE DP CONSTANT TO BE USED AS A CRITERION.

0668				33,2716	0 0006 1	ALTCHK	EXTEND		
0669	REF 261	LAST	877	33,2717	5 0000 1		INDEX	A	
0670	REF 1			33,2720	3 2732 0		DCA	ALTCRIT	
0671	REF 325	LAST	878	33,2721	52 156 1		DXCH	MPAC +1	
0672				33,2722	0 0006 1		EXTEND		
0673	REF 6	LAST	877	33,2723	4 1533 1		DCS	HCALC	
0674	REF 326	LAST	879	33,2724	20 156 1		DAS	MPAC +1	
0675	REF 1			33,2725	0 6726 1		TC	BRANCH +4	
0676	REF 156	LAST	872	33,2726	3 4755 1		CAF	ZERO	BETTER THAN A NOOP, PERHAPS
0677	REF 6	LAST	503	33,2727	24 133 0		INCR	BUF2	
0678	REF 4	LAST	548	33,2730	1 4631 0		TCF	SWRETURN	

0679	REF 2	LAST	852	33,2731		ALTCRIT	=	25KFT	
0680				33,2731	00007 0	25KFT	2DEC	7620	B-24 (0)
0680				33,2732	16100 1				
0681				33,2733	00016 0	50KFT	2DEC	15240	B-24 (2)
0681				33,2734	34200 1				
0682				33,2735	00000 0	50FT	2DEC	15.24	B-24 (4)
0682				33,2736	00364 0				
0683				33,2737	00010 0	30KFT	2DEC	9144	B-24 (6)
0683				33,2740	35600 1				
0684				33,2741	01414 1	2KFT/SEC	DEC	6.096	B-7 2000 FT/SEC AT 217) M/CS

R0685

0686	REF 18	LAST	835	33,2742	3 6241 0	XORCHK	CAF	SIX	ARE WE BELOW 30000 FT?
0687	REF 235	LAST	864	33,2743	0 4616 1		TC	BANKCALL	
0688	REF 1			33,2744	66716 1		CADR	ALTCHK	
0689	REF 1			33,2745	1 2531 0		TCF	HITEST	CONTINUE LR UPDATE
0690	REF 53	LAST	864	33,2746	0 5504 0		TC	UPFLAG	YES: INHIBIT X-AXIS OVERRIDE
0691	REF 7	LAST	852	33,2747	00311 1		ADRES	XOVINFLG	
0692	REF 54	LAST	879	33,2750	0 5504 0		TC	UPFLAG	
0693	REF 1			33,2751	00253 0		ADRES	XORFLG	
0694	REF 2	LAST	879	33,2752	1 2531 0		TCF	HITEST	CONTINUE LR UPDATE

0695	REF 54	LAST	858	33,2753	3 4752 0	35KCHK	CAF	TWO	ARE WE BELOW 35000 FT?
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0696	REF	236	LAST	879	33,2754	0 4616	1
0697	REF	2	LAST	879	33,2755	66716	1
0698	REF	3	LAST	875	33,2756	1 2573	0
0699	REF	55	LAST	879	33,2757	0 5504	0
0700	REF	1			33,2760	00256	0
0701	REF	4	LAST	880	33,2761	1 2573	0

TC	BANKCALL
CADR	ALTCHK
TCF	CONTISERV
TC	UPFLAG
ADRES	READLR
TCF	CONTISERV

SET READLR FLAG TO ENABLE LR READING.

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P0702 *****
R0705

0706				33,2762	41456 0	CALCGRV	PUSH	SAVE UNIT/R/ IN PUSHLIST	(18)
0707	REF	24	LAST	878	33,2763		UNIT/R/		
0708				33,2764	67340 1		STORE		
0709	REF	15	LAST	784	33,2765		LXC,1	RTX2 = 0 IF EARTH ORBIT, =2 IF LUNAR.	
0710	REF	16	LAST	881	33,2766				
0711				33,2767	50076 0		PTX2		
0712	REF	1		33,2770	67017 0		RTX2		
0713				33,2771	50375 0		DCOMP		
0714	REF	8	LAST	843	33,2772		BMN		
0715	REF	25	LAST	881	33,2773		CALCGRV1		
0716				33,2774	41552 0		DOT		(12)
0717				33,2775	44316 0		UNITZ		
0718	REF	1		33,2776	27061 0		UNIT/R/		
0719				33,2777	56325 0		PUSH		(14)
0720	REF	1		33,3000	26040 1		SL1		
0721				33,3001	00043 0		DSQ		
0722				33,3002	00041 1		BDSU		
0723				33,3003	41205 0		DP1/20		
0724	REF	1		33,3004	26042 0		DDV		
0725				33,3005	65361 0		RESQ		
0726	REF	26	LAST	881	33,3006		34D	{RNISQ	
0727				33,3007	41205 0		32D	TEMP FOR (RE/RN)SQ	
0728	REF	1		33,3010	26044 0		DMP		
0729				33,3011	00041 1		DMP		
0730				33,3012	76561 1		20J		
0731	REF	9	LAST	881	33,3013		PDDL		
0732				33,3014	45455 1		VXSC		
0733	REF	2	LAST	784	33,3015		UNIT/R/		
0734				33,3016	41455 0		DMP		
0735				33,3017	60345 0		2J		
0736				33,3020	00043 0		32D		
0737	REF	13	LAST	722	33,3021		VSL1		
0738				33,3022	53663 1		UNITZ		
0739	REF	1		33,3023	26032 1		STADR		
0740				33,3024	56623 0		UNITGOBL		
0741				33,3025	45561 1		PUSH	MPAC = UNIT GRAVITY VECTOR.	(18)
0742	REF	3	LAST	846	33,3026		NORM	PERFORM A NORMALIZATION ON RMAGSQ IN	
0743				33,3027	77616 0		34D	ORDER TO BE ABLE TO SCALE THE MU FOR	
							X2	MAXIMUM PRECISION.	
							BDDV*		
							SLR*		
							-MUDT,1		
							0 -21D,2		
							STADR		
							GDT1/2	SCALED AT 2(+7) M/CS	
							RVQ		
0744				33,3030	61375 1	CALCRVG	VLOAD	VXM	
0745	REF	6	LAST	861	33,3031			DELV	
0746	REF	37	LAST	877	33,3032			REFSMAT	
0747				33,3033	76561 1		VXSC	VSL1	
0748	REF	2	LAST	862	33,3034			KPI1	
0749	REF	6	LAST	785	33,3035		STORE	DELVREF	
0750				33,3036	41562 0		VSR1	PUSH	
0751				33,3037	41455 0		VAD	PUSH	{DV-OLDGDT}/2 TO PD SCALED AT 2(+7)M/CS

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0752	REF	7	LAST	813	33,3040	01237 0		GDT/2		
0753					33,3041	65255 0	VAD	PDDL		(18)
0754	REF	8	LAST	783	33,3042	01227 1		VN		
0755	REF	4	LAST	871	33,3043	01250 1		PGUIDE		
0756					33,3044	74261 1	SL	VXSC		
0757					33,3045	20207 0		6D		
0758					33,3046	44055 1	VAD	STQ		
0759	REF	12	LAST	868	33,3047	01221 1		RN		
0760					33,3050	00037 0		31D		
0761	REF	8	LAST	877	33,3051	37543 1	STCALL	RN1	TEMP STORAGE OF RN SCALED 2(+29)M	
0762	REF	2	LAST	868	33,3052	66762 1		CALCGRV		
0763					33,3053	53255 0	VAD	VAD		
0764					33,3054	77655 1	VAD			
0765	REF	9	LAST	882	33,3055	01227 1		VN		
0766	REF	7	LAST	877	33,3056	37551 1	STCALL	VN1	TEMP STORAGE OF VN SCALED 2(+7)M/CS	
0767					33,3057	00037 0		31D		
0768					33,3060	01463 1	DP1/20	2DEC	0.05	
0768					33,3061	06315 0				
0769					33,3062	00010 0	SHIFT11	2DEC	1 8-11	
0769					33,3063	00000 1				

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P0770 *****

R0772 MUNRVG IS A SPECIAL AVERAGE G INTEGRATION ROUTINE USED BY THRUSTING
 R0773 PROGRAMS WHICH FUNCTION IN THE VICINITY OF AN ASSUMED SPHERICAL MOON.
 R0774 THE INPUT AND OUTPUT QUANTITIES ARE REFERENCED TO THE STABLE MEMBER
 R0775 COORDINATE SYSTEM.

0776				33,3064	41575	0	RVBOTH	VLOAD	PUSH	
0777	REF	3	LAST	742	33,3065	02323	1		G(CSM)	
0778					33,3066	65255	0	VAD	PDDL	
0779	REF	4	LAST	868	33,3067	01726	0		V(CSM)	
0780	REF	5	LAST	882	33,3070	01250	1		PGUIDE	
0781					33,3071	74271	0	DDV	VXSC	
0782	REF	1			33,3072	27063	1		SHIFT11	
0783					33,3073	77655	1	VAD		
0784	REF	4	LAST	868	33,3074	01720	0		R(CSM)	
0785	REF	7	LAST	878	33,3075	37571	0	STCALL	RIS	
0786	REF	6	LAST	868	33,3076	67162	0		MUNGRAV	
0787					33,3077	53255	0	VAD	VAD	
0788	REF	5	LAST	883	33,3100	01726	0		V(CSM)	
0789					33,3101	77626	0	STADR		
0790	REF	9	LAST	878	33,3102	74200	0	STORF	VIS	
0791					33,3103	77776	1	EXIT		
0792	REF	6	LAST	877	33,3104	0 3535	1	TC	QUIKFAZ5	
0793	REF	149	LAST	877	33,3105	0 6036	1	TC	INTPRET	
0794					33,3106	77775	1	VLOAD		
0795	REF	4	LAST	881	33,3107	03561	0		GDT1/2	
0796	REF	4	LAST	883	33,3110	26323	1	STOVL	G(CSM)	
0797	REF	8	LAST	883	33,3111	03571	1		RIS	
0798	REF	5	LAST	883	33,3112	25720	0	STOVL	R(CSM)	
0799	REF	10	LAST	883	33,3113	03577	1		VIS	
0800	REF	6	LAST	883	33,3114	01726	0	STORE	V(CSM)	
0801					33,3115	77776	1	EXIT		
0802	REF	7	LAST	883	33,3116	0 3535	1	TC	QUIKFAZ5	
0803	REF	150	LAST	883	33,3117	0 6036	1	TC	INTPRET	
0804					33,3120	74375	0	MUNRVG	VLOAD	
0805	REF	7	LAST	881	33,3121	00325	0		VXSC	
0806	REF	1			33,3122	26024	0		DELV	
0807					33,3123	53206	0		KPIP2	
0808	REF	8	LAST	882	33,3124	01237	0	PUSH	VAD	1ST PUSH: DELV IN UNITS OF 2(8) M/CS
0809					33,3125	53206	0		GDT/2	
0810	REF	16	LAST	878	33,3126	03525	0	PUSH	VAD	2ND PUSH: (DELV + GDT)/2, UNITS OF 2(7)
0811					33,3127	56325	0		V	(12)
0812	REF	6	LAST	883	33,3130	01250	1	PDDL	DDV	
0813	REF	2	LAST	883	33,3131	27063	1		PGUIDE	
0814					33,3132	77761	1		SHIFT11	
0815					33,3133	77655	1	VXSC		
0816	REF	23	LAST	878	33,3134	03517	1	VAD		
0817	REF	9	LAST	883	33,3135	37571	0		R	
0818	REF	7	LAST	883	33,3136	67162	0	STCALL	RIS	STORE R SCALED AT 2(+24)M.
									MUNGRAV	

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0819				33,3137	53255 0	VAD	VAD	
0820				33,3140	77655 1	VAD		(0)
0821	REF	17	LAST	883	33,3141	03525 0	V	
0822	REF	11	LAST	883	33,3142	03577 1	STORE	V1S STORE V SCALED AT 2(+7)M/CS.
0823				33,3143	77646 0	ABVAL		
0824	REF	5	LAST	743	33,3144	27470 1	STOVL	ABVEL STORE SPEED FOR LR AND DISPLAYS.
0825	REF	27	LAST	881	33,3145	03535 1	UNIT/R/	
0826				33,3146	72441 0	DOT	SL1	
0827	REF	12	LAST	884	33,3147	03577 1	V1S	
0828	REF	5	LAST	330	33,3150	27472 0	STOVL	HDDTDISP HDOT = V. UNIT(R)*2(7)M/CS.
0829	REF	10	LAST	883	33,3151	03571 1	R1S	
0830				33,3152	72435 0	VXV	VSL2	
0831	REF	5	LAST	843	33,3153	02331 1	WM	
0832	REF	2	LAST	166	33,3154	17732 1	STODL	DELVS LUNAR ROTATION CORRECTION TERM*2(5)M/CS.
0833				33,3155	00045 0		36D	
0834				33,3156	77625 0	DSU		
0835	REF	10	LAST	877	33,3157	02337 1	/LAND/	
0836	REF	7	LAST	879	33,3160	37533 0	STCALL	HCALLC FOR NOW, DISPLAY WHETHER POS OR NEG
0837	REF	1			33,3161	66514 1	MUNRETRN	
0838				33,3162	77656 1	MUNGRAV	UNIT	AT 36D HAVE ABVAL(R), AT 34D R.R
0839	REF	28	LAST	884	33,3163	17535 1	STODL	UNIT/R/
0840				33,3164	00043 0		34D	
0841				33,3165	55261 1	SL	BDDV	
0842				33,3166	20207 0		6D	
0843	REF	1			33,3167	26036 0	-MUDTMUN	
0844				33,3170	74205 0	DMP	VXSC	
0845	REF	3	LAST	883	33,3171	27063 1	SHIFT11	
0846	REF	29	LAST	884	33,3172	03535 1	UNIT/R/	
0847	REF	5	LAST	883	33,3173	03561 0	STORE	GDT1/2 1/2GDT SCALED AT 2(7)M/CS.
0848				33,3174	77616 0	RVQ		
0849				33,3175	00303 1	1.95SECS	DEC	195
0850				33,3176	00005 1	7.5	2DEC	.02286 B-6 7.5 FT/SEC AT 2(6) M/CS
0850				33,3177	33212 0			
0851				33,3200	00014 1	2SEC(18)	2DEC	200 B-18
0851				33,3201	20000 0			
0852				33,3202	00000 1	2SEC(28)	2OCT	00000 00310 2SEC AT 2(28)
0852				33,3203	00310 0			
0853				33,3204	00110 1	8ITS4-7	OCT	110

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0854	REF	2	LAST	873	33,3205	3 4742	1	UPDATCHK	CAF	NOLRRBIT	SEE IF LR UPDATE INHIBITED.
0855	REF	27	LAST	876	33,3206	7 0107	0		MASK	FLGWRD11	
0857	REF	262	LAST	879	33,3207	10 000	0		CCS	A	
0858	REF	5	LAST	880	33,3210	1 2573	0		TCF	CONTSERV	IT IS-NO LR UPDATE
0859	REF	1			33,3211	3 4750	1		CAF	RNGEDBIT	NO INHIBIT - SEE ALT MEAS. THIS CYCLE.
0860	REF	28	LAST	885	33,3212	7 0107	0		MASK	FLGWRD11	
0861					33,3213	0 0006	1		EXTEND		
0862	REF	1			33,3214	1 3320	1		BZF	VMEASCHK	NO ALT MEAS THIS CYCLE-CHECK FOR VEL
0863	REF	151	LAST	883	33,3215	0 6036	1	POSUPDAT	TC	INTPRET	
0864					33,3216	54345	1		DLOAD	SL	
0865	REF	5	LAST	874	33,3217	03653	1			HMEAS	COMPUTE SLANT RANGE
0866					33,3220	20210	0			7	
0867					33,3221	74205	0		DMP	VXSC	
0868	REF	1			33,3222	26011	0			HSCAL	SLANT RANGE AT 2(21)M
0869	REF	1			33,3223	02313	1			HBEAMNB	RANGE VECTOR IN NB COORDINATES AT 2(22)M
0870					33,3224	77705	0		VXM		
0871	REF	9	LAST	875	33,3225	02146	0			XNBPIP	CONVERT TO SM COORDINATES AT 2(23)M
0872					33,3226	45241	1		DOT	DSU	
0873	REF	30	LAST	884	33,3227	03535	1			UNIT/R/	ALTITUDE AT 2(24)M
0874	REF	8	LAST	884	33,3230	03533	1			HCALC	DELTA H AT 2(24) M
0875	REF	5	LAST	790	33,3231	03663	1		STORE	DELTAH	
0876					33,3232	77776	1		EXIT		
0877	REF	29	LAST	885	33,3233	3 0107	1		CA	FLGWRD11	
0878	REF	2	LAST	875	33,3234	7 4741	0		MASK	PSTHIBIT	
0879					33,3235	0 0006	1		EXTEND		
0880	REF	1			33,3236	1 3253	1		BZF	NOREASON	DO NOT PERFORM DATA REASONABLENESS TEST UNTIL AFTER HIGATE
0881	REF	152	LAST	885	33,3237	0 6036	1		TC	INTPRET	
0882					33,3240	45246	0		ABS	DSU	
0883	REF	2	LAST	138	33,3241	02501	1			DELQFIX	ABS(DELTAH) - DOFIX 50 FT NOM
0884					33,3242	45252	0		SL3	DSU	SCALE TO 2(21)
0885	REF	9	LAST	885	33,3243	03533	1			HCALC	ABS(DELTAH) - (50 + HCALC/8) AT 2(21)
0886					33,3244	77776	1		EXIT		
0887	REF	2	LAST	165	33,3245	25'666	0		INCR	LRLCTR	
0888	REF	2	LAST	879	33,3246	0 6722	0		TC	BRANCH	
0889	REF	1			33,3247	1 3543	1		TCF	HFAIL	DELTA H TOO LARGE
0890	REF	2	LAST	885	33,3250	1 3543	1		TCF	HFAIL	DELTA H TOO LARGE
0891	REF	82	LAST	855	33,3251	0 5516	0		TC	DOWNFLAG	TURN OFF ALT FAIL LAMP
0892	REF	1			33,3252	00263	0		ADRES	HFLSHFLG	
0893	REF	30	LAST	885	33,3253	4 0107	0	NOREASON	CS	FLGWRD11	
0894	REF	1			33,3254	7 4744	0		MASK	LRINHBIT	
0895	REF	263	LAST	885	33,3255	10 000	0		CCS	A	
0896	REF	2	LAST	885	33,3256	1 3320	1		TCF	VMEASCHK	UPDATE INHIBITED - TEST VELOCITY ANYWAY
0897	REF	153	LAST	885	33,3257	0 6036	1		TC	INTPRET	DO POSITION UPDATE

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0898				33,3260	40545	1	DLOAD	SR4	
0899	REF	10	LAST	885	33,3261	03533		HCALLC	RESCALE H TO 2(28)M
0900				33,3262	77776	1	EXIT		
0901				33,3263	0 0006	1	EXTEND		
0902	REF	6	LAST	985	33,3264	3 1663	DCA	DELTAH	STORE DELTAH IN MPAC AND
0903	REF	327	LAST	879	33,3265	52 155	DXCH	MPAC	BRING HCALLC INTO A,L
0904	REF	1			33,3266	0 7543	TC	ALSIGNAG	
0905					33,3267	0 0006	EXTEND		IF HIGH PART OF HCALLC IS NON ZERO, THEN
0906					33,3270	1 3272	BZF	+2	HCALLC > HMAX,
0907	REF	3	LAST	885	33,3271	1 3320	TCF	VMEASCHK	SO UPDATE IS BYPASSED
0908	REF	328	LAST	886	33,3272	54 156	TS	MPAC +2	FOR LATER SHORTMP
0909	REF	131	LAST	875	33,3273	4 0001	CS	L	-H AT 2(14)M
0910	REF	1			33,3274	6 1416	AD	LRHMAX	HMAX - H
0911					33,3275	0 0006	EXTEND		
0912	REF	4	LAST	886	33,3276	6 3320	BZMF	VMEASCHK	IF H > HMAX, BYPASS UPDATE
0913					33,3277	0 0006	EXTEND		
0914	REF	1			33,3300	7 1420	MP	LRWH	WH(HMAX - H)
0915					33,3301	0 0006	EXTEND		
0916	REF	2	LAST	886	33,3302	11 416	DV	LRHMAX	WH(1 - H/HMAX)
0917	REF	4	LAST	475	33,3303	54 135	TS	MPTMP	
0918	REF	1			33,3304	0 7312	TC	SHORTMP2	DELTAH (WH)(1 - H/HMAX) IN MPAC
0919	REF	154	LAST	885	33,3305	0 6036	TC	INTPRET	MODE IS DP FROM ABOVE
09195					33,3306	77752	SL1		
0920					33,3307	53361	VXSC	VAD	
0921	REF	31	LAST	885	33,3310	03535		UNIT/R/	DELTAR = DH(WH)(1 - H/HMAX) UNIT/R/
0922	REF	11	LAST	884	33,3311	03571		R1S	
0923	REF	1			33,3312	37655	STCALL	GNUR	
0924	REF	8	LAST	883	33,3313	67162		MUNGRAV	
0925					33,3314	77776	EXIT		
0926	REF	8	LAST	883	33,3315	0 3535	TC	QUIKFAZ5	
0927	REF	157	LAST	879	33,3316	3 4755	CA	ZERO	
0928	REF	1			33,3317	0 3517	TC	GNURVST	
0929	REF	9	LAST	886	33,3320	0 3535	VMEASCHK	TC	QUIKFAZ5
0930	REF	31	LAST	885	33,3321	4 0107	CS	FLGWRD11	RESTART AT NEXT LOCATION
0931	REF	1			33,3322	7 4745	CS	VELDABIT	IS V READING AVAILABLE?
0932	REF	264	LAST	885	33,3323	10 000	CCS	A	
0933	REF	1			33,3324	1 3475	TCF	VALTCHK	NO SEE IF V READING TO BE TAKEN
0934	REF	3	LAST	215	33,3325	4 1647	VELUPDAT	CS	VSELECT
0935	REF	132	LAST	886	33,3326	54 001	TS	L	PROCESS VELOCITY DATA
0936	REF	133	LAST	886	33,3327	26 001	ADS	L	-2 VSELECT IN L
0937	REF	134	LAST	886	33,3330	6 0001	AD	L	
0938	REF	135	LAST	886	33,3331	6 0001	AD	L	-6 VSELECT IN A
0939	REF	23	LAST	864	33,3332	50 120	INDEX	FIXLOC	
0940	REF	18	LAST	825	33,3333	52 047	DXCH	X1	X1 = -6 VSELECT, X2 = -2 VSELECT

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0941	REF	4	LAST	875	33,3334	3 4741 1	CA	EBANK4	
0942	REF	29	LAST	875	33,3335	54 003 0	TS	EBANK	
0943	REF	2	LAST	132	E4,1660		EBANK=	LRXCDU	
0944	REF	2	LAST	132	33,3336	3 1661 1	CA	LRXCDU	STORE LRCDUS IN CDUSPOTS
0945	REF	19	LAST	612	33,3337	54 766 1	TS	CDUSPOT	
0946	REF	2	LAST	132	33,3340	3 1662 1	CA	LRZCDU	
0947	REF	20	LAST	887	33,3341	54 770 0	TS	CDUSPOT +2	
0948	REF	3	LAST	887	33,3342	3 1660 0	CA	LRXCDU	
0949	REF	21	LAST	887	33,3343	54 772 1	TS	CDUSPOT +4	
0950	REF	237	LAST	880	33,3344	0 4616 1	TC	BANKCALL	
0951	REF	3	LAST	862	33,3345	47521 1	CADR	QUICTRIG	GET SINES AND COSINES FOR NBSM
0952	REF	24	LAST	886	33,3346	3 0120 1	CA	FIXLOC	
0953	REF	9	LAST	864	33,3347	54 166 1	TS	PUSHLOC	SET PD TO ZERO
0954	REF	155	LAST	886	33,3350	0 6036 1	TC	INTPRET	
0955					33,3351	45173 0	VLOAD*	CALL	
0956	REF	2	LAST	132	33,3352	02235 1		VZBEAMNB,1	CONVERT VBEAM FROM NB TO SM
0957	REF	4	LAST	591	33,3353	47577 1		*NBSM*	
0958					33,3354	54325 1	PDDL	SL	STORE IN PD 0-5
0959	REF	3	LAST	216	33,3355	03651 0		VMFAS	LOAD VELOCITY MEASUREMENT
0960					33,3356	20215 0		12D	
0961					33,3357	41403 0	DMP*	PUSH	SCALE TO M/CS AT 2(6)
0962	REF	1			33,3360	51764 0		VZSCAL,2	AND STORE IN PD 6-7
0963					33,3361	77776 1	EXIT		
0964	REF	95	LAST	863	33,3362	4 4753 0	CS	ONE	
0965	REF	12	LAST	824	33,3363	54 163 1	TS	MODE	CHANGE STORE MODE TO VECTOR
0966	REF	2	LAST	135	33,3364	3 1663 0	CA	PIPTFM	STORE DELV IN MPAC
0967					33,3365	22 007 0	ZL		
0968	REF	329	LAST	886	33,3366	52 155 1	DXCH	MPAC	
0969	REF	3	LAST	887	33,3367	3 1664 1	CA	PIPTFM +1	
0970					33,3370	22 007 0	ZL		
0971	REF	330	LAST	887	33,3371	52 160 1	DXCH	MPAC +3	
0972	REF	4	LAST	887	33,3372	3 1665 0	CA	PIPTFM +2	
0973					33,3373	22 007 0	ZL		
0974	REF	331	LAST	887	33,3374	52 162 0	DXCH	MPAC +5	
0975	REF	9	LAST	864	33,3375	3 5016 0	CA	EBANK7	
0976	REF	30	LAST	887	33,3376	54 003 0	TS	EBANK	RESTORE EBANK 7
0977	REF	45	LAST	875	E7,1513		EBANK=	DVCNTR	
0978	REF	156	LAST	887	33,3377	0 6036 1	TC	INTPRET	
0979					33,3400	65361 0	VXSC	PDDL	
0980	REF	3	LAST	881	33,3401	26022 0		KPIP1	SCALE DELV TO 2(7) M/CS AND PUSH
0981	REF	2	LAST	132	33,3402	02257 0		LRVTIME	TIME OF DELV AT 2(28)CS
0982					33,3403	56225 1	DSU	DDV	

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0983	REF	17	LAST	871	33,3404	01235 1		PIPTIME	TU - T(N-1)
0984	REF	1			33,3405	27203 0		2SEC(28)	
0985					33,3406	76561 1	VXSC	VSL1	G(N-1)(TU - T(N-1))
0986	REF	9	LAST	883	33,3407	01237 0		GDT/2	SCALED AT 2(7) M/CS
0987					33,3410	53255 0	VAD	VAD	PUSH UP FOR DELV
0988	REF	18	LAST	884	33,3411	03525 0		V	VU = V(N-1) + DELVU + G(N-1) DTU
0989					33,3412	53352 0	VSL2	VAD	SCALE TO 2(5) M/CS AND SUBTRACT
0990	REF	3	LAST	884	33,3413	03732 1		DELVS	MOON ROTATION.
0991					33,3414	51406 1	PUSH	ABVAL	STORE IN PD
0992					33,3415	43202 0	SR4	DAD	ABS(VM)/8 + 7.5 AT 2(6)
0993	REF	1			33,3416	27177 0		7.5	
0994					33,3417	24025 0	STOVL	20D	STORE IN 20D AND PICK UP VM
0995					33,3420	44241 0	DOT	BDSU	V(EST) AT 2(6)
0996					33,3421	00001 0		0	DELTAV = VMEAS - V(EST)
0997					33,3422	51406 1	PUSH	ABS	
0998					33,3423	77425 1	DSU	EXIT	ABS(DV) - (7.5 + ABS(VM)/8))
0999					33,3424	00025 0		20D	
1000	REF	2	LAST	166	33,3425	25*670 1	INCR	LRMCTR	
1001	REF	3	LAST	885	33,3426	0 6722 0	TC	BRANCH	
1002	REF	1			33,3427	1 3560 0	TCF	VFAIL	DELTA V TOO LARGE ALARM
1003	REF	2	LAST	888	33,3430	1 3560 0	TCF	VFAIL	DELTA V TOO LARGE ALARM
1004	REF	83	LAST	885	33,3431	0 5516 0	TC	DOWNFLAG	TURN OFF VEL FAIL LAMP
1005	REF	1			33,3432	00262 1	ADRES	VFLSHFLG	
1006	REF	32	LAST	886	33,3433	3 0107 1	CA	FLGWRD11	
1007	REF	1			33,3434	7 4740 1	MASK	VXINHBIT	
1008					33,3435	0 0006 1	EXTEND		
1009	REF	1			33,3436	1 3445 0	BZF	VUPDAT	IF VX INHIBIT RESET, INCORPORATE DATA.
1010	REF	84	LAST	888	33,3437	0 5516 0	TC	DOWNFLAG	
1011	REF	1			33,3440	00250 0	ADRES	VXINH	RESET VX INHIBIT
1012	REF	4	LAST	886	33,3441	3 1647 0	CA	VSELECT	
1013	REF	4	LAST	509	33,3442	6 7745 0	AD	NEG2	IF VSELECT = 2 (X AXIS),
1014					33,3443	0 0006 1	EXTEND		BYPASS UPDATE
1015	REF	1			33,3444	1 3475 0	BZF	ENDVDAT	
1016	REF	33	LAST	888	33,3445	4 0107 0	VUPDAT	CS	FLGWRD11
1017	REF	2	LAST	885	33,3446	7 4744 0		MASK	LRINHBIT
1018	REF	265	LAST	886	33,3447	10 000 0		CCS	A
1019	REF	2	LAST	886	33,3450	1 3475 0	TCF	VALTCHK	UPDATE INHIBITED
1020	REF	332	LAST	887	33,3451	54 155 1	TS	MPAC +1	ZFRD MPAC +1 FOR MULTIPLY LATER
1021	REF	6	LAST	884	33,3452	4 1467 1	CS	ABVEL	
1022	REF	1			33,3453	6 1417 1	AD	LRVMAX	VMAX - V
1023					33,3454	0 0006 1	EXTEND		
1024	REF	3	LAST	888	33,3455	6 3475 1	BZMF	VALTCHK	IF V > VMAX BYPASS UPDATE
1025					33,3456	0 0006 1	EXTEND		

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1026	REF	5	LAST	888	33,3457	5 1647 0	INDEX	VSELECT	
1027	REF	1			33,3460	7 1421 0	MP	LRWVZ	WV(VMAX - V)
1028					33,3461	0 0006 1	EXTEND		
1029	REF	2	LAST	888	33,3462	11'417 0	DV	LRVMAX	WV(1 - V/VMAX)
1030	REF	333	LAST	888	33,3463	54 154 0	TS	MPAC	STORE IN MPAC, MODE IS DP FROM ABOVE
1031	REF	157	LAST	887	33,3464	0 6036 1	TC	INTPRET	
1032					33,3465	74205 0	DMP	VXSC	W(DELTA V){VBEAMSM} UP 6-7, 0-5
1033					33,3466	53372 1	VSL1	VAD	
1034	REF	13	LAST	884	33,3467	03577 1		VIS	ADD WEIGHTED DELTA V TO VELOCITY
1035	REF	1			33,3470	03655 1	STORE	GNUV	
1036					33,3471	77776 1	EXIT		
1037	REF	10	LAST	886	33,3472	0 3535 1	TC	QUIKFAZ5	DO NOT RE-UPDATE
1038	REF	19	LAST	879	33,3473	3 6241 0	CA	SIX	
1039	REF	2	LAST	886	33,3474	0 3517 1	TC	GNURVST	STORE NEW VELOCITY VECTOR
1040	REF	4	LAST	888	33,3475		ENDVDAT	=	VALTCHK
1041	REF	11	LAST	889	33,3475	0 3535 1	VALTCHK	TC	QUIKFAZ5
1042	REF	1			33,3476	3 4747 1	CAF	READVBIT	TEST READVEL TO SEE IF VELOCITY READING
1043	REF	34	LAST	888	33,3477	7 0107 0	MASK	FLGWRD11	IS DESIRED.
1044	REF	266	LAST	888	33,3500	10 000 0	CCS	A	
1045	REF	1			33,3501	1 3512 0	TCF	READV	TES - READ VELOCITY
1046	REF	7	LAST	888	33,3502	4 1467 1	CS	ABVEL	NO - SEE IF VELOCITY < 2000 FT/SEC
1047	REF	1			33,3503	6 2741 1	AD	2KFT/SEC	
1048					33,3504	0 0006 1	EXTEND		
1049	REF	6	LAST	885	33,3505	6 2573 1	BZMF	CONTSERV	V > 2000 FT/SEC DO NOT READ VEL
1050	REF	56	LAST	880	33,3506	0 5504 0	TC	UPFLAG	
1051	REF	1			33,3507	00257 1	ADRES	READVEL	V < 2000 FT/SEC SET READVEL AND READ
1052	REF	158	LAST	886	33,3510	3 4755 1	CAF	ZERO	
1053	REF	6	LAST	889	33,3511	55'647 1	TS	VSELECT	INITIALIZE VSELECT
1054	REF	3	LAST	874	33,3512	3 7717 1	CAF	PRI032	
1055	REF	24	LAST	873	33,3513	0 5072 1	TC	NOVAC	SET UP JOB TO READ VELOCITY BEAMS.
1056	REF	6	LAST	885	E7,1652		EBANK=	HMEAS	
1057	REF	1			33,3514	03601 0	2CADR	LRVJOB	
1057	REF	1			33,3515	66067 0			
1058	REF	7	LAST	889	33,3516	1 2573 0	TCF	CONTSERV	CONTINUE WITH SERVICER
1059	REF	61	LAST	857	33,3517	54 130 1	GNURVST	TS	BUF
1060					33,3520	0 0006 1	EXTEND		
1061	REF	2	LAST	886	33,3521	3 1655 0	DCA	GNUV	STORE GNUR (=GNUV) IN RIS OR VIS
1062	REF	62	LAST	889	33,3522	50 130 0	INDEX	BUF	A = 0 FOR R, A = 6 FOR V
1063	REF	12	LAST	886	33,3523	53'571 1	DXCH	RIS	

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1064 33,3524 0 0006 1
 1065 REF 3 LAST 889 33,3525 3 1657 1
 1066 REF 63 LAST 889 33,3526 50 130 0
 1067 REF 13 LAST 889 33,3527 53'573 0
 1068 33,3530 0 0006 1
 1069 REF 4 LAST 890 33,3531 3 1661 1
 1070 REF 64 LAST 890 33,3532 50 130 0
 1071 REF 14 LAST 890 33,3533 53'575 0
 1072 REF 217 LAST 873 33,3534 0 0002 0

EXTEND
 DCA GNUR +2
 INDEX BUF
 DXCH R1S +2
 EXTEND
 DCA GNUR +4
 INDEX BUF
 DXCH R1S +4
 TC Q

1073 REF 3 LAST 825 33,3535 3 5007 0
 1074 REF 31 LAST 887 33,3536 56 003 1
 1075 REF 136 LAST 886 33,3537 52 002 1
 1076 REF 1 E3,1446
 1077 REF 2 LAST 890 33,3540 55'446 1
 1078 REF 32 LAST 890 33,3541 22 003 1
 1079 REF 46 LAST 887 E7,1513
 1080 REF 267 LAST 889 33,3542 0 0000 1

QUICKFAZ5 CA EBANK3
 XCH EBANK
 DXCH L
 EBANK= PHSNAME5
 TS PHSNAME5
 LXCH EBANK
 EBANK= DVCNTR
 TC A

SET EBANK 3
 Q TO A, A TO L

1081 REF 2 LAST 166 33,3543 4 1667 0
 1082 33,3544 0 0006 1
 1083 REF 1 33,3545 1 3555 0
 1084 REF 3 LAST 885 33,3546 6 1666 0
 1085 REF 1 33,3547 7 7744 0
 1086 33,3550 0 0006 1
 1087 33,3551 1 3553 C
 1088 REF 2 LAST 890 33,3552 1 3555 0

HFAIL CS LRRCTR
 EXTEND
 BZF NORLITE
 AD LRLCTR
 MASK NEG3
 EXTEND
 BZF +2
 TCF NORLITE

IF R = 0, DO NOT TURN ON TRK FAIL

IF L-R LT 4, DO NOT TURN ON TRK FAIL

1089 REF 57 LAST 889 33,3553 0 5504 0
 1090 REF 2 LAST 885 33,3554 00263 0

TC UPFLAG
 ADRES HFLSHFLG

AND SET BIT TO TURN ON TRACKER FAIL LITE

1091 REF 4 LAST 890 33,3555 3 1666 0
 1092 REF 3 LAST 890 33,3556 55'667 0

NORLITF CA LRLCTR
 TS LRRCTR

SET R = L

1093 REF 5 LAST 886 33,3557 1 3320 1

TCF VMEA SCHK

1094 REF 2 LAST 166 33,3560 4 1671 1
 1095 33,3561 0 0006 1
 1096 REF 1 33,3562 1 3572 0
 1097 REF 3 LAST 888 33,3563 6 1670 1
 1098 REF 2 LAST 890 33,3564 7 7744 0
 1099 33,3565 0 0006 1
 1100 33,3566 1 3570 1
 1101 REF 2 LAST 890 33,3567 1 3572 0

VFAIL CS LRSCTR
 EXTEND
 BZF NOLITE
 AD LRMCTR
 MASK NEG3
 EXTEND
 BZF +2
 TCF NOLITE

DELTA Q LARGE
 IF S = 0, DO NOT TURN ON TRACKER FAIL

M-S
 TEST FOR M-S > 3
 IF M-S > 3, THEN TWO OR MORE OF THE
 LAST FOUR V READINGS WERE BAD,
 SO TURN ON VELOCITY FAIL LIGHT

1102 REF 58 LAST 890 33,3570 0 5504 0
 1103 REF 2 LAST 888 33,3571 00262 1

TC JPFLAG
 ADRES VFLSHFLG

AND SET BIT TO TURN ON TRACKER FAIL LITE

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1104	REF	4	LAST	890	33,3572	3 1670 1	NOLITE	CA	LRMCTR	SET S = M
1105	REF	3	LAST	890	33,3573	55'671 1		TS	LRSCTR	
1106	REF	7	LAST	889	33,3574	11'647 1		CCS	VSELECT	TEST FOR Z COMPONENT
1107	REF	2	LAST	888	33,3575	1 3475 0		TCF	ENDVDAT	NOT Z, DO NOT SET VX INHIBIT
1108	REF	59	LAST	890	33,3576	0 5504 0		TC	UPFLAG	Z COMPONENT - SET FLAG TO SKIP X
1109	REF	2	LAST	888	33,3577	00250 0		ADRES	VXINH	COMPONENT, AS ERROR MAY BE DUE TO CROSS
1110	REF	3	LAST	891	33,3600	1 3475 0		TCF	ENDVDAT	LOBE LOCK UP NOT DETECTED ON X AXIS.

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 P1111 LRVJOB IS SET WHEN THE LEM IS BELOW 15000 FT DURING THE LANDING PHASE
 R1113 THIS JOB INITIALIZES THE LANDING RADAR READ ROUTINE FOR 5 VELOCITY
 R1114
 R1115 SAMPLES AND GOES TO SLEEP WHILE THE SAMPLING IS DONE-ABOUT 500 MS.
 R1116 WITH A GOODEND RETURN THE DATA IS STORED IN VMEAS AND BIT7 OF LRSTAT
 R1117 IS SET. THE GIMBAL ANGLES ARE READ ABOUT MIDWAY IN THE SAMPLING .

1118 REF 6 LAST 460 4361 170MS EQUALS ND1

1119	REF	1		33,3601	3 4361 1	LRVJOB	CA	170MS	SET TASK TO READ CDUS + PIPAS
1120	REF	34	LAST 860	33,3602	0 5203 0		TC	WAITLIST	
1121	REF	3	LAST 887	E4,1656			EBANK=	LRVTIME	
1122	REF	1		33,3603	03750 0		2CADR	RDGIMS	
1122	REF	1		33,3604	64064 1				
1123	REF	8	LAST 891	33,3605	11'647 1		CCS	VSELECT	SEQUENCE LR VEL BEAM SELECTOR
1124				33,3606	1 3610 1		TCF	+2	
1125	REF	55	LAST 879	33,3607	3 4752 0		CAF	TWO	IF ZERO-RESET TO TWO
1126				33,3610	6 0000 1		DOUBLE		2XVSELECT USED FOR VBEAM INDEX IN LRVEL
1127	REF	238	LAST 887	33,3611	0 4616 1		TC	BANKCALL	GO INITIALIZE LR VEL READ ROUTINE
1128	REF	1		33,3612	53107 1		CADR	LRVEL	
1129	REF	239	LAST 892	33,3613	0 4616 1		TC	BANKCALL	PUT LRVJOB TO SLEEP ABOUT 500 MS
1130	REF	13	LAST 617	33,3614	17667 0		CADR	RADSTALL	
1131	REF	1		33,3615	1 3650 0		TCF	VBAD	
1132	REF	2	LAST 166	33,3616	11'673 0		CCS	STILBADV	IS DATA GOOD JUST PRESENT?
1133	REF	1		33,3617	1 3651 1		TCF	VSTILBAD	JUST GOOD - MUST WAIT 4 SECONDS.

1134				33,3620	0 0004 0		INHINT		
1135				33,3621	0 0006 1		EXTEND		GOOD RETURN-STOW AWAY VMEAS
1136	REF	8	LAST 581	33,3622	3 1102 0		DCA	SAMPLSUM	
1137	REF	4	LAST 887	33,3623	53'651 0		DXCH	VMEAS	
113701	REF	5	LAST 887	33,3624	3 4741 1		CA	EBANK4	FOR DOWNLINK
113702	REF	33	LAST 890	33,3625	54 003 0		TS	EBANK	
113703	REF	4	LAST 892	E4,1656			EBANK=	LRVTIME	

11371				33,3626	0 0006 1		EXTEND		
11372	REF	5	LAST 892	33,3627	3 1657 1		DCA	LRVTIME	
11373	REF	2	LAST 215	33,3630	53'744 0		DXCH	LRVTIMDL	
11374				33,3631	0 0006 1		EXTEND		
11375	REF	4	LAST 887	33,3632	3 1661 1		DCA	LRXCDU	
11376	REF	3	LAST 216	33,3633	53'741 0		DXCH	LRXCUDL	
11377	REF	3	LAST 887	33,3634	3 1662 1		CA	LRZCDU	
11378	REF	3	LAST 215	33,3635	55'742 0		TS	LRZCUDL	
113781	REF	10	LAST 887	33,3636	3 5016 0		CA	EBANK7	
113782	REF	34	LAST 892	33,3637	54 003 0		TS	EBANK	
113783	REF	9	LAST 892	E7,1647			EBANK=	VSELECT	

1138	REF	35	LAST 889	33,3640	4 0107 0		CS	FLGWRD11	SET BIT TO INDICATE VELOCITY
1139	REF	2	LAST 886	33,3641	7 4745 1		MASK	VELDABIT	MEASUREMENT MADE.

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1140 REF 36 LAST 892 33,3642 26 107 0 ADS FLGWRD11
 1141 REF 10 LAST 892 33,3643 11'647 1 ENDLRV CCS VSELECT
 1142 33,3644 1 3646 1 TCF +2
 1143 REF 56 LAST 892 33,3645 3 4752 0 CA TWO
 1144 REF 11 LAST 893 33,3646 55'647 1 TS VSELECT
 1145 REF 135 LAST 868 33,3647 1 5155 1 TCF ENDOFJOB

UPDATE VSELECT

1146 REF 57 LAST 893 33,3650 3 4752 0 VBAD CAF TWO
 1147 REF 3 LAST 892 33,3651 55'673 0 VSTILBAD TS STILBADV
 1148 REF 1 33,3652 1 3643 1 TCF ENDLPV

SET STILBAD TO WAIT 4 SECONDS

R1149 LRHJOB IS SET BY LRHTASK WHEN LEM IS BELOW 25000 FT. THIS JOB
 R1150 INITIALIZES THE LR READ ROUTINE FOR AN ALT MEASUREMENT AND GOES TO
 R1151 SLEEP WHILE THE SAMPLING IS DONE-ABOUT 95 MS. WITH A GOODEND RETURN
 R1152 THE ALT DATA IS STORED IN HMEAS AND BIT7 OF LRSTAT IS SET.

11521 34,3717 BANK 34
 11522 REF 1 34,2000 SETLOC R12STUFF
 11523 34,3717 BANK

11524 REF 1 COUNT* \$\$/SERV

1153 REF 240 LAST 892 34,3717 0 4616 1 LRHJOB TC BANKCALL INITIATE LR ALT MEASUREMENT
 1154 REF 2 LAST 503 34,3720 53073 0 CADR LRLAT
 1155 REF 241 LAST 893 34,3721 0 4616 1 TC BANKCALL LRHJOB TO SLEEP ABOUT 95MS
 1156 REF 14 LAST 892 34,3722 17667 0 CADR RADSTALL
 1157 REF 1 34,3723 1 3746 0 TCF HBAD
 1158 REF 2 LAST 166 34,3724 11'672 1 CCS STILBADH IS DATA GOOD JUST PRESENT?
 1159 REF 1 34,3725 1 3756 1 TCF HSTILBAD JUST GOOD - MUST WAIT 4 SECONDS.

1160 34,3726 0 0004 0 INHINT
 1161 34,3727 0 0006 1 EXTEND
 1162 REF 9 LAST 892 34,3730 3 1102 0 DCA SAMPLSUM GOOD RETURN-STORE AWAY LRH DATA
 1163 REF 7 LAST 889 34,3731 53'653 1 DXCH HMEAS LRH DATA 1.079 FT/BIT
 11631 34,3732 0 0006 1 EXTEND FOR DOWNLINK
 11632 REF 12 LAST 871 34,3733 3 1557 1 DCA PIPTIME1
 11633 REF 9 LAST 617 34,3734 53'753 0 DXCH MKTIME

11634 34,3735 0 0006 1 EXTEND
 11635 REF 3 LAST 873 34,3736 3 1157 0 DCA CDUTEMPY CDUY,Z = AIG,AMG
 11636 REF 11 LAST 617 34,3737 53'456 0 DXCH AIG

11637 REF 3 LAST 873 34,3740 3 1155 1 CA CDUTFMPX CDUX = AOG
 11638 REF 7 LAST 617 34,3741 55'457 1 TS AOG

1164 REF 37 LAST 893 34,3742 4 0107 0 CS FLGWRD11 SET BIT TO INDICATE RANGE
 1165 REF 2 LAST 885 34,3743 7 4750 0 MASK RANGEDBIT MEASUREMENT MADE.
 1166 REF 38 LAST 893 34,3744 26 107 0 ADS FLGWRD11
 1167 REF 136 LAST 893 34,3745 0 5155 0 ENDLRH TC ENDOFJOB TERMINATE LRHJOB

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1168	REF	24	LAST	831	34,3746	3 0101	1	HBAD	CA	FLAGWRD5		
1169	REF	2	LAST	582	34,3747	7 4742	0		MASK	RNGSCBIT	IS BAD RETURN DUE TO SCALE CHANGE?	
1170					34,3750	0 0006	1		EXTEND			
1171	REF	2	LAST	893	34,3751	1 3755	1		BZF	HSTILBAD -1	NO	RESET HSTILBAD
1172	REF	85	LAST	888	34,3752	0 5516	0		TC	DOWNFLAG	YES	RESET SCALE CHANGE BIT AND IGNORE
1173	REF	4	LAST	617	34,3753	00120	1		ADRES	RNGSCFLG		
1174	REF	137	LAST	893	34,3754	0 5155	0		TC	ENDOFJOB		

1175	REF	58	LAST	893	34,3755	3 4752	0		CAF	TWO	SET STILBAD TO WAIT 4 SECONDS	
1176	REF	3	LAST	893	34,3756	55'672	1	HSTILBAD	TS	STILBADH		
1177	REF	138	LAST	894	34,3757	0 5155	0		TC	ENDOFJOB		

11771					32,3750				BANK	32		
11772	REF	2	LAST	864	32,2000				SETLOC	SERV2		
11773					32,3750				BANK			

11774	REF	2	LAST	864 TO 867:	55	55*			COUNT*	\$/SERV		
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R1178 RDGIMS IS A TASK SET UP BY LRVJOB TO PICK UP THE IMU CDUS AND TIME
 R1179 AT ABOUT THE MIDPOINT OF THE LR VEL READ ROUTINE WHEN 5 VEL SAMPLES
 R1180 ARE SPECIFIED.

1181	REF	6	LAST	892	34,1656				EBANK=	LRVTIME		
1182					32,3750	0 0006	1	RDGIMS	EXTEND			
1183	REF	26	LAST	871	32,3751	3 0025	0		DCA	TIME2	PICK UP TIME2,TIME1	
1184	REF	7	LAST	894	32,3752	53'657	0		DXCH	LRVTIME	AND SAVE IN LRVTIME	
1185					32,3753	0 0006	1		EXTEND			
1186	REF	14	LAST	871	32,3754	3 0033	1		DCA	CDUX	PICK UP CDUX AND CDUY	
1187	REF	5	LAST	892	32,3755	53'661	0		DXCH	LRXCDCU	AND SAVE IN LRXCDCU AND LRYCDCU	
1188	REF	8	LAST	871	32,3756	3 0034	0		CA	CDUZ		
1189	REF	4	LAST	892	32,3757	55'662	0		TS	LRZCDCU	SAVE CDUZ IN LRZCDCU	
1190	REF	11	LAST	872	32,3760	3 0037	0		CA	PIPAK		
1191	REF	5	LAST	887	32,3761	55'663	1		TS	PIPTM	SAVE PIPAK IN PIPTM	
1192					32,3762	0 0006	1		EXTEND			
1193	REF	3	LAST	397	32,3763	3 0041	1		DCA	PIPAY	PICK UP PIPAY AND PIPAZ	
1194	REF	6	LAST	894	32,3764	53'665	1		DXCH	PIPTM +1	AND SAVE IN PIPTM +1 AND PIPTM +2	
1195	REF	58	LAST	860	32,3765	0 5261	1		TC	TASKCOVER		

11951					33,3653				BANK	33		
11952	REF	8	LAST	874	33,2000				SETLOC	SERVICES		
11953					33,3653				BANK			

11954	REF	8	LAST	874 TO 893:	617	848*			COUNT*	\$/SERV		
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1196	REF	47	LAST	890	E7,1513				EBANK=	DVCNTR		
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R1197 HIGATJOB IS SET APPROXIMATELY 6 SECONOS PRIOR TO HIGH GATE DURING
 R1198 THE DESCENT BURN PHASE OF LUNAR LANDING. THIS JOB INITIATES THE
 R1199 LANDING RADAR REPOSITIONING ROUTINE AND GOES TO SLEEP UNTIL THE
 R1200 LR ANTENNA MOVES FROM POSITION 1 TO POSITION 2. IF THE LR ANTENNA
 R1201 ACHIEVES POSITION 2 WITHIN 22 SECONDS THE ALTITUDE AND VELOCITY
 R1202 BEAM VECTORS ARE RECOMPUTED TO REFLECT THE NEW ORIENTATION WITH
 R1203 RESPECT TO THE NB. BIT10 OF LRSTAT IS CLEARED TO ALLOW LR
 R1204 MEASUREMENTS AND THE JOB TERMINATES.

1205	REF	242	LAST	893	33,3653	0 4616	1	HIGATJOB	TC	BANKCALL	START LRPOS2 JOB
1206	REF	2	LAST	280	33,3654	53471	0		CAOR	LRPOS2	
1207	REF	243	LAST	895	33,3655	0 4616	1		TC	BANKCALL	PUT HIGATJOB TO SLEEP UNTIL JOB IS DONE
1208	REF	15	LAST	893	33,3656	17667	0		CAOR	RADSTALL	
1209	REF	1			33,3657	1 3666	0		TCE	POSALARM	BAD END ALARM
1210	REF	2	LAST	862	33,3660	3 7711	1	POSGOOD	CA	PRI024	REDUCE PRIORITY FOR INTERPRETIVE STUFF
12101	REF	14	LAST	862	33,3661	0 5146	1		TC	PRI0CHNG	
12102	REF	1			33,3662	0 3721	0		TC	SETPOS2	LR IN POS2 - SET UP TRANSFORMATIONS
1211	REF	86	LAST	894	33,3663	0 5516	0		TC	DOWNFLAG	
1212	REF	1			33,3664	00252	1		AORES	NOLRREAD	RESET NOLRREAD FLAG TO ENABLE LR READING
1213	REF	139	LAST	894	33,3665	0 5155	0		TC	ENOOFJOB	
1214	REF	1			33,3666	3 3703	0	POSALARM	CA	OCT523	
1215	REF	244	LAST	895	33,3667	0 4616	1		TC	BANKCALL	
1216	REF	7	LAST	524	33,3670	21451	1		CAOR	PRI0LARM	FLASH ALARM CODE
1217	REF	40	LAST	855	33,3671	1 6001	1		TCF	30TCPOOH	TERMINATE
1218					33,3672	1 3675	1		TCF	+3	PROCEED - TRY AGAIN
1219	REF	140	LAST	895	33,3673	1 5155	1		TCE	ENDOFJOB	V 32 E TERMINATE R12
1220	REF	141	LAST	895	33,3674	0 5155	0		TC	ENDOFJOB	
1221	REF	34	LAST	875	33,3675	3 4745	0	+3	CA	BIT7	SEE IF IN POS2 YET
1222					33,3676	0 0006	1		EXTEND		
1223	REF	23	LAST	875	33,3677	02 033	0		RAND	CHAN33	
1224					33,3700	0 0006	1		EXTEND		
1225	REF	1			33,3701	1 3660	0		BZE	POSGOOD	POS2 ACHIEVED SET UP ANTENNA BEAMS
1226	REF	2	LAST	895	33,3702	1 3666	0		TCF	POSALARM	STILL DIDN'T MAKE IT REALARM
1227					33,3703	00523	0	OCT523	OCT	523	
1228	REF	11	LAST	755	33,3704	0 4645	1	SETPOS1	TC	MAKECADR	MUST BE CALLED BY BANKCALL
1229	REF	1			33,3705	55'654	0		TS	LRADRET1	SAVE RETURN CADR, SINCE BUE2 CLOBBED
1230	REF	59	LAST	894	33,3706	3 4752	0		CAF	TWO	
1231	REF	4	LAST	894	33,3707	55'672	1		TS	STILBADH	INITIALIZE STILBAD
1232	REF	4	LAST	893	33,3710	55'673	0		TS	STILBAOV	INITIALIZE STILBAD
1233	REF	159	LAST	889	33,3711	3 4755	1		CA	ZERO	INDEX FOR LRALPHA,LRBETA IN POS 1.

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1234 REF 5 LAST 890 33,3712 55'666 1
 1235 RFF 5 LAST 891 33,3713 55'670 0
 1236 REF 4 LAST 890 33,3714 55'667 0
 1237 RFF 4 LAST 891 33,3715 55'671 1
 1238 REF 1 33,3716 0 3722 0

TS LRLCTR
 TS LRMCTR
 TS LRRCTR
 TS LRSCTR
 TC SETPOS

SET L,M,R, ANS S TO ZERO

CONTINUE WITH COMPUTATIONS

1239 REF 2 LAST 895 33,3717 3 1654 1
 1240 REF 16 LAST 865 33,3720 0 4640 1

CA LRADRET1
 TC BANKJUMP

RETURN TO CALLER

1243 REF 60 LAST 895 33,3721 3 4752 0
 1244 33,3722 0 0006 1
 1245 RFF 268 LAST 890 33,3723 5 0000 1
 1246 RFF 2 LAST 153 33,3724 3 1413 0
 1247 REF 22 LAST 887 33,3725 54 772 1
 1248 REF 23 LAST 896 33,3726 22 766 0
 1249 RFF 160 LAST 895 33,3727 3 4755 1
 1250 REF 24 LAST 896 33,3730 54 770 0

SETPOS2
 SETPOS

CA TWO
 EXTEND
 INDFX A
 DCA LRALPHA
 TS CDUSPOT +4
 LXCH CDUSPOT
 CA ZERO
 TS CDUSPOT +2

INDEX FOR POS2

LRALPHA IN A, LRBETA IN L

ROTATION ABOUT X

ROTATION ABOUT Y

ZERO ROTATION ABOUT Z.

1251 33,3731 0 0006 1
 1252 RFF 2 LAST 165 33,3732 23'646 1

EXTEND
 QXCH LRADRET

SAVE RETURN

1253 REF 158 LAST 889 33,3733 0 6036 1
 1254 33,3734 45175 0
 1255 RFF 5 LAST 790 33,3735 06420 1
 1256 REF 2 LAST 581 33,3736 47555 1
 1257 RFF 2 LAST 132 33,3737 26243 0
 1258 REF 10 LAST 796 33,3740 06422 0
 1259 33,3741 77624 1
 1260 REF 4 LAST 559 33,3742 47575 0
 1261 RFF 2 LAST 132 33,3743 02251 0
 1262 33,3744 76435 1
 1263 RFF 3 LAST 896 33,3745 02243 0
 1264 RFF 3 LAST 887 33,3746 26235 1
 1265 RFF 1 33,3747 26003 0
 1266 33,3750 77624 1
 1267 RFF 5 LAST 896 33,3751 47575 0
 1268 REF 2 LAST 885 33,3752 02313 1
 1269 33,3753 77776 1

TC INTPRFT
 VLOAD CALL
 UNITY
 TRG*SMNB
 STOVL VYBEAMNB
 UNITX
 CALL
 SMNE
 STORE VXBEAMNB
 VXV VSL1
 VYBEAMNB
 STOVL VZBFAMNB
 HBFAMANT
 CALL
 SMNB
 STORE HBEAMNB
 EXIT

CONVERT UNITY(ANTENNA) TO NB

CONVERT UNITX(ANTENNA) TO NB

Z = X * Y

CONVERT TO NB

1270 RFF 3 LAST 896 33,3754 0 1646 1

TC LRADRET

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0001					21,2340				BANK	21		
0002	REF	3	LAST	873	21,2000				SETLOC	R10		
0003					21,2340				BANK			
0004	REF	32	LAST	886	E7,1534				EBANK=	UNIT/R/		
0005	REF	2	LAST	57 TO	57:	6	6*		COUNT*	\$/R10		
0006	REF	2	LAST	829	21,2340	23'712	1	LANDISP	LXCH	PIPCTR1	UPDATE TBASE2 AND PIPCTR SIMULTANEOUSLY.	
0007	REF	13	LAST	860	21,2341	4'0025	1		CS	TIME1		
0008	REF	4	LAST	859	21,2342	53'056	1		DXCH	TBASE2		
0009	REE	23	LAST	866	21,2343	4'0103	1		CS	FLAGWRD7	IS LANDING ANALOG DISPLAYS FLAG SET?	
0010	REF	3	LAST	747	21,2344	7'4741	0		MASK	SWANDBIT		
0011	REE	269	LAST	896	21,2345	10'000	0		CCS	A		
0012	REF	1			21,2346	1'3237	0		TCE	DISPRSET	NO.	
0013	REF	29	LAST	829	21,2347	3'1303	0		CA	IMODES33	BIT 7 = 0 (DO ALTRATE), =1 (DO ALT.)	
0014	REE	35	LAST	895	21,2350	7'4745	1		MASK	BIT7		
0015	REE	270	LAST	897	21,2351	10'000	0		CCS	A		
0016	REE	1			21,2352	1'2424	0		TCE	ALTOUT		
0017	REF	I			21,2353	0'2510	1	ALTROUT	TC	DISINDAT	CHECK MODE SELECT SWITCH AND DIDFLG.	
0018	REE	30	LAST	897	21,2354	4'1303	1		CS	IMODES33		
0019	REF	36	LAST	897	21,2355	7'4745	1		MASK	BIT7		
0020	REF	31	LAST	897	21,2356	27'303	1		ADS	IMODES33	ALTERNATE ALTITUDE RATE WITH ALTITUDE.	
0021	REF	44	LAST	821	21,2357	3'4752	0		CAE	BIT2	RATE COMMAND IS EXECUTED BEFORE RANGE.	
0022					21,2360	0'0006	1		EXTEND			
0023	REF	12	LAST	838	21,2361	05'014	1		WOR	CHAN14	ALTRATE (BIT2 = 1), ALTITUDE (BIT2 = 0).	
0024	REE	5	LAST	878	21,2362	3'1741	1	ARCOMP	CA	RUNIT	COMPUTE ALTRATE=RUNIT.VVECT M/CS *2(-6).	
0025					21,2363	0'0006	1		EXTEND			
0026	REE	2	LAST	166	21,2364	7'1704	1		MP	VVECT	MULTIPLY X-COMPONENTS.	
0027	REF	20	LAST	273	21,2365	56'070	0		XCH	RUPTREG1	SAVE SINGLE PRECISION RESULT M/CS*2(-6).	
0028	REF	6	LAST	897	21,2366	3'1742	1		CA	RUNIT +1	MULTIPLY Y-COMPONENTS.	
0029					21,2367	0'0006	1		EXTEND			
0030	REE	3	LAST	897	21,2370	7'1705	0		MP	VVECT +1		
0031	REE	21	LAST	897	21,2371	26'070	1		ADS	RUPTREG1	ACCUMULATE PARTIAL PRODUCTS.	
0032	REF	7	LAST	897	21,2372	3'1743	0		CA	RUNIT +2	MULTIPLY Z-COMPONENTS.	
0033					21,2373	0'0006	1		EXTEND			
0034	REF	4	LAST	897	21,2374	7'1706	0		MP	VVECT +2		
0035	REE	22	LAST	897	21,2375	26'070	1		ADS	RUPTREG1	ALTITUDE RATE IN M/CS *2(-6).	
0036	REF	1			21,2376	3'2000	0		CA	ARCONV	CONVERT ALTRATE TO BIT UNITS (.5FPS/BIT)	
0037					21,2377	0'0006	1		EXTEND			
0038	REE	23	LAST	897	21,2400	7'0070	1		MP	RUPTREG1		
0039					21,2401	20'001	1		DDOUBL			
0040					21,2402	20'001	1		DDOUBL			
0041	REE	24	LAST	897	21,2403	56'070	0		XCH	RUPTREG1	ALTITUDE RATE IN BIT UNITS*2(-14).	
0042	REF	3	LAST	878	21,2404	3'1714	1		CA	DALTRATE	ALTITUDE RATE COMPENSATION FACTOR.	
0043					21,2405	0'0006	1		EXTEND			
0044	REE	2	LAST	166	21,2406	7'1713	1		MP	DT		
0045	REF	25	LAST	897	21,2407	6'0070	0		AD	RUPTREG1		
0046	REE	2	LAST	166	21,2410	55'707	1		TS	ALTPATE	ALTITUDE RATE IN BIT UNITS*2(-14).	
0047	REE	3	LAST	897	21,2411	4'1707	1		CS	ALTRATE		

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0048				21,2412	0 0006 1		EXTEND		CHECK POLARITY OF ALTITUDE RATE.
0049				21,2413	6 2415 0		BZMF	+2	
0050	REF	1		21,2414	1 2417 0		TCF	DATAOUT	NEGATIVE - SEND POS. PULSES TO ALTM REG.
0051	REF	4	LAST	897	21,2415	3 1707 0	CA	ALTRATE	POSITIVE OR ZERO - SFT SIGN BIT = 1 AND
0052	REF	35	LAST	600	21,2416	6 4735 1	AD	BIT15	SEND TO ALTM REGISTER. *00 NOT SEND +0*
0053	REF	1		21,2417	54 060 0		TS	ALTM	ACTIVATE THE LANDING ANALOG DISPLAYS - -
0054	REF	34	LAST	733	21,2420	3 4751 0	CAF	BIT3	
0055				21,2421	0 0006 1		EXTEND		
0056	REF	13	LAST	897	21,2422	05 014 1	WOR	CHAN14	BIT3 DRIVES THE ALT/ALTRATE METER.
0057	REF	59	LAST	894	21,2423	1 5261 0	TCF	TASKOVER	EXIT
0058	REF	2	LAST	897	21,2424	0 2510 1	ALTOUT	TC	CHECK MODE SELECT SWITCH AND DIDFLG.
0059	REF	37	LAST	897	21,2425	4 4745 1	CS	BIT7	
0060	REF	32	LAST	897	21,2426	7 1303 1	MASK	IMODES33	
0061	REF	33	LAST	898	21,2427	55 303 1	TS	IMODES33	ALTERNATE ALTITUDE RATE WITH ALTITUDE.
0062	REF	45	LAST	897	21,2430	4 4752 1	CS	BIT2	
0063				21,2431	0 0006 1		EXTEND		
0064	REF	14	LAST	898	21,2432	03 014 1	WAND	CHAN14	
0065	REF	3	LAST	877	21,2433	11 737 1	CCS	ALTBITS	--1 IF OLD ALT. DATA TOBE EXTRAPOLATED.
0066				21,2434	1 2440 1		TCF	+4	
0067				21,2435	1 2440 1		TCF	+3	
0068	REF	1		21,2436	1 2456 0		TCF	OLDATA	
0069	REF	4	LAST	898	21,2437	55 737 1	TS	ALTBITS	SET ALTBITS FROM -0 TO +0.
0070	REF	56	LAST	887	21,2440	4 4753 0	CS	ONE	
0071	REF	5	LAST	898	21,2441	53 740 1	DXCH	ALTBITS	SET ALTBITS--1 FOR SWITCH USE NFXST PASS.
0072	REF	2	LAST	166	21,2442	53 711 0	DXCH	ALTSAVE	
0073	REF	41	LAST	786	21,2443	3 4742 1	CA	BIT10	NEW ALTITUDE EXTRAPOLATION WITH ALTRATE.
0074	REF	218	LAST	890	21,2444	56 002 0	XCH	0	
0075				21,2445	22 007 0		LXCH	7	ZL
0076	REF	3	LAST	897	21,2446	3 1713 0	CA	DT	
0077				21,2447	0 0006 1		EXTEND		
0078	*REF	219	LAST	898	21,2450	10 002 1	DV	Q	RESCALE DT*2(-14) TO *2(-9) TIME IN CS.
0079				21,2451	0 0006 1		EXTEND		
0080	REF	1		21,2452	7 2002 0		MP	ARTQA2	.0021322 *2(+8)
0081	REF	2	LAST	898	21,2453	1 2457 1	TCF	OLDATA +1	RATE APPLIES FOR DT CS.
0082	REF	3	LAST	898	21,2454	53 711 0	ZDATA2	DXCH	ALTSAVE
0083	REF	1		21,2455	1 2477 0		TCF	NEWDATA	
0084	REF	1		21,2456	3 2001 1		CA	ARTQA	RATE APPLIES FOR .5 SEC. (4X/SEC. CYCLE)
0085				21,2457	0 0006 1		EXTEND		
0086	REF	5	LAST	898	21,2460	7 1707 1	MP	ALTRATE	EXTRAPOLATE WITH ALTITUDE RATE.
0087				21,2461	20 001 1		DDOUBL		
0088	REF	4	LAST	898	21,2462	6 1711 1	AD	ALTSAVE +1	
0089	REF	5	LAST	898	21,2463	55 711 0	TS	ALTSAVE +1	
0090	REF	161	LAST	896	21,2464	3 4755 1	CAF	ZERO	
0091	REF	6	LAST	898	21,2465	27 710 1	ADS	ALTSAVE	
0092	REF	18	LAST	816	21,2466	3 4733 1	CAF	POS MAX	FORCE SIGN AGREEMENT ASSUMING A
0093	REF	97	LAST	898	21,2467	6 4753 1	AD	ONE	NON-NEGATIVE ALTSAVE.
0094	REF	7	LAST	898	21,2470	6 1711 1	AD	ALTSAVE +1	IF ALTSAVE IS NEGATIVE, ZERO ALTSAVE
0095	REF	8	LAST	898	21,2471	55 711 0	TS	ALTSAVE +1	AND ALTSAVE +1 AT ZERODATA.

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0096	REF	162	LAST	898	21,2472	3 4755 1	CAF	ZERO	
0097	REF	19	LAST	898	21,2473	6 4733 1	AD	POS MAX	
0098	RFF	9	LAST	898	21,2474	6 1710 0	AD	ALTSAVE	
0099	REF	10	LAST	899	21,2475	55'710 1	TS	ALTSAVE	POSSIBLY SKIP TO NEWDATA.
0100	RFF	1			21,2476	1 3234 0	TCF	ZERODATA	
0101	REF	11	LAST	899	21,2477	11'711 0	CCS	ALTSAVE +1	
0102					21,2500	1 2504 0	TCF	+4	
0103					21,2501	1 2504 0	TCF	+3	
0104	REF	163	LAST	899	21,2502	3 4755 1	CAF	ZERO	SET NEGATIVE ALTSAVE +1 TO +0.
0105	REF	12	LAST	899	21,2503	55'711 0	TS	ALTSAVE +1	
0106	RFF	13	LAST	899	21,2504	11'710 1	CCS	ALTSAVE	PROVIDE A 15 BIT UNSIGNED OUTPUT.
0107	REF	36	LAST	898	21,2505	3 4735 1	CAF	BIT15	THE HI-ORDER PART IS +1 OR +0.
0108	RFF	14	LAST	899	21,2506	6 1711 1	AD	ALTSAVE +1	
0109	RFF	2	LAST	898	21,2507	1 2417 0	TCF	DATAOUT	DISPATCH UNSIGNED BITS TO ALTM REG.
0110					21,2510	0 0006 1	DISINDAT	EXTEND	
0111	REF	3	LAST	829	21,2511	23'712 1	QXCH	LADQSAVF	SAVE RETURN TO ALTROUT +1 OR ALTOUT +1
0112	REF	43	LAST	876	21,2512	3 4746 0	CAF	BIT6	
0113					21,2513	0 0006 1	EXTEND		WISHETH THE ASTRONAUT THE ANALOG
0114	REF	8	LAST	830	21,2514	02 030 0	RAND	CHAN30	DISPLAYS? I.E.,
0115	REF	271	LAST	897	21,2515	10 000 0	CCS	A	IS THE MODE SELECT SWITCH IN PGNC'S?
0116	REF	2	LAST	897	21,2516	1 3237 0	TCF	DISPRSET	NO. ASTRONAUT REQUESTS NO INERTIAL DATA
0117	REF	23	LAST	529	21,2517	4 0075 1	CS	FLAGWRD1	YES. CHECK STATUS OF DIDFLAG.
0118	REF	2	LAST	232	21,2520	7 4736 0	MASK	DIDFLBIT	
0119					21,2521	0 0006 1	EXTEND		
0120	REF	1			21,2522	1 2560 1	BZF	SPFEDRUN	SET. PERFORM DATA DISPLAY SEQUENCE.
0121	RFF	24	LAST	899	21,2523	4 0075 1	CS	FLAGWRD1	RESET. PERFORM INITIALIZATION FUNCTIONS.
0122	RFF	3	LAST	899	21,2524	7 4736 0	MASK	DIDFLBIT	
0123	RFF	25	LAST	899	21,2525	26 075 1	ADS	FLAGWRD1	SET DIDFLAG.
0124	REF	38	LAST	898	21,2526	4 4745 1	CS	BIT7	
0125	REF	34	LAST	898	21,2527	7 1303 1	MASK	IMODES33	TO DISPLAY ALTRATE FIRST AND ALT. SECOND
0126	REF	35	LAST	899	21,2530	55'303 1	TS	IMODES33	
0127	RFF	26	LAST	831	21,2531	4 0074 0	CS	FLAGWRD0	ARE WE IN DESCENT TRAJECTORY?
0128	REF	2	LAST	831	21,2532	7 4752 1	MASK	R10FLBIT	
0129					21,2533	0 0006 1	EXTEND		
0130	REF	60	LAST	898	21,2534	1 5261 0	BZF	TASKOVER	NO
0131	REF	29	LAST	811	21,2535	3 4744 1	CAF	BIT8	YES.
0132					21,2536	0 0006 1	EXTEND		
0133	RFF	51	LAST	875	21,2537	05 012 1	WOR	CHAN12	SET DISPLAY INERTIAL DATA OUTBIT.
0134	REF	164	LAST	899	21,2540	3 4755 1	CAF	ZERO	
0135	RFF	2	LAST	166	21,2541	55'700 0	TS	TRAKLATV	LATERAL VELOCITY MONITOR FLAG
0136	REF	2	LAST	166	21,2542	55'701 1	TS	TRAKFWDV	FORWARD VELOCITY MONITOR FLAG
0137	REF	2	LAST	166	21,2543	55'674 1	TS	LATVMETR	LATVEL MONITOR METER
0138	RFF	2	LAST	166	21,2544	55'675 0	TS	FORVMETR	FORVEL MONITOR METER
0139	REF	37	LAST	838	21,2545	3 4750 1	CAF	BIT4	
0140	RFF	27	LAST	853	21,2546	0 5173 1	TC	TWIDDLE	
0141	REF	1			21,2547	02551 1	ADRES	INTLZE	
0142	REF	61	LAST	899	21,2550	1 5261 0	TCF	TASKOVER	
0143	REF	46	LAST	898	21,2551	3 4752 0	CAF	BIT2	
0144					21,2552	0 0006 1	EXTEND		
0145	REF	52	LAST	899	21,2553	05 012 1	WOR	CHAN12	ENABLE RR ERROR COUNTER.

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0146	REF	36	LAST	899	21,2554	4 1303 1	CS	IMCDES33	
0147	REF	30	LAST	899	21,2555	7 4744 0	MASK	BIT8	
0148	REF	37	LAST	900	21,2556	27*303 1	ADS	IMCDES33	SET INERTIAL DATA FLAG.
0149	REF	62	LAST	899	21,2557	1 5261 0	TCF	TASKOVER	
0150	REF	18	LAST	888	21,2560	4 1235 0	SPEEDRUN CS	PIPTIME +1	UPDATE THE VELOCITY VECTOR
0151	REF	14	LAST	897	21,2561	6 0025 0	AD	TIME1	COMPUTE T - TN
0152	REF	7	LAST	543	21,2562	6 4736 1	AD	HALF	CORRECT FOR POSSIBLE OVERFLOW OF TIME1.
0153	REF	8	LAST	900	21,2563	6 4736 1	AD	HALF	
0154	REF	4	LAST	898	21,2564	57*713 0	XCH	DT	SAVE FOR LATER USE
0155	REF	16	LAST	770	21,2565	3 4777 1	CA	ISEC	
0156	REF	8	LAST	623	21,2566	54 065 0	TS	ITEMP5	INITIALIZE FOR DIVISION LATER
0157					21,2567	0 0006 1	EXTEND		
0158	REF	10	LAST	888	21,2570	3 1237 0	DCA	GDT/2	COMPUTE THE X-COMPONENT OF VELOCITY.
0159					21,2571	20 001 1	DDOUBL		
0160					21,2572	20 001 1	DDOUBL		
0161					21,2573	0 0006 1	EXTEND		
0162	REF	5	LAST	900	21,2574	7 1713 1	MP	DT	
0163					21,2575	0 0006 1	EXTEND		
0164	REF	9	LAST	900	21,2576	10 065 0	DV	ITEMP5	
0165	REF	5	LAST	897	21,2577	57*704 0	XCH	VVECT	VVECT = G(T-TN) M/CS *2(-5)
0166					21,2600	0 0006 1	EXTEND		
0167	REF	19	LAST	888	21,2601	3 1525 1	DCA	V	M/CS *2(-7)
0168					21,2602	20 001 1	DDOUBL		RESCALE TO 2(-5)
0169					21,2603	20 001 1	DDOUBL		
0170	REF	6	LAST	900	21,2604	27*704 1	ADS	VVECT	VVECT = VN + G(T-TN) M/CS *2(-5)
0171	REF	12	LAST	894	21,2605	3 0037 0	CA	PIPAX	DELV CM/SEC *2(-14)
0172	REF	3	LAST	871	21,2606	6 1160 1	AD	PIPATMPX	IN CASE PIPAX HAS BEEN ZEROED
0173					21,2607	0 0006 1	EXTEND		
0174	REF	1			21,2610	7 2004 0	MP	KPIP1(5)	DELV M/CS *2(-5)
0175	REF	7	LAST	900	21,2611	27*704 1	ADS	VVECT	VVECT = VN + DELV + GN(T-TN) M/CS *2(-5)
0176					21,2612	0 0006 1	EXTEND		
0177	REF	11	LAST	900	21,2613	3 1241 1	DCA	GDT/2 +2	COMPUTE THE Y-COMPONENT OF VELOCITY.
0178					21,2614	20 001 1	DDOUBL		
0179					21,2615	20 001 1	DDOUBL		
0180					21,2616	0 0006 1	EXTEND		
0181	REF	6	LAST	900	21,2617	7 1713 1	MP	DT	
0182					21,2620	0 0006 1	EXTEND		
0183	REF	10	LAST	900	21,2621	10 065 0	DV	ITEMP5	
0184	REF	8	LAST	900	21,2622	57*705 1	XCH	VVECT +1	
0185					21,2623	0 0006 1	EXTEND		
0186	REF	20	LAST	900	21,2624	3 1527 0	DCA	V +2	
0187					21,2625	20 001 1	DDOUBL		
0188					21,2626	20 001 1	DDOUBL		
0189	REF	9	LAST	900	21,2627	27*705 0	ADS	VVECT +1	
0190	REF	4	LAST	894	21,2630	3 0040 0	CA	PIPAY	
0191	REF	3	LAST	871	21,2631	6 1161 0	AD	PIPATMPY	
0192					21,2632	0 0006 1	EXTEND		
0193	REF	2	LAST	900	21,2633	7 2004 0	MP	KPIP1(5)	
0194	REF	10	LAST	900	21,2634	27*705 0	ADS	VVECT +1	

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0195					21,2635	0 0006 1
0196	REF	12	LAST	900	21,2636	3 1243 0
0197					21,2637	20 001 1
0198					21,2640	20 001 1
0199					21,2641	0 0006 1
0200	REF	7	LAST	900	21,2642	7 1713 1
0201					21,2643	0 0006 1
0202	REF	11	LAST	900	21,2644	10 065 0
0203	REF	11	LAST	900	21,2645	57*706 1
0204					21,2646	0 0006 1
0205	REF	21	LAST	900	21,2647	3 1531 1
0206					21,2650	20 001 1
0207					21,2651	20 001 1
0208	REF	12	LAST	901	21,2652	27*706 0
0209	REF	6	LAST	872	21,2653	3 0041 1
0210	REF	3	LAST	871	21,2654	6 1162 0
0211					21,2655	0 0006 1
0212	REF	3	LAST	900	21,2656	7 2004 0
0213	REF	13	LAST	901	21,2657	27*706 0
0214	REF	35	LAST	898	21,2660	3 4751 0
0215	REF	9	LAST	858	21,2661	0 5224 0
0216	REF	27	LAST	899	21,2662	4 0074 0
0217	REF	3	LAST	899	21,2663	7 4752 1
0218	REF	272	LAST	899	21,2664	10 000 0
0219					21,2665	1 2667 0
0220	REF	4	LAST	899	21,2666	0 1712 1
0221	REF	4	LAST	888	21,2667	3 1731 0
0222	REF	14	LAST	901	21,2670	6 1704 0
0223	REF	35	LAST	868	21,2671	54 061 1
0224	REF	5	LAST	901	21,2672	3 1733 1
0225	REF	15	LAST	901	21,2673	6 1705 1
0226	REF	11	LAST	757	21,2674	54 062 1
0227	REF	6	LAST	901	21,2675	3 1735 1
0228	REF	16	LAST	901	21,2676	6 1706 1
0229	REF	20	LAST	758	21,2677	54 063 0
0230	REF	36	LAST	901	21,2700	3 0061 0
0231					21,2701	0 0006 1
0232	REF	5	LAST	877	21,2702	7 1715 1
0233	REF	26	LAST	897	21,2703	56 070 0
0234	REF	12	LAST	901	21,2704	3 0062 0
0235					21,2705	0 0006 1
0236	REF	6	LAST	901	21,2706	7 1717 0
0237	REF	27	LAST	901	21,2707	26 070 1
0238	REF	21	LAST	901	21,2710	3 0063 1
0239					21,2711	0 0006 1
0240	REF	7	LAST	901	21,2712	7 1721 0
0241	REF	28	LAST	901	21,2713	26 070 1

EXTEND	
DCA	GDT/2 +4
DDOUBL	
DDOUBL	
EXTEND	
MP	DT
EXTEND	
DV	ITEMP5
XCH	VVECT +2
EXTEND	
DCA	V +4
DDOUBL	
DDOUBL	
ADS	VVECT +2
CA	PIPAZ
AD	PIPATMPZ
EXTEND	
MP	KPIP1(5)
ADS	VVECT +2

COMPUTE THE Z-COMPONENT OF VELOCITY.

CAF	8IT3
TC	VARDFLAY

PAUSE 30 MS TO LET OTHER RUPTS IN.

CS	FLAGWRDO
MASK	R10FL8IT
CCS	A
TCF	+2
TC	LADQSAVE

ARE WE IN DESCENT TRAJECTORY?

YES.

NO.

CA	DELVS
AD	VVECT
TS	ITEMP1
CA	DELVS +2
AD	VVECT +1
TS	ITEMP2
CA	DELVS +4
AD	VVECT +2
TS	ITEMP3
CA	ITEMP1
EXTEND	
MP	UHYP
XCH	RUPTREG1
CA	ITEMP2
EXTEND	
MP	JHYP +2
ADS	RUPTREG1
CA	ITEMP3
EXTEND	
MP	UHYP +4
ADS	RUPTREG1

HI X OF VELOCITY CORRECTION TERM.

HI X OF UPDATED VELOCITY VECTOR.

= VX - DVX M/CS*2(-5).

Y

Y

= VY - DVY M/CS*2(-5).

Z

Z

= VZ - DVZ M/CS*2(-5).

COMPUTE VHY, VELOCITY DIRECTED ALONG THE Y-COORDINATE.

HI X OF CROSS-RANGE HALF-UNIT VECTOR.

Y

ACCUMULATE PARTIAL PRODUCTS.

Z

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0242	REF	29	LAST	901	21,2714	3 0070 0	CA	RUPTREG1	
0243					21,2715	6 0000 1	DOUBLE		
0244	REF	2	LAST	166	21,2716	57 702 0	XCH	VHY	VHY=VMP.UHYP M/CS*2(-5).
0245	REF	37	LAST	901	21,2717	3 0061 0	CA	ITEMP1	NOW COMPUTE VHZ, VELOCITY DIRECTED ALONG
0246					21,2720	0 0006 1	EXTEND		THE Z-COORDINATE.
0247	REF	3	LAST	877	21,2721	7 1723 1	MP	UHZP	HI X OF DOWN-RANGE HALF-UNIT VECTOR.
0248	REF	30	LAST	902	21,2722	56 070 0	XCH	RUPTREG1	
0249	REF	13	LAST	901	21,2723	3 0062 0	CA	ITEMP2	
0250					21,2724	0 0006 1	EXTEND		
0251	REF	4	LAST	902	21,2725	7 1725 1	MP	UHZP +2	Y
0252	REF	31	LAST	902	21,2726	26 070 1	ADS	RUPTREG1	ACCUMULATE PARTIAL PRODUCTS.
0253	REF	22	LAST	901	21,2727	3 0063 1	CA	ITEMP3	
0254					21,2730	0 0006 1	EXTEND		
0255	REF	5	LAST	902	21,2731	7 1727 0	MP	UHZP +4	Z
0256	REF	32	LAST	902	21,2732	26 070 1	ADS	RUPTREG1	
0257	REF	33	LAST	902	21,2733	3 0070 0	CA	RUPTREG1	
0258					21,2734	6 0000 1	DOUBLE		
0259	REF	2	LAST	166	21,2735	57 703 1	XCH	VHZ	VHZ = VMP.UHYP M/CS*2(-5).
0260	REF	4	LAST	308	21,2736	3 5015 0	CAE	EBANK6	GET SIN(AOG),COS(AOG) FROM GPMATRIX.
0261	REF	35	LAST	892	21,2737	54 003 0	TS	EBANK	
0262	REF	3	LAST	203	E6,1415		EBANK=	M22	
0263	REF	4	LAST	902	21,2740	3 1415 0	CA	M22	
0264	REF	23	LAST	902	21,2741	54 063 0	TS	ITEMP3	
0265	REF	2	LAST	204	21,2742	3 1416 0	CA	M32	
0266	REF	9	LAST	758	21,2743	54 064 1	TS	ITEMP4	
0267	REF	11	LAST	892	21,2744	3 5016 0	CAF	EBANK7	
0268	REF	36	LAST	902	21,2745	54 003 0	TS	EBANK	
0269	REF	33	LAST	897	E7,1534		EBANK=	UNIT/R/	
0270	REF	10	LAST	902	21,2746	3 0064 0	CA	ITEMP4	COMPUTE LATERAL AND FORWARD VELOCITIES.
0271					21,2747	0 0006 1	EXTEND		
0272	REF	3	LAST	902	21,2750	7 1702 1	MP	VHY	
0273	REF	34	LAST	902	21,2751	56 070 0	XCH	RUPTREG1	
0274	REF	24	LAST	902	21,2752	3 0063 1	CA	ITEMP3	
0275					21,2753	0 0006 1	EXTEND		
0276	REF	3	LAST	902	21,2754	7 1703 0	MP	VHZ	
0277	REF	35	LAST	902	21,2755	26 070 1	ADS	RUPTREG1	=VHY(COS)AOG+VHZ(SIN)AOG M/CS *2(-5)
0278	REF	1			21,2756	3 2003 0	CA	VELCONV	CONVERT LATERAL VELOCITY TO BIT UNITS.
0279					21,2757	0 0006 1	EXTEND		
0280	REF	36	LAST	902	21,2760	7 0070 1	MP	RUPTREG1	
0281					21,2761	20 001 1	DDOUBL		
0282	REF	2	LAST	166	21,2762	57 676 1	XCH	LATVEL	LATERAL VELOCITY IN BIT UNITS *2(-14).
0283	REF	11	LAST	902	21,2763	3 0064 0	CA	ITEMP4	COMPUTE FORWARD VELOCITY.
0284					21,2764	0 0006 1	EXTEND		
0285	REF	4	LAST	902	21,2765	7 1703 0	MP	VHZ	
0286	REF	37	LAST	902	21,2766	56 070 0	XCH	RUPTREG1	
0287	REF	25	LAST	902	21,2767	3 0063 1	CA	ITEMP3	
0288					21,2770	0 0006 1	EXTEND		
0289	REF	4	LAST	902	21,2771	7 1702 1	MP	VHY	
0290	REF	273	LAST	901	21,2772	4 0000 0	CS	A	
0291	REF	38	LAST	902	21,2773	26 070 1	ADS	RUPTREG1	=VHZ(COS)AOG-VHY(SIN)AOG M/CS *2(-5).

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0292	REF	2	LAST	902	21,2774	3 2003 0	CA	VELCONV	CONVERT FORWARD VELOCITY TO BIT UNITS.
0293					21,2775	0 0006 1	EXTEND		
0294	REF	39	LAST	902	21,2776	7 0070 1	MP	RUPTREG1	
0295					21,2777	20 001 1	DDOUBL		
0296	REF	2	LAST	166	21,3000	57*677 0	XCH	FDRVEL	FORWARD VELOCITY IN BIT UNITS *2(-14).
0297	REF	1			21,3001	4 2005 1	CS	MAXVBITS	ACC.= -199.9989 FT./SEC.
0298	REF	5	LAST	623	21,3002	54 066 0	TS	ITEMP6	-547 BIT UNITS (OCTAL) AT 0.5571 FPS/BIT
0299	REF	58	LAST	898	21,3003	3 4753 1	CAF	ONE	LOOP TWICE.
0300	REF	12	LAST	901	21,3004	54 065 0	TS	ITEMP5	FORWARD AND LATERAL VELOCITY LANDING
0301	REF	13	LAST	903	21,3005	50 065 1	INDEX	ITEMP5	ANALOG DISPLAYS MONITOR.
0302	REF	3	LAST	902	21,3006	11*676 0	CCS	LATVEL	
0303					21,3007	1 3013 1	TCF	+4	
0304	REF	1			21,3010	1 3114 1	TCF	LVLIMITS	
0305					21,3011	1 3021 0	TCF	+80	
0306	REF	2	LAST	903	21,3012	1 3114 1	TCF	LVLIMITS	
0307	REF	14	LAST	903	21,3013	50 065 1	INDEX	ITEMP5	
0308	REF	4	LAST	903	21,3014	4 1676 0	CS	LATVEL	
0309	REF	2	LAST	903	21,3015	6 2005 0	AD	MAXVBITS	+199.9989 FT./SEC.
0310					21,3016	0 0006 1	EXTEND		
0311	REF	1			21,3017	6 3027 1	BZMF	CHKLASTY	
0312	REF	3	LAST	903	21,3020	1 3114 1	TCF	LVLIMITS	
0313	REF	15	LAST	903	21,3021	50 065 1	INDEX	ITEMP5	
0314	REF	5	LAST	903	21,3022	3 1676 1	CA	LATVEL	
0315	REF	3	LAST	903	21,3023	6 2005 0	AD	MAXVBITS	
0316					21,3024	0 0006 1	EXTEND		
0317					21,3025	6 3027 1	BZMF	+2	
0318	REF	4	LAST	903	21,3026	1 3114 1	TCF	LVLIMITS	
0319	REF	16	LAST	903	21,3027	50 065 1	INDEX	ITEMP5	
0320	REF	3	LAST	899	21,3030	11*674 1	CCS	LATVMETR	
0321					21,3031	1 3035 0	TCF	+4	
0322	REF	1			21,3032	1 3046 1	TCF	LASTOK	
0323					21,3033	1 3042 0	TCF	+7	
0324	REF	2	LAST	903	21,3034	1 3046 1	TCF	LASTOK	
0325	REF	17	LAST	903	21,3035	50 065 1	INDEX	ITEMP5	
0326	REF	6	LAST	903	21,3036	3 1676 1	CA	LATVEL	
0327					21,3037	0 0006 1	EXTEND		
0328	REF	1			21,3040	6 3065 1	BZMF	LASTPOSY +5	
0329					21,3041	1 3046 1	TCF	+5	
0330	REF	18	LAST	903	21,3042	50 065 1	INDEX	ITEMP5	
0331	REF	7	LAST	903	21,3043	4 1676 0	CS	LATVEL	
0332					21,3044	0 0006 1	EXTEND		
0333	REF	1			21,3045	6 3102 1	BZMF	LASTNEG +4	
0334	REF	19	LAST	903	21,3046	50 065 1	INDEX	ITEMP5	
0335	REF	3	LAST	899	21,3047	11*700 0	CCS	TRAKLATV	
0336	REF	2	LAST	903	21,3050	1 3060 0	TCF	LASTPOSY	
0337					21,3051	1 3053 0	TCF	+2	
0338	REF	2	LAST	903	21,3052	1 3076 1	TCF	LASTNEG	
0339	REF	20	LAST	903	21,3053	50 065 1	INDEX	ITEMP5	

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0340	REF	8	LAST	903	21,3054	3 1676 1	CA	LATVFL
0341					21,3055	0 0006 1	EXTEND	
0342	REF	1			21,3056	6 3104 1	BZMF	NEGVMAXY
0343	REF	1			21,3057	1 3067 1	TCF	POSVMAXY
0344	REF	21	LAST	903	21,3060	50 065 1	LASTPOSY	INDEX ITEMP5
0345	REF	9	LAST	904	21,3061	3 1676 1	CA	LATVEL
0346					21,3062	0 0006 1	EXTEND	
0347					21,3063	6 3065 1	BZMF	+2
0348	REF	2	LAST	904	21,3064	1 3067 1	TCF	POSVMAXY
0349	REF	4	LAST	903	21,3065	4 2005 1	CS	MAXVBITS
0350	REF	1			21,3066	1 3210 0	TCF	ZEROLSTY
0351	REF	22	LAST	904	21,3067	50 065 1	POSVMAXY	INDEX ITEMP5
0352	REF	4	LAST	903	21,3070	4 1674 1	CS	LATVMETR
0353	REF	5	LAST	904	21,3071	6 2005 0	AD	MAXVBITS
0354	REF	23	LAST	904	21,3072	50 065 1	INDEX	ITEMP5
0355	REF	2	LAST	385	21,3073	56 072 1	XCH	RUPTREG3
0356	REF	99	LAST	903	21,3074	3 4753 1	CAF	ONE
0357	REF	2	LAST	904	21,3075	1 3213 0	TCF	ZERCLSTY +3
0358	REF	24	LAST	904	21,3076	50 065 1	LASTNEGY	INDEX ITEMP5
0359	REF	10	LAST	904	21,3077	3 1676 1	CA	LATVEL
0360					21,3100	0 0006 1	EXTEND	
0361	REF	2	LAST	904	21,3101	6 3104 1	BZMF	NEGVMAXY
0362	REF	6	LAST	904	21,3102	3 2005 0	CA	MAXVBITS
0363	REF	3	LAST	904	21,3103	1 3210 0	TCF	ZEROLSTY
0364	REF	25	LAST	904	21,3104	50 065 1	NEGVMAXY	INDEX ITEMP5
0365	REF	5	LAST	904	21,3105	3 1674 0	CA	LATVMETR
0366	REF	7	LAST	904	21,3106	6 2005 0	AD	MAXVBITS
0367					21,3107	4 0000 0	COM	
0368	REF	26	LAST	904	21,3110	50 065 1	INDEX	ITEMP5
0369	REF	3	LAST	904	21,3111	56 072 1	XCH	RUPTREG3
0370	REF	100	LAST	904	21,3112	4 4753 0	CS	ONE
0371	REF	4	LAST	904	21,3113	1 3213 0	TCF	ZFOLSTY +3
0372	REF	27	LAST	904	21,3114	50 065 1	LVLIMITS	INDEX ITEMP5
0373	REF	4	LAST	903	21,3115	11 700 0	CCS	TRAKLATV
0374	REF	1			21,3116	1 3145 0	TCF	LATVPOS
0375					21,3117	1 3121 1	TCF	+2
0376	REF	1			21,3120	1 3152 0	TCF	LATVNFG
0377	REF	28	LAST	904	21,3121	50 065 1	INDEX	ITEMP5
0378	REF	6	LAST	904	21,3122	4 1674 1	CS	LATVMETR
0379					21,3123	0 0006 1	EXTEND	
0380					21,3124	6 3126 1	BZMF	+2
0381	REF	1			21,3125	1 3161 0	TCF	NEGLMLV
0382	REF	29	LAST	904	21,3126	50 065 1	INDEX	ITEMP5
0383	REF	11	LAST	904	21,3127	4 1676 0	CS	LATVFL
0384					21,3130	0 0006 1	EXTEND	
0385	REF	1			21,3131	6 3204 1	BZMF	LVMINLM
0386	REF	6	LAST	903	21,3132	6 0066 1	AD	ITEMP6
0387	REF	30	LAST	904	21,3133	50 065 1	INDEX	ITEMP5
0388	REF	7	LAST	904	21,3134	6 1674 0	AD	LATVMETR
0389					21,3135	0 0006 1	EXTEND	

L LANDING ANALOG DISPLAYS

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0390	REF	2	LAST	904	21,3136	6 3204 1	BZMF	LVMINLM
0391	REF	31	LAST	904	21,3137	50 065 1	INDEX	ITEMP5
0392	REF	12	LAST	904	21,3140	6 1676 1	AD	LATVEL
0393					21,3141	0 0006 1	EXTEND	
0394	REF	32	LAST	905	21,3142	5 0065 1	INDEX	ITEMP5
0395	REF	8	LAST	904	21,3143	61'674 0	SU	LATVMETR
0396	REF	5	LAST	904	21,3144	1 3210 0	TCF	ZEROLSTY
0397	REF	33	LAST	905	21,3145	50 065 1	INDEX	ITEMP5
0398	REF	13	LAST	905	21,3146	4 1676 0	CS	LATVEL
0399					21,3147	0 0006 1	EXTEND	
0400	REF	3	LAST	905	21,3150	6 3204 1	BZMF	LVMINLM
0401					21,3151	1 3156 1	TCF	+5
0402	REF	34	LAST	905	21,3152	50 065 1	INDEX	ITEMP5
0403	REF	14	LAST	905	21,3153	3 1676 1	CA	LATVEL
0404					21,3154	0 0006 1	EXTEND	
0405	REF	4	LAST	905	21,3155	6 3204 1	BZMF	LVMINLM
0406	REF	35	LAST	905	21,3156	50 065 1	INDEX	ITEMP5
0407	REF	9	LAST	905	21,3157	4 1674 1	CS	LATVMETR
0408	REF	6	LAST	905	21,3160	1 3210 0	TCF	ZEROLSTY
0409	REF	36	LAST	905	21,3161	50 065 1	INDEX	ITEMP5
0410	REF	15	LAST	905	21,3162	3 1676 1	CA	LATVEL
0411					21,3163	0 0006 1	EXTEND	
0412	REF	5	LAST	905	21,3164	6 3204 1	BZMF	LVMINLM
0413	REF	8	LAST	904	21,3165	3 2005 0	CA	MAXVBITS
0414	REF	37	LAST	905	21,3166	50 065 1	INDEX	ITEMP5
0415	REF	10	LAST	905	21,3167	6 1674 0	AD	LATVMETR
0416					21,3170	4 0000 0	COM	
0417	REF	38	LAST	905	21,3171	50 065 1	INDEX	ITEMP5
0418	REF	16	LAST	905	21,3172	6 1676 1	AD	LATVEL
0419					21,3173	0 0006 1	EXTEND	
0420	REF	6	LAST	905	21,3174	6 3204 1	BZMF	LVMINLM
0421					21,3175	0 0006 1	EXTEND	
0422	REF	39	LAST	905	21,3176	5 0065 1	INDEX	ITEMP5
0423	REF	17	LAST	905	21,3177	61'676 1	SU	LATVEL
0424	REF	40	LAST	905	21,3200	50 065 1	INDEX	ITEMP5
0425	REF	11	LAST	905	21,3201	6 1674 0	AD	LATVMETR
0426					21,3202	4 0000 0	COM	
0427	REF	7	LAST	905	21,3203	1 3210 0	TCF	ZEROLSTY
0428	REF	41	LAST	905	21,3204	50 065 1	INDEX	ITEMP5
0429	REF	12	LAST	905	21,3205	4 1674 1	CS	LATVMETR
0430	REF	42	LAST	905	21,3206	50 065 1	INDEX	ITEMP5
0431	REF	18	LAST	905	21,3207	6 1676 1	AD	LATVEL
0432	REF	43	LAST	905	21,3210	50 065 1	INDEX	ITEMP5
0433	REF	4	LAST	904	21,3211	56 072 1	XCH	RUPTREG3
0434	REF	165	LAST	899	21,3212	3 4755 1	CAF	ZERO
0435	REF	44	LAST	905	21,3213	50 065 1	INDEX	ITEMP5
0436	REF	5	LAST	904	21,3214	55'700 0	TS	TRAKLATV
0437	REF	45	LAST	905	21,3215	50 065 1	INDEX	ITEMP5
0438	REF	5	LAST	905	21,3216	3 0072 1	CA	RUPTREG3
0439	REF	25	LAST	873	21,3217	6 4754 0	AD	NEGO

AVOIDS +0 DINC HARDWARE MALFUNCTION

L LANDING ANALOG DISPLAYS

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0440 REF 46 LAST 905 21,3220 50 065 1
 0441 REF 2 LAST 547 21,3221 54 053 0
 0442 REF 47 LAST 906 21,3222 50 065 1
 0443 REF 6 LAST 905 21,3223 3 0072 1
 0444 REF 48 LAST 906 21,3224 50 065 1
 0445 REF 13 LAST 905 21,3225 27'674 1
 0446 REF 49 LAST 906 21,3226 10 065 0
 0447 REF 1 21,3227 1 3004 1

INDEX ITEMP5
 TS CDUTCMD
 INDEX ITEMP5
 CA RUPTREG3
 INDEX ITEMP5
 ADS LATVMETR
 CCS ITEMP5
 TCF VMONITOR

FIRST MONITOR FORWARD THEN LATERAL VEL.

0448 REF 1 21,3230 3 5020 0
 0449 21,3231 0 0006 1
 0450 REF 15 LAST 898 21,3232 05 014 1
 0451 REF 5 LAST 901 21,3233 0 1712 1
 0452 REF 166 LAST 905 21,3234 3 4755 1
 0453 REF 137 LAST 890 21,3235 54 001 1
 0454 REF 1 21,3236 1 2454 1

CAF BITSET
 EXTEND
 WOR CHAN14
 TC LADQSAVF
 CAF ZERO
 TS L
 TCF ZDATA2

DRIVE THE X-POINTER DISPLAY.

GO TO ALTROUT +1 OR TO ALTOUT +1
 ZERO ALTSAVE AND ALTSAVE +1 - - -
 NO NEGATIVE ALTITUDES ALLOWED.

R0455 *****

0456 REF 28 LAST 901 21,3237 4 0074 0
 0457 REF 4 LAST 901 21,3240 7 4752 1
 0458 21,3241 0 0006 1
 0459 REF 1 21,3242 1 3253 1
 0460 REF 31 LAST 900 21,3243 3 4744 1
 0461 REF 38 LAST 900 21,3244 7 1303 1
 0462 REF 274 LAST 902 21,3245 10 000 0
 0463 REF 47 LAST 899 21,3246 3 4752 0
 0464 REF 32 LAST 906 21,3247 6 4744 1
 0465 21,3250 4 0000 0
 0466 21,3251 0 0006 1
 0467 REF 53 LAST 899 21,3252 03 012 1
 0468 REF 1 21,3253 4 3262 0
 0469 REF 39 LAST 906 21,3254 7 1303 1
 0470 REF 40 LAST 906 21,3255 55'303 1
 0471 REF 4 LAST 899 21,3256 4 4736 0
 0472 REF 26 LAST 899 21,3257 7 0075 1
 0473 REF 27 LAST 906 21,3260 54 075 1
 0474 REF 63 LAST 900 21,3261 1 5261 0

DISPRSET CS FLAGWRD0
 MASK R10FLBIT
 EXTEND
 BZF ABORTON
 CAF BIT8
 MASK IMODES33
 CCS A
 CAF BIT2
 AD BIT8
 COM
 EXTEND
 WAND CHAN12
 ABORTON CS BITS8/7
 MASK IMODES33
 TS IMODES33
 CS DIDFLBIT
 MASK FLAGWRD1
 TS FLAGWRD1
 TCF TASKOVER

ARE WE IN DESCENT TRAJECTORY?

NO.
 YES.
 CHECK IF INERTIAL DATA JUST DISPLAYED.
 YES. DISABLE RR ERROR COUNTER
 NO. REMOVE DISPLAY INERTIAL DATA

R0475 *****

0476 21,3262 00300 1

BITS8/7 OCT 00300

INERTIAL DATA AND INTERLEAVE FLAGS.

0477 REF 2 LAST 547 5020

BITSET = PRI06

R0478 *****

L FINOCUW - GUIDAP INTERFACE

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R0001 PROGRAM NAME: FINDCDUW

R0002 MOD NUMBER: 1 68 07 15

R0003 MOD AUTHOR: KLUMPP

R0004 OBJECTS OF MOD: 1. TO SUPPLY COMMANDED GIMBAL ANGLES FOR NOUN 22.
R0005 2. TO MAINTAIN CORRECT AND CURRENT THRUST
R0006 DIRECTION DATA IN ALL MODES. THIS IS DONE BY
R0007 FETCHING FOR THE THRUST DIRECTION FILTER THE
R0008 CDUD'S IN PNGCS-AUTO, THE CDU'S IN ALL OTHER
R0009 MODES.
R0010 3. TO SUBSTITUTE A STOPRATE FOR THE NORMAL
R0011 AUTOPILOT COMMANDS WHENEVER
R0012 1) NOT IN PNGCS-AUTO, OR
R0013 2) ENGINE IS OFF.

R0014 FUNCTIONAL DESCRIPTION:

R0015 FINDCDUW PROVIDES THE INTERFACES BETWEEN THE VARIOUS POWERED FLITE GUIDANCE PROGRAMS
R0017 AND THE DIGITAL AUTOPILOT. THE INPUTS TO FINDCDUW ARE THE THRUST COMMAND VECTOR
R0019 AND THE WINDOW COMMAND VECTOR, AND THE OUTPUTS ARE THE GIMBAL ANGLE
R0020 INCREMENTS, THE COMMANDED ATTITUDE ANGLE RATES, AND THE COMMANDED
R0021 ATTITUDE LAG ANGLES (WHICH ACCOUNT FOR THE ANGLES BY WHICH THE BODY WILL
R0022 LAG BEHIND A RAMP COMMAND IN ATTITUDE ANGLE DUE TO THE FINITE ANGULAR
R0023 ACCELERATIONS AVAILABLE).

R0024 FINDCDUW ALINES THE ESTIMATED THRUST VECTOR FROM THE THRUST DIRECTION
R0025 FILTER WITH THE THRUST COMMAND VECTOR, AND, WHEN XOVINHIB SET,
R0026 ALINES THE +Z HALF OF THE LM ZX PLANE WITH THE WINDOW COMMAND VECTOR.

L FINDCDUW - GUIDAP INTERFACE

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P0027 SPECIFICATIONS:

R0028 INITIALIZATION: A SINGLE INTERPRETIVE CALL TO INITCDUW IS REQUIRED
R0029 BEFORE EACH GUIDED MANEUVER USING FINDCDUW.

R0030 CALL: INTERPRETIVE CALL TO FINDCDUW WITH THE THRUST COMMAND
R0031 VECTOR IN MPAC. INTERPRETIVE CALL TO FINDCDUW -2 WITH
R0032 THE THRUST COMMAND VECTOR IN UNFC/2 AND NOT IN MPAC.

R0033 RETURNS: NORMAL INTERPRETIVE IN ALL CASES

R0034 1. NORMALLY ALL AUTOPILOT CMDS ARE ISSUED.

R0035 2. IF NOT PNGCS AUTO, DO STOPRATE AND RETURN
R0036 WITHOUT ISSUING AUTOPILOT CMDS.

R0037 3. IF ENGINE OFF, DO STOPRATE AND RETURN WITHOUT
R0038 ISSUING AUTOPILOT CMDS.

R0039 ALARMS: 0040I IF INPUTS DETERMINE AN ATTITUDE IN GIMBAL LOCK.
R0040 FINDCDUW DRIVES CDUXD AND CDUYD TO THE RQD VALUES,
R0042 BUT DRIVES CDUZD ONLY TO THE GIMBAL LOCK CONE.
R0043 00402 IF UNFC/2 OR UNWC/2 PRODUCE OVERFLOW WHEN
R0044 UNITIZED USING NORMUNIT. FINDCDUW ISSUES
R0045 STOPRATE AS ONLY INPUT TO AUTOPILOT.

R0046 INPUTS: UNFC/2 THRUST COMMAND VECTOR, NEED NOT BE SEMI-UNIT.
R0047 UNWC/2 WINDOW COMMAND VECTOR, NEED NOT BE SEMI-UNIT.
R0048 XQVINHIB FLAG DENOTING X AXIS OVERRIDE INHIBITED.
R0049 CSMDOCKD FLAG DENOTING CSM DOCKED.
R0050 STEERSW FLAG DENOTING INSUFF THRUST FOR THRUST DIR FLTR.
R0052

R0053 OUTPUTS: DELCDUX,Y,Z
R0054 OMEGAPD,+1,+2
R0055 DELPEROR,+1,+2
R0056 CPHI,+1,+2 FOR NOUN22
R0057

R0058 DEBRIS: FINDCDUW DESTROYS SINCDUX,Y,Z AND COSCDUX,Y,Z BY
R0059 WRITING INTO THESE LOCATIONS THE SINES AND COSINES
R0060 OF THE CDU'S IN PNGCS-AUTO, OF THE CDU'S OTHERWISE.

L FINDCDUW - GUIDAP INTERFACE

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P0061 INITIALIZATION FOR FINDCDUW

0062				30,3055			BANK	30	
0063	REF	1		30,2000			SETLOC	FCDUW	
0064				30,3055			BANK		
0065	REF	2	LAST	151	E6,1644		EBANK=	ECDUW	
0066	REF	1					COUNT*	\$/FCDUW	
0067				30,3055	77775	1	INITCDUW	VLOAD	
0068	REF	11	LAST	896	30,3056	06422	0	UNITX	
0069	REF	5	LAST	151	30,3057	03266	0	STORE	UNFV/2
0070	REF	9	LAST	853	30,3060	03260	0	STORF	UNWC/2
0071				30,3061	77616	0	RVQ		

R0072 FINDCDUW PRELIMINARIES

0073				30,3062	77775	1	VLOAD		FINDCDUW -2: ENTRY WHEN UNFC/2 PRF-STORD
0074	REF	18	LAST	853	30,3063	03252	1	JNFC/2	INPUT VECTORS NEED NOT BE SEMI-UNIT
0075				30,3064	40200	1	FINDCDUW BOV	SETPD	FINDCDUW: ENTRY WHEN UNFC/2 IN MPAC
0076	REF	5	LAST	851	30,3065	61064	1	FINDCDUW	INTERPRETER NOW INITIALIZED
0077				30,3066	00023	0	22		LOCS 0 THRU 21 FOR DIRECTION COSINE MAT
0078				30,3067	77420	1	STQ	EXIT	
0079	REF	2	LAST	151	30,3070	03245	1	QCDUWUSR	SAVE RETURN ADDRESS

R0080 MORE HAUSKEEPING

0081	REF	1		30,3071	3	3732	1	CA	ECDUWL	
0082	REF	37	LAST	902	30,3072	56	003	1	XCH	EBANK
0083	REF	2	LAST	151	30,3073	55	644	1	TS	ECDUWUSR
										SET EBANK
										SAVE USER'S EBANK
0084	REF	33	LAST	864	30,3074	3	0111	0	CA	DAPBOOLS
0085	REF	6	LAST	760	30,3075	7	4737	1	MASK	CSMDCKD
										CSMDCKD MUST NOT BE BIT15
0086	REF	275	LAST	906	30,3076	10	000	0	CCS	A
0087	REF	101	LAST	904	30,3077	3	4753	1	CA	ONE
										INDEX IF CSM DOCKED
0088	REF	2	LAST	151	30,3100	55	646	0	TS	NDXCUDW
0089	REF	1		30,3101	3	4743	0		CA	XOVINHIB
0090	REF	2	LAST	151	30,3102	55	650	1	TS	FLPAUTNO
										XOVINHIB MUST NOT BE BIT15
										SET TO POS-NON-ZERO FLAG PNGCS AUTO NOT
0091	REF	34	LAST	909	30,3103	7	0111	1	MASK	DAPBOOLS
0092	REF	2	LAST	151	30,3104	55	647	1	TS	FLAGOODW
										FLAGOODW = ANY PNZ NUMBER IF XOVI INHIBITD

L FINDCDUW - GUIDAP INTERFACE

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P0093 FETCH BASIC DATA

0094 30,3105 0-0004 0

INHINT

RELINT AT PAUTNO (TC INTPRET)

0095 REF 15 LAST 894 30,3106 3 0032 0

CA CDUX

FETCH CDUX,CDUY,CDUZ IN ALL CASES, BUT
REPLACE BELDW IF PNGCS AUTO

0096 REF 2 LAST 873 30,3107 54 772 1

TS CDUSPOTX

0097 REF 6 LAST 871 30,3110 3 0033 1

CA CDUY

0098 REF 2 LAST 873 30,3111 54 766 1

TS CDUSPOTY

0099 REF 9 LAST 894 30,3112 3 0034 0

CA CDUZ

0100 REF 2 LAST 873 30,3113 54 770 0

TS CDJSPDTZ

0101 REF 42 LAST 898 30,3114 3 4742 1

CA BIT10

PNGCS CONTROL BIT

0102 30,3115 0 0006 1

EXTEND

0103 REF 9 LAST 899 30,3116 02 030 0

RAND CHAN30

0104 REF 276 LAST 909 30,3117 10 000 0

CCS A

0105 REF 1 30,3120 1 3135 1

TCF PAUTND

NOT PNGCS (BITS INVERTED)

0106 REF 64 LAST 789 30,3121 3 4736 1

CA BIT14

AUTO MODE BIT

0107 30,3122 0 0006 1

EXTEND

0108 REF 6 LAST 820 30,3123 02 031 1

RAND CHAN31

0109 REF 277 LAST 910 30,3124 10 000 0

CCS A

0110 REF 2 LAST 910 30,3125 1 3135 1

TCF PAUTNO

NOT AUTO (BITS INVERTED)

0111 REF 3 LAST 909 30,3126 55 650 1

TS FLPAUTND

RESET FLAG PNGCS AUTO NDT

0112 REF 12 LAST 531 30,3127 3 1633 0

CA CDUXD

PNGCS AUTO: FETCH CDUXD,CDUYD,CDUZD

0113 REF 3 LAST 910 30,3130 54 772 1

TS CDJSPOTX

0114 REF 2 LAST 382 30,3131 3 1634 1

CA CDUYD

0115 REF 3 LAST 910 30,3132 54 766 1

TS CDUSPOTY

0116 REF 3 LAST 530 30,3133 3 1635 0

CA CDUZD

0117 REF 3 LAST 910 30,3134 54 770 0

TS CDJSPOTZ

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P0118 FETCH INPUTS

0119	REF 159	LAST 896	30,3135	0 6036 1	PAUTNO	TC	INTPRET	ENTERING THRUST CMD STILL IN MPAC
0120			30,3136	77634 0		RTB		
0121	REF 9	LAST 815	30,3137	21700 0			NORMUNIT	
0122	RFF 1		30,3140	24001 0		STOVL	UNX/2	SEMI-UNIT THRUST CMD AS INITIAL UNX/2
0123	REF 10	LAST 909	30,3141	03260 0			UNWC/2	
0124			30,3142	47034 0		RTB	RTB	
0125	REF 10	LAST 911	30,3143	21700 0			NORMUNIT	
0126	REF 4	LAST 887	30,3144	47521 1			QUICTRIG	ALWAYS REQ TO OBTAIN TRIGS OF CDUD'S
0127	REF 1		30,3145	24015 0		STOVL	JNZ/2	SEMI-UNIT WINDOW CMD AS INITIAL UNZ/2
0128	REF 8	LAST 883	30,3146	00325 0			DELV	
0129			30,3147	53404 1		BOVB	UNIT	
0130	REF 1		30,3150	61721 1			NOATCNT	AT LEAST ONE ENTERING CMD VCT ZERO
0131			30,3151	45000 0		BOV	CALL	
0132	REF 1		30,3152	61166 1			AFTRELTR	IF UNIT DELV OVERFLOWS, SKIP FILTER
0133	REF 6	LAST 896	30,3153	47575 0			*SMNB*	YIELDS UNIT(DELV) IN VEH COORDS FOR FLTR

R0134 THRUST DIRECTION FILTER

0135			30,3154	77776 1		EXIT		
0136	REF 1		30,3155	3 1667 1		CA	UNFVY/2	FOR RESTARTS, UNFV/2 ALWAYS INTACT, MPAC
0137	REF 334	LAST 889	30,3156	22 157 1		LXCH	MPAC	RENEWED AFTER RETURN FROM CALLER,
0138	REF 1		30,3157	0 3454 1		TC	FLTRSUB	TWO FILTER UPDATES MAY BE DONE.
0139	REF 2	LAST 911	30,3160	55'667 0		TS	UNFVY/2	UNFV/2 NEED NOT BE EXACTLY SEMI-UNIT.
0140	REF 1		30,3161	3 1671 0		CA	UNFVZ/2	
0141	REF 335	LAST 911	30,3162	22 161 1		LXCH	MPAC	+5
0142	REF 2	LAST 911	30,3163	0 3454 1		TC	FLTRSUB	
0143	REF 2	LAST 911	30,3164	55'671 1		TS	UNFVZ/2	
0144	REF 160	LAST 911	30,3165	0 6036 1		TC	INTPRET	COMPLETES FILTER

L FINDCDUW - GUIDAP INTERFACE

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P0145 FIND A SUITABLE WINDOW POINTING VECTOR

0146					30,3166	46135 1	AFTRFLTR	SLOAD	BHIZ	IF XOV NOT INHIBITED, GO FETCH ZNB
0147	REF	3	LAST	909	30,3167	03250 0			FLAGCDW	
0148	REF	1			30,3170	61174 1			FETCHZNB	
0149					30,3171	45175 0		VLOAD	CALL	
0150	REF	2	LAST	911	30,3172	00015 0			UNZ/2	
0151	REF	1			30,3173	61474 1			UNWCTEST	

0152					30,3174	77775 1	FETCHZNB	VLOAD		
0153	REF	1			30,3175	02162 0			ZNBPIP	
0154	REF	3	LAST	912	30,3176	34015 1		STCALL	UNZ/2	
0155	REF	2	LAST	912	30,3177	61474 1			UNWCTEST	

0156					30,3200	57575 1		VLOAD	VCOMP	Z AND -X CAN'T BOTH PARALLEL UNFC/2
0157	REF	10	LAST	885	30,3201	02146 0			XNBPIP	
0158	REF	4	LAST	912	30,3202	00015 0		STORE	UNZ/2	

R0159 COMPUTE THE REQUIRED DIRECTION COSINE MATRIX

0160					30,3203	47375 0	DCMCL	VLOAD	VXV	
0161	REF	5	LAST	912	30,3204	00015 0			UNZ/2	
0162	REF	2	LAST	911	30,3205	00001 0			UNX/2	
0163					30,3206	41456 0		UNIT	PUSH	UNY/2 FIRST ITERATION
0164					30,3207	76435 1		VXV	VSL1	
0165	REF	3	LAST	912	30,3210	00001 0			UNX/2	
0166	REF	6	LAST	912	30,3211	00015 0		STORE	UNZ/2	-UNZ/2 FIRST ITERATION
0167					30,3212	63361 0		VXSC	PDVL	EXCHANGE -UNFVZ/2 UNZ/2 FOR UNY/2
0168	REF	3	LAST	911	30,3213	03272 0			UNFVZ/2	MUST BE SMALL
0169					30,3214	51361 1		VXSC	BVSU	YIELDS -UNFVY/2 UNY/2-UNFVZ/2 UNZ/2
0170	REF	3	LAST	911	30,3215	03270 1			UNFVY/2	MUST BE SMALL
0171					30,3216	53372 1		VSL1	VAD	
0172	REF	4	LAST	912	30,3217	00001 0			UNX/2	
0173					30,3220	77656 1		UNIT		TOTALLY ELIMINATES THRUST POINTING ERROR
0174	REF	5	LAST	912	30,3221	00001 0		STORE	UNX/2	UNX/2
0175					30,3222	76435 1		VXV	VSL1	
0176	REF	7	LAST	912	30,3223	00015 0			UNZ/2	-UNZ/2 WAS STORED HERE REMEMBER
0177	REF	1			30,3224	00007 0		STORE	UNY/2	UNY/2
0178					30,3225	47276 1		VCOMP	VXV	
0179	REF	6	LAST	912	30,3226	00001 0			UNX/2	
0180					30,3227	77772 0		VSL1		
0181	REF	8	LAST	912	30,3230	00015 0		STORE	UNZ/2	UNZ/2

L FINDCCUW - GUIDAP INTERFACE

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P0182 CCMPUTE THE REQUIRED GIMBAL ANGLES

0183				30,3231	77624 1	CALL		
0184	REF	1		30,3232	61504 1		NB2CDUSP	YIELDS THE RQD GIMBAL ANGLES, 2'S, PI
0185				30,3233	77776 1	EXIT		

R0186 LIMIT THE MIDDLE GIMBAL ANGLE & COMPUTE THE UNLIMITED GIMBAL ANGLE CHGS

0187	REF	336	LAST	911	30,3234	3 0156 0	CA	MPAC	+2	LIMIT THE MGA
0188	REF	138	LAST	906	30,3235	54 001 1	TS	L		CAN'T LXCH: NEED UNLIMITED MGA FOR ALARM
0189	REF	1			30,3236	3 3744 0	CA	CDU2DLIM		
0190	REF	1			30,3237	0 3700 0	TC	LIMITSUB		YIELDS LIMITED MGA. 1 BIT ERROR POSSIBLE
0191	REF	337	LAST	913	30,3240	56 156 0	XCH	MPAC	+2	BECAUSE USING 2'S COMP. WHO CARES?
0192					30,3241	0 0006 1	EXTEND			
0193	REF	338	LAST	913	30,3242	20 156 1	MSU	MPAC	+2	THIS BETTER YIELD ZERO
0194					30,3243	0 0006 1	EXTEND			
0195					30,3244	1 3246 0	BZF	+2		
0196	REF	1			30,3245	1 3727 1	TCF	ALARMGA		
0197					30,3246	0 0004 0	MGARET	INHINT		RELINT AT TC INTPRET AFTER TCQCDUW
0198					30,3247	22 007 0	ZL			
0199	REF	61	LAST	896	30,3250	3 4752 0	CA	TWO		
0200	REF	4	LAST	114	30,3251	54 142 1	DELGMBLP	IS	TEM2	
0201	REF	139	LAST	913	30,3252	3 0001 0	CA	L		TO PREVENT FALSE STARTS ABOUT X, ZERO
0202					30,3253	0 0006 1	EXTEND			FLAGOODW IF DELGMBZ OR Y TOO BIG.
0203					30,3254	7 0000 0	SQUARE			
0204	REF	5	LAST	429	30,3255	6 4350 0	AD	HI5		WITHIN 1 BIT OF -(45 DEG SQUARED)
0205					30,3256	0 0006 1	EXTEND			
0206					30,3257	6 3262 1	BZMF	+3		
0207	REF	167	LAST	906	30,3260	3 4755 1	CA	ZERO		
0208	REF	4	LAST	912	30,3261	55'647 1	TS	FLAGOODW		
0209	REF	5	LAST	913	30,3262	50 142 0	INDEX	TEM2		
0210	REF	339	LAST	913	30,3263	3 0154 1	CA	MPAC		
0211	REF	6	LAST	913	30,3264	50 142 0	INDEX	TEM2		
0212	REF	10	LAST	529	30,3265	54 321 0	TS	CPHI		OUTPUTS TO NOUN22
0213					30,3266	0 0006 1	EXTEND			
0214	REF	7	LAST	913	30,3267	5 0142 0	INDEX	TEM2		
0215	REF	13	LAST	910	30,3270	21'633 1	MSU	CDUXD		NO MATTER THAT THESE SLIGHTLY DIFFERENT
0216					30,3271	4 0000 0	COM			FROM WHEN WE INITIALLY FETCHED THEM
0217	REF	8	LAST	913	30,3272	50 142 0	INDEX	TEM2		
0218	REF	1			30,3273	55'673 0	TS	-DELGMB		-UNLIMITED GIMBAL ANGLE CHGS, 1'S, PI
0219	REF	140	LAST	913	30,3274	54 001 1	TS	L		FOR PRECEDING TEST ON NEXT LOOP PASS
0220	REF	9	LAST	913	30,3275	10 142 1	CCS	TEM2		
0221	REF	1			30,3276	1 3251 0	TCF	DELGMBLP		

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P0222 BRANCHES TC NOATTCNT

0223	REF	4	LAST	910	30,3277	11'650	1
0224	REF	2	LAST	911	30,3300	1 3723	0

CCS	FLPAUTNO	
TCF	NOATTCNT +2	NOT PNGCS AUTO

0225	REF	25	LAST	894	30,3301	3 0101	1
0226	REF	6	LAST	831	30,3302	7 4745	1
0227					30,3303	0 0006	1
0228	REF	3	LAST	914	30,3304	1 3723	0

CA	FLAGWRD5	
MASK	ENGONBIT	
EXTEND		
BZF	NOATTCNT +2	ENGINE NOT ON

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P0229 LIMIT THE ATTITUDE ANGLE CHANGES

R0230 THIS SECTION LIMITS THE ATTITUDE ANGLE CHANGES ABOUT A SET OF ORTHOGONAL VEHICLE AXES X,YPRIME,ZPRIME.
 R0232 THESE AXES COINCIDE WITH THE COMMANDED VEHICLE AXES IF AND ONLY IF CDUW IS ZERO. THE PRIME SYSTEM IS
 R0234 THE COMMANDED VEHICLE SYSTEM ROTATED ABOUT THE X AXIS TO BRING THE Z AXIS INTO ALINEMENT WITH THE MIDDLE GIMBAL
 R0236 AXIS. ATTITUDE ANGLE CHANGES IN THE PRIME SYSTEM ARE RELATED TO SMALL GIMBAL ANGLE CHANGES BY:

R0238 * -DELATTX * * 1 SIN(CDUW) 0 * * -DELGMBX *
 R0239 * * * * * * * * * *
 R0240 * -DELATTYPRIME * = * 0 COS(CDUW) 0 * * -DELGMBY *
 R0241 * * * * * * * * * *
 R0242 * -DELATTZPRIME * * 0 0 1 * * -DELGMBZ *

0243	REF	2	LAST	913	30,3305	23'675	1	LXCH	-DELGMB	+2	SAME AS -DELATTZPRIME UNLIMITED
0244	REF	3	LAST	909	30,3306	51'646	1	INDEX	NDXC DUW		
0245	REF	1			30,3307	3 3740	1	CA	DAXMAX		
0246	REF	2	LAST	913	30,3310	0 3700	0	TC	LIMITSUB		
0247	REF	3	LAST	915	30,3311	55'675	0	TS	-DELGMB	+2	-DELGMBZ

0248	REF	4	LAST	915	30,3312	3 1674	0	CA	-DELGMB	+1	
0249					30,3313	0 0006	1	EXTEND			
0250	REF	3	LAST	491	30,3314	7 0746	0	MP	COSCDUW		YIELDS -DELATTYPRIME/2 UNLIMITED
0251	REF	141	LAST	913	30,3315	54 001	1	TS	L		
0252	REF	4	LAST	915	30,3316	51'646	1	INDEX	NDXC DUW		
0253	REF	1			30,3317	3 3742	0	CA	DAY/2MAX		
0254	REF	3	LAST	915	30,3320	0 3700	0	TC	LIMITSUB		
0255					30,3321	0 0006	1	EXTEND			
0256	REF	4	LAST	915	30,3322	10 746	0	DV	COSCDUW		
0257	REF	5	LAST	915	30,3323	57'674	0	XCH	-DELGMB	+1	-DELGMBY, FETCHING UNLIMITED VALUE

0258					30,3324	0 0006	1	EXTEND			
0259	REF	3	LAST	491	30,3325	7 0740	0	MP	SINCDUW		
0260					30,3326	20 001	1	DDOUBL			
0261					30,3327	4 0000	0	COM			
0262					30,3330	0 0006	1	EXTEND			YIELDS +DELATTX UNLIMITD, MAG < 180 DEG,
0263	REF	6	LAST	915	30,3331	21'673	0	MSU	-DELGMB		BASED ON UNLIMITED DELGMBY.
0264	REF	142	LAST	915	30,3332	54 001	1	TS	L		ONE BIT ERROR IE OPERANDS IN MSU
0265	REF	5	LAST	915	30,3333	51'646	1	INDEX	NDXC DUW		OE MIXED SIGNS. WHO CARES?
0266	REF	1			30,3334	3 3740	1	CA	DAXMAX		
0267	REF	4	LAST	915	30,3335	0 3700	0	TC	LIMITSUB		
0268	REF	7	LAST	915	30,3336	55'673	0	TS	-DELGMB		SAVE LIMITED +DELATTX
0269	REF	5	LAST	913	30,3337	11'647	1	CCS	FLAGOODW		
0270	REF	8	LAST	915	30,3340	4 1673	0	CS	-DELGMB		FETCH IT BACK CHGNG SIGN IF WINDOW GOOD
0271	REF	9	LAST	915	30,3341	55'673	0	TS	-DELGMB		OTHERWISE USE ZERO FOR -DELATTX
0272	REF	10	LAST	915	30,3342	4 1674	1	CS	-DELGMB	+1	
0273					30,3343	0 0006	1	EXTEND			
0274	REF	4	LAST	915	30,3344	7 0740	0	MP	SINCDUW		
0275					30,3345	20 001	1	DDOUBL			YIELDS -CNTRIB TO -DELATTX FROM -DELGMBY
0276	REF	11	LAST	915	30,3346	27'673	0	ADS	-DELGMB		-DELGMBX. NO OVERFLOW SINCE LIMITED TO
A0277											20DEG(1+SIN(70DEG)/COS(70DEG)) < 180DEG

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P0278 COMPUTE COMMANDED ATTITUDE RATES

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R0279 * CMEGAPD * * -2 -4 SINCDUZ +0 * * -DELGMBX *
R0280 * * * * * * * * * *
R0281 * CMEGAQD * = * +0 -8 COSCDUZ CDSCDUX -4 SINCDUX * * -DELGMBY *
R0282 * * * * * * * * * *
R0283 * CMEGARD * * +0 +8 CDSCDUX SINCDUX -4 COSCDUX * * -DELGMBZ *

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R0284 ATTITUDE ANGLE RATES IN UNITS OF $\pi/4$ RAD/SEC = K TRIG FCNS IN UNITS OF 2 X GIMBAL ANGLE RATES IN UNITS OF
 R0286 $\pi/2$ RAD/SEC. THE CONSTANTS ARE BASED ON DELGMB BEING THE GIMBAL ANGLE CHANGES IN UNITS OF π RADIAN,
 R0288 AND 2 SECONDS BEING THE COMPUTATION PERIOD (THE PERIOD BETWEEN SUCCESSIVE PASSES THRU FINDCDUW).

0290	REF	12	LAST	915	30,3347	4 1673 0	CS	-DELGMB	
0291	REF	6	LAST	382	30,3350	55'641 1	TS	OMEGAPD	
0292	REF	13	LAST	916	30,3351	4 1674 1	CS	-DELGMB	+1
0293					30,3352	0 0006 1	EXTEND		
0294	REF	5	LAST	915	30,3353	7 0740 0	MP	SINCDUZ	
0295					30,3354	20 001 1	DDOUBL		
0296	REF	7	LAST	916	30,3355	27'641 1	ADS	OMEGAPD	
0297	REF	8	LAST	916	30,3356	27'641 1	ADS	OMEGAPD	
0298	REF	14	LAST	916	30,3357	4 1674 1	CS	-DELGMB	+1
0299					30,3360	0 0006 1	EXTEND		
0300	REF	4	LAST	491	30,3361	7 0750 1	MP	CDSCDUX	
0301					30,3362	20 001 1	DDOUBL		
0302					30,3363	0 0006 1	EXTEND		
0303	REF	5	LAST	915	30,3364	7 0746 0	MP	COSCDUZ	
0304	REF	2	LAST	382	30,3365	55'642 1	TS	OMEGAQD	
0305	REF	15	LAST	916	30,3366	4 1675 0	CS	-DELGMB	+2
0306					30,3367	0 0006 1	EXTEND		
0307	REF	3	LAST	491	30,3370	7 0742 1	MP	SINCDUX	
0308	REF	3	LAST	916	30,3371	27'642 1	ADS	OMEGAQD	
0309	REF	4	LAST	916	30,3372	27'642 1	ADS	OMEGAQD	
0310	REF	5	LAST	916	30,3373	27'642 1	ADS	OMEGAQD	
0311	REF	16	LAST	916	30,3374	3 1674 0	CA	-DELGMB	+1
0312					30,3375	0 0006 1	EXTEND		
0313	REF	4	LAST	916	30,3376	7 0742 1	MP	SINCDUX	
0314					30,3377	20 001 1	DDOUBL		
0315					30,3400	0 0006 1	EXTEND		
0316	REF	6	LAST	916	30,3401	7 0746 0	MP	COSCDUZ	
0317	REF	2	LAST	382	30,3402	55'643 0	TS	OMEGARD	
0318	REF	17	LAST	916	30,3403	4 1675 0	CS	-DELGMB	+2
0319					30,3404	0 0006 1	EXTEND		
0320	REF	5	LAST	916	30,3405	7 0750 1	MP	COSCDUX	
0321	REF	3	LAST	916	30,3406	27'643 0	ADS	OMEGARD	
0322	REF	4	LAST	916	30,3407	27'643 0	ADS	OMEGARD	
0323	REF	5	LAST	916	30,3410	27'643 0	ADS	OMEGARD	

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P0324 FINAL TRANSFER

0325	REF	62	LAST	913	30,3411	3 4752 0	CA	TWO	
0326	REF	10	LAST	913	30,3412	54 142 1	TS	TEM2	
0327	REF	11	LAST	917	30,3413	50 142 0	INDEX	TEM2	
0328	REF	18	LAST	916	30,3414	3 1673 1	CA	-DELGMB	
0329					30,3415	0 0006 1	EXTEND		
0330	REF	1			30,3416	7 3745 0	MP	DT/DELT	RATIO OF DAP INTERVAL TO CDUW INTERVAL
0331	REF	1			30,3417	0 3714 0	TC	ONESTO2S	
0332	REF	12	LAST	917	30,3420	50 142 0	INDEX	TEM2	
0333	REF	4	LAST	151	30,3421	55'636 1	TS	DELCUW	ANGLE INTERFACE
0334	REF	13	LAST	917	30,3422	50 142 0	INDEX	TEM2	
0335	REF	9	LAST	916	30,3423	11'641 1	CCS	OMEGAPD	
0336	REF	102	LAST	909	30,3424	6 4753 1	AD	ONE	
0337					30,3425	1 3427 1	TCF	+2	
0338	REF	103	LAST	917	30,3426	6 4753 1	AD	ONE	
0339					30,3427	0 0006 1	EXTEND		WE NOW HAVE ABS(OMEGAPD,QD,RD)
0340	REF	14	LAST	917	30,3430	5 0142 0	INDEX	TEM2	
0341	REF	10	LAST	917	30,3431	7 1641 1	MP	OMEGAPD	
0342					30,3432	0 0006 1	EXTEND		
0343	REF	29	LAST	758	30,3433	7 4741 0	MP	BIT11	1/16
0344					30,3434	0 0006 1	EXTEND		
0345	REF	15	LAST	917	30,3435	5 0142 0	INDEX	TEM2	2
0346	REF	6	LAST	380	30,3436	11'530 1	DV	1JACC	UNITS PI/4 RAD/SEC
0347	REF	143	LAST	915	30,3437	54 001 1	TS	L	
0348	REF	1			30,3440	3 3742 0	CA	DELERLIM	
0349	REF	5	LAST	915	30,3441	0 3700 0	TC	LIMITSUB	
0350	REF	16	LAST	917	30,3442	50 142 0	INDEX	TEM2	
0351	REF	3	LAST	382	30,3443	55'277 0	TS	DELPERROR	LAG ANGLE = OMEGA ABS(OMEGA)/2 ACCEL
0352	REF	17	LAST	917	30,3444	10 142 1	CCS	TEM2	
0353	REF	1			30,3445	1 3412 1	TCF	CDUWXFR	

R0354 HAUSKEEPING AND RETURN

0355	REF	3	LAST	909	30,3446	3 1644 0	TCQCDUW	CA	ECUWUSR	
0356	REF	38	LAST	909	30,3447	54 003 0		TS	EBANK	RETURN USER'S EBANK
0357	REF	161	LAST	911	30,3450	0 6036 1		TC	INTPPRET	
0358					30,3451	52001 1		SETPD	GOTO	
0359					30,3452	00001 0			0	
0360	REF	3	LAST	909	30,3453	03245 1			QCUDWUSP	NORMAL AND ABNORMAL RETURN TO USER

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P0361 THRUST VECTOR FILTER SUBROUTINE

0362				30,3454	0 0006	1	FLTRSUB	EXTEND		
0363	REF	18	LAST	917	30,3455	22 142	0	QXCH	TEM2	
0364	REF	3	LAST	114	30,3456	54 143	0	TS	TEM3	
0365					30,3457	4 0000	0	COM		SAVE ORIGINAL OFFSET
0366	REF	144	LAST	917	30,3460	6 0001	0	AD	L	ONE MCT, NO WDS, CAN BE SAVED IF NEG OF
0367					30,3461	0 0006	1	EXTEND		ORIG OFFSET ARRIVES IN A, BUT IT'S
0368	REF	6	LAST	915	30,3462	5 1646	1	INDEX	NDXCDUW	NOT WORTH THE INCREASED OBSCURITY.
0369	REF	1			30,3463	7 3733	1	MP	GAINFLTR	
0370	REF	145	LAST	918	30,3464	54 001	1	TS	L	INCR TO OFFSET, UNLIMITED
0371	REF	1			30,3465	3 3735	0	CA	DUNFVLIM	SAME LIMIT FOR Y AND Z
0372	REF	6	LAST	917	30,3466	0 3700	0	TC	LIMITSUB	YIELDS INCR TO OFFSET, LIMITED
0373	REF	4	LAST	918	30,3467	6 0143	1	AD	TEM3	ORIGINAL OFFSET
0374	REF	146	LAST	918	30,3470	54 001	1	TS	L	TOTAL OFFSET, UNLIMITED
0375	REF	1			30,3471	3 3736	0	CA	UNFVLIM	SAME LIMIT FOR Y AND Z
0376	REF	7	LAST	918	30,3472	0 3700	0	TC	LIMITSUB	YIELDS TOTAL OFFSET, LIMITED
0377	REF	19	LAST	918	30,3473	0 0142	0	TC	TEM2	

R0378 SUBR TO TEST THE ANGLE BETWEEN THE PROPOSED WINDOW AND THRUST CMD VCTS

0379					30,3474	63441	0	UNWCTEST	DOT	DSQ
0380	REF	7	LAST	912	30,3475	00001	0			UNX/2
0381					30,3476	50025	0		DSU	3MN
0382	REF	1			30,3477	21740	1			DOTSWFMX
0383	REF	1			30,3500	61203	1			DCMCL
0384					30,3501	43531	1	SSP	RVQ	RVQ FOR ALT CHOICE IF DOT MAGN TOO LARGE
0385	REF	6	LAST	915	30,3502	03250	0		FLAGCDW	ZEROING WINDOW GOOD FLAG
0386					30,3503	00000	1		0	

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P0387 NB2CDUWP RETURNS THE 2'S COMPLEMENT, PI, SP CDU ANGLES X,Y,Z IN MPAC,+1,+2 GIVEN THE MATRIX WHOSE ROW VECTORS
 R0389 ARE THE SEMI-UNIT NAV BASE VECTORS X,Y,Z EXPRESSED IN STABLE MEMBER COORDINATES, LOCATED AT 0 IN THE PUSH LIST.

R0391 NB2CDUWP USES ARCTRGSP WHICH HAS A MAXIMUM ERROR OF +-4 BITS.

0392				30,3504	63545	0	NB2CDUWP	DLOAD	DSQ		
0393				30,3505	00003	1			2		
0394				30,3506	51021	0		BDSU	BPL		
0395	REF	5	LAST	657	30,3507	06414	0		DP1/4TH		
0396					30,3510	61513	1		+3		
0397					30,3511	77745	1		DLOAD		
0398	REF	17	LAST	818	30,3512	06424	0		ZEROVECS		IN CASE SIN WAS SLIGHTLY > 1/2
0399					30,3513	77566	1		SQRT	EXIT	YIELDS COS(CDUZ) IN UNITS OF 2
0400					30,3514	0 0006	1		EXTEND		
0401	REF	340	LAST	913	30,3515	3 0155	0		DCA	MPAC	
0402					30,3516	20 001	1		DDOUBL		
0403	REF	3	LAST	114	30,3517	54 145	0		TS	TEM5	
0404					30,3520	1 3523	1		TCF	+3	
0405	REF	20	LAST	899	30,3521	3 4733	1		CA	POSMAX	OVERFLOW. FETCH POSMAX, MPAC ALWAYS POS
0406	REF	4	LAST	919	30,3522	54 145	0		TS	TEM5	COS(CDUZ) IN TEM5, UNITS 1
0407	REF	25	LAST	887	30,3523	50 120	1		INDEX	FIXLOC	
0408					30,3524	3 0002	0		CA	2	
0409	REE	341	LAST	919	30,3525	22 154	1		LXCH	MPAC	
0410	REF	1			30,3526	0 3573	0		TC	ARCTRGSP	
0411	REF	342	LAST	919	30,3527	54 156	1		TS	MPAC	+2 CDUZ
0412	REF	168	LAST	913	30,3530	3 4755	1		CA	ZERO	
0413	REF	1			30,3531	0 3551	0		TC	DVBYCOSM	
0414	REF	21	LAST	860	30,3532	3 4751	0		CA	EQUR	
0415	REF	2	LAST	919	30,3533	0 3551	0		TC	DVBYCOSM	
0416	REF	9	LAST	349	30,3534	4 0141	1		CS	TEM1	
0417	REF	2	LAST	919	30,3535	0 3573	0		TC	ARCTRGSP	
0418	REE	343	LAST	919	30,3536	54 155	1		TS	MPAC	+1 CDUY
0419	REF	38	LAST	899	30,3537	3 4750	1		CA	BIT4	
0420	REF	3	LAST	919	30,3540	0 3551	0		TC	DVBYCOSM	
0421	REF	1			30,3541	3 3550	1		CA	16OCT	
0422	REF	4	LAST	919	30,3542	0 3551	0		TC	DVBYCOSM	
0423	REE	10	LAST	919	30,3543	4 0141	1		CS	TEM1	
0424	REF	3	LAST	919	30,3544	0 3573	0		TC	ARCTRGSP	
0425	REF	344	LAST	919	30,3545	54 154	0		TS	MPAC	CDUX
0426	REF	162	LAST	917	30,3546	0 6036	1		TC	INTPRET	
0427					30,3547	77616	0		RVQ		
0428					30,3550	00016	0	16OCT	OCT	16	

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P0429 THE ELEMENTS OF THE NAV BASE MATRIX WHICH WE MUST DIVIDE BY COS(MGA)
 R0430 ALREADY CONTAIN COS(MGA)/2 AS A FACTOR. THEREFORE THE QUOTIENT SHOULD
 R0431 ORDINARILY NEVER EXCEED 1/2 IN MAGNITUDE. BUT IF THE MGA IS NEAR $\pi/2$
 R0432 THEN COS(MGA) IS NEAR ZERO, AND THERE MAY BE SOME CHAFF IN THE OTHER
 R0433 ELEMENTS OF THE MATRIX WHICH WOULD PRODUCE CHAOS UNDER DIVISION.
 R0434 BEFORE DIVIDING WE MAKE SURE COS(MGA) IS AT LEAST ONE BIT LARGER
 R0435 THAN THE MAGNITUDE OF THE HIGH ORDER PART OF THE OPERAND.

R0436 IF ONE OR MORE DIVIDES CANNOT BE PERFORMED, THIS MEANS THAT THE
 R0437 REQUIRED MGA IS VERY NEARLY $\pm\pi/2$ AND THEREFORE THE OTHER GIMBAL
 R0438 ANGLES ARE INDETERMINATE. THE INNER AND OUTER GIMBAL ANGLES RETURNED
 R0439 IN THIS CASE WILL BE RANDOM MULTIPLES OF $\pi/2$.

0440	REF	26	LAST	919	30,3551	6 0120 1	DVBYCOSM	AD	FIXLCC	
0441	REF	1			30,3552	54 116 0		TS	ADDRWD	ADRES OF OPERAND
0442	REF	2	LAST	920	30,3553	50 116 1		INDEX	ADDRWD	FETCH NEG ABS OF OPERAND, AD TEM5, AND
0443					30,3554	3 0000 1		CA	0	SKIP DIVIDE IF RESULT NEG OR ZERO
0444					30,3555	0 0006 1		EXTEND		
0445					30,3556	6 3560 1		BZMF	+2	
0446					30,3557	4 0000 0		COM		
0447	REF	5	LAST	919	30,3560	6 0145 1		AD	TEM5	C(A) ZERO OR NEG, C(TEM5) ZERO OR POS
0448					30,3561	0 0006 1		EXTEND		
0449	REF	1			30,3562	6 3570 0		BZMF	TSL&TCQ	DIFFERENCE ALWAYS SMALL IF BRANCH
0450					30,3563	0 0006 1		EXTEND		
0451	REF	3	LAST	920	30,3564	5 0116 1		INDEX	ADDRWD	TEM5 EXCEEDS ABS HIGH ORDER PART OF
0452					30,3565	3 0001 0		DCA	0	OPERAND BY AT LEAST ONE BIT.
0453					30,3566	0 0006 1		EXTEND		THEREFORE IT EXCEEDS THE DP OPERAND
0454	REF	6	LAST	920	30,3567	10 145 0		DV	TEM5	AND DIVISION WILL ALWAYS SUCCEED.
0455	REF	147	LAST	918	30,3570	54 001 1	TSL&TCQ	TS	L	
0456	REF	11	LAST	919	30,3571	22 141 0		LXCH	TEM1	
0457	REF	220	LAST	898	30,3572	0 0002 0		TC	Q	

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P0458 ARCTRGSP RETURNS THE 2'S COMPLEMENT, PI, SP ANGLE IN THE A REGISTER GIVEN ITS SINE IN A AND ITS COSINE IN L IN
 R0460 UNITS OF 2. THE RESULT IS AN UNAMBIGUOUS ANGLE ANYWHERE IN THE CIRCLE, WITH A MAXIMUM ERROR OF +-4 BITS.
 R0462 THE ERROR IS PRODUCED BY THE SUBROUTINE SPARCSIN WHICH IS USED ONLY IN THE REGION +-45 DEGREES.

0464				30,3573	0 0006 1	ARCTRGSP	EXTEND		
0465	REF	1		30,3574	1 3636 0	BZF	SINZERO	TO AVOID DIVIDING BY ZERO	
0466				30,3575	0 0006 1		EXTEND		
0467	REF	10	LAST	433	30,3576	22 144 0	QXCH	TEM4	
0468	REF	20	LAST	918	30,3577	54 142 1	TS	TEM2	
0469	REF	148	LAST	920	30,3600	3 0001 0	CA	L	
0470	REF	5	LAST	918	30,3601	54 143 0	TS	TEM3	
0471	REF	169	LAST	919	30,3602	3 4755 1	CA	ZERO	
0472				30,3603	0 0006 1		EXTEND		
0473	REF	21	LAST	921	30,3604	10 142 1	DV	TEM2	
0474				30,3605	0 0006 1		EXTEND		
0475	REF	1		30,3606	1 3625 1	BZF	USECOS		
0476	REF	6	LAST	921	30,3607	10 143 0	CCS	TEM3	SIN IS SMALLER OR EQUAL
0477	REF	170	LAST	921	30,3610	3 4755 1	CA	ZERO	
0478				30,3611	1 3615 1	TCF	+4		
0479	REF	22	LAST	921	30,3612	4 0142 1	CS	TEM2	IF COS NEG, REVERSE SIGN OF SIN,
0480	REF	23	LAST	921	30,3613	54 142 1	TS	TEM2	ANGLE = PI-ARCSIN(SIN)
0481	REF	3	LAST	608	30,3614	3 4735 1	CA	NEGMAX	PICK UP PI, 2'S COMPLEMENT
0482	REF	7	LAST	921	30,3615	54 143 0	TS	TEM3	WE NO LONGER NEED COS
0483	REF	24	LAST	921	30,3616	3 0142 0	CA	TEM2	
0484	REF	2	LAST	811	30,3617	0 3643 0	TC	SPARCSIN -1	
0485	REF	2	LAST	917	30,3620	0 3714 0	TC	ONESTO2S	
0486				30,3621	0 0006 1		EXTEND		
0487	REF	8	LAST	921	30,3622	20 143 0	MSU	TEM3	
0488	REF	3	LAST	921	30,3623	0 3714 0	1TO2&TCO TC	ONESTO2S	
0489	REF	11	LAST	921	30,3624	0 0144 0	TC	TEM4	
0490	REF	9	LAST	921	30,3625	4 0143 0	USECOS CS	TEM3	COS IS SMALLER
0491	REF	3	LAST	921	30,3626	0 3643 0	TC	SPARCSIN -1	ANGLE = SIGN(SIN)(PI/2-ARCSIN(COS))
0492	REF	9	LAST	900	30,3627	6 4736 1	AD	HALF	
0493	REF	10	LAST	921	30,3630	54 143 0	TS	TEM3	WE NO LONGER NEED COS
0494	REF	25	LAST	921	30,3631	10 142 1	CCS	TEM2	
0495	REF	11	LAST	921	30,3632	3 0143 1	CA	TEM3	
0496	REF	1		30,3633	1 3623 1	TCF	1TO2&TCO		
0497	REF	12	LAST	921	30,3634	4 0143 0	CS	TEM3	
0498	REF	2	LAST	921	30,3635	1 3623 1	TCF	1TO2&TCO	
0499	REF	149	LAST	921	30,3636	10 001 1	SINZERO CCS	L	
0500	REF	171	LAST	921	30,3637	3 4755 1	CA	ZERO	
0501	REF	221	LAST	920	30,3640	0 0002 0	TC	Q	
0502	REF	4	LAST	921	30,3641	3 4735 1	CA	NEGMAX	PI, 2'S COMP
0503	REF	222	LAST	921	30,3642	0 0002 0	TC	Q	

L FINDCCUW - GUIDAP INTERFACE

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P0504 SPARCSIN TAKES AN ARGUMENT SCALED UNITY IN A AND RETURNS AN ANGLE SCALED
 R0505 180 DEGREES IN A. IT HAS BEEN UNIT TESTED IN THE REGION $\pm .94$ (± 70
 R0506 DEGREES) AND THE MAXIMUM ERROR IS ± 5 BITS WITH AN AVERAGE TIME OF
 R0507 450 MICROSECONDS. SPARCSIN -1 TAKES THE ARGUMENT SCALED TWO.(BOB CRISP)

0508				30,3643	6 0000 1		DOUBLE
0509	REF	8	LAST	457	30,3644	54 021 0	SPARCSIN TS SR
0510					30,3645	1 3651 1	TCF +4
0511	REF	278	LAST	910	30,3646	50 000 1	INDEX A
0512	REF	1			30,3647	4 4734 1	CS LIMITS
0513	REF	9	LAST	922	30,3650	54 021 0	TS SR
0514					30,3651	0 0006 1	EXTEND
0515	REF	279	LAST	922	30,3652	7 0000 0	MP A
0516	REF	12	LAST	920	30,3653	54 141 1	TS TEM1
0517					30,3654	0 0006 1	EXTEND
0518	REF	1			30,3655	7 3677 0	MP DPL9
0519	REF	1			30,3656	6 3676 0	AD DPL7
0520					30,3657	0 0006 1	EXTEND
0521	REF	13	LAST	922	30,3660	7 0141 1	MP TEM1
0522	REF	1			30,3661	6 3675 0	AD DPL5
0523					30,3662	0 0006 1	EXTEND
0524	REF	14	LAST	922	30,3663	7 0141 1	MP TEM1
0525	REF	1			30,3664	6 3674 1	AD DPL3
0526					30,3665	0 0006 1	EXTEND
0527	REF	15	LAST	922	30,3666	7 0141 1	MP TEM1
0528	REF	1			30,3667	6 3673 0	AD DPL1
0529					30,3670	0 0006 1	EXTEND
0530	REF	10	LAST	922	30,3671	7 0021 0	MP SR
0531	REF	223	LAST	921	30,3672	0 0002 0	TC Q
0532					30,3673	24406 0	DPL1 DEC 10502
0533					30,3674	00660 1	DPL3 DEC 432
0534					30,3675	16204 0	DPL5 DEC 7300
0535					30,3676	50744 0	DPL7 DEC -11803
0536					30,3677	20315 1	DPL9 DEC 8397

L FINDCDUW - GUIDAP INTERFACE

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P0537 LIMITSUB LIMITS THE MAGNITUDE OF THE POSITIVE OR NEGATIVE VARIABLE
 R0538 ARRIVING IN L TO THE POSITIVE LIMIT ARRIVING IN A.
 R0539 THE SIGNED LIMITED VARIABLE IS RETURNED IN A.

R0540 VERSION COURTESY FUGH BLAIR-SMITH

0541	REF 16	LAST 922	30,3700	54 141 1	LIMITSUB TS	TEM1
0542	REF 172	LAST 921	30,3701	3 4755 1	CA	ZERO
0543			30,3702	0 0006 1	EXTEND	
0544	REF 17	LAST 923	30,3703	10 141 1	DV	TEM1
0545	REF 280	LAST 922	30,3704	10 000 0	CCS	A
0546	REF 18	LAST 923	30,3705	22 141 0	LXCH	TEM1
0547			30,3706	1 3710 0	TCF	+2
0548			30,3707	1 3712 1	TCF	+3
0549	REF 150	LAST 921	30,3710	3 0001 0	CA	L
0550	REF 224	LAST 922	30,3711	0 0002 0	TC	Q
0551	REF 19	LAST 923	30,3712	4 0141 1	CS	TEM1
0552	REF 225	LAST 923	30,3713	0 0002 0	TC	Q

R0553 SUBROUTINE TO CONVERT 1'S COMP SP TO 2'S COMP

0554	REF 281	LAST 923	30,3714	10 000 0	ONESTO2S CCS	A
0555	REF 104	LAST 917	30,3715	6 4753 1	AD	ONE
0556	REF 226	LAST 923	30,3716	0 0002 0	TC	Q
0557	REF 282	LAST 923	30,3717	4 0000 0	CS	A
0558	REF 227	LAST 923	30,3720	0 0002 0	TC	Q

R0559 NO ATTITUDE CONTROL

0560	REF 34	LAST 876	30,3721	0 5567 0	NOATTICNT TC	ALARM	
0561			30,3722	00402 1	OCT	00402	NO ATTITUDE CONTROL
0562			30,3723	0 0004 0	+2	INHINT	COME HERE FOR NOATTICNT WITHOUT ALARM
0563	REF 46	LAST 876	30,3724	0 4674 0	TC	IBNKCALL	RELINT AT TC INTPRET AFTER TCQCDUW
0564	REF 7	LAST 864	30,3725	40165 1	FCADR	STOPRATF	
0565	REF 1		30,3726	1 3446 0	TCF	TCQCDUW	RETURN TO USER SKIPPING AUTOPILOT CMDS

R0566 MIDDLE GIMBAL ANGLE ALARM

0567	REF 35	LAST 923	30,3727	0 5567 0	ALARMGA TC	ALARM
0568			30,3730	00401 1	OCT	00401
0569	REF 1		30,3731	1 3246 0	TCF	MGARET

L FINDCDUW - GUIDAP INTERFACE

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P0570 *****
 R0571 CCNstants
 R0572 *****

R0573 ADDRESS CONSTANTS

0574 REF 3 LAST 909 30,3732 03244 0 ECDUWL ECADR FCDUW

R0575
 R0576 THRUST DIRECTION FILTER CONSTANTS

0577 30,3733 06315 0 GAINFLTR DEC .2 GAIN FILTER SANS CSM
 0578 30,3734 03146 1 DEC .1 GAIN FILTER WITH CSM

0579 30,3735 00071 1 DUNFVLIM DEC .007 8-1 7 MR MAX CHG IN F DIR IN VFH IN 2 SFCS.
 A0580 THIS DOES NOT ALLOW FOR S/C ROT RATE.

0581 30,3736 02041 0 UNFVLIM DEC .129 8-1 129 MR MAX THRUST OFFSET. 105 MR TRAVEL
 A0582 +10MR DEFL+5MR MECH MOUNT+9MR ABLATION.
 R0583

R0584 CCNstants RLATED TO GIMBAL ANGLE COMPUTATIONS

0585 30,3737 01673 1 DOTSWMX DEC .93302 8-4 LIM COLNRTY OF UNWC/2 & UNFC/2 TO 85 DFG
 A0586 LOWER PART COMES FROM NEXT CONSTANT

0587 30,3740 03434 1 DAXMAX DEC .1111111111 DFLATTX LIM TO 20 DFG IN 2 SFCS, 1'S, PI
 0588 30,3741 00266 0 DEC .0111111111 2 DFG WHEN CSM DOCKED

0589 30,3742 01616 1 DAY/2MAX DEC .0555555555 LIKEWISE FOR DFLATTY
 0590 30,3743 00133 0 DEC .0055555555

0591 RFF 2 LAST 915 30,3740 DAZMAX = DAXMAX LIKEWISE FOR DELATTZ

0592 30,3744 14344 1 CDUZDLIM DEC .3888888888 70 DEG LIMIT FOR MGA, 1'S, PI
 R0593

R0594 CCNstants FOR DATA TRANSFER

0595 30,3745 01463 1 DT/DELT DEC .05 .1 SFC/2 SFC WHICH IS THE AUTOPILOT
 A0596 CONTROL SAMPLE PERIOD/COMPUTATION PERIOD

0597 RFF 2 LAST 915 30,3742 DFLFRLIM = DAY/2MAX 10 DEG LIMIT FOR LAG ANGLES, 1'S, PI
 R0598

*** END OF FLY .109 ***

L P51-P53

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R0001 PROGRAM NAME- PROG52
R0003 MCD NC- 0
R0005 MODIFICATION BY- LONSKE

DATE- JAN 9, 1967
LOG SECTION- P51-P53
ASSEMBLY- SUNDANCE REV 46

R0007 FUNCTIONAL DESCRIPTION-

R0008 ALIGNS THE IMU TO ONE OF THREE ORIENTATIONS SELECTED BY THE ASTRONAUT. THE PRESENT IMU ORIENTATION IS KNOWN
R0010 AND IS STORED IN REFSMMAT. THE THREE POSSIBLE ORIENTATIONS MAY BE_

R0011 (A) PREFERRED ORIENTATION

R0012 AN OPTIMUM ORIENTATION FOR A PREVIOUSLY CALCULATED MANUEVER. THIS ORIENTATION MUST BE CALCULATED AND
R0014 STORED BY A PREVIOUSLY SELECTED PROGRAM.

R0015 (B) NOMINAL ORIENTATION

R0016 $X = \text{UNIT} (R)$
R0017 -SM

R0018 $Y = \text{UNIT} (V \times R)$
R0019 SM

R0020 $Z = \text{UNIT} (X \times X \times Y)$
R0021 -SM SM SM

R0022 WHERE
R0023 $R = \text{THE GEOCENTRIC RADIUS VECTOR AT TIME } T(\text{ALIGN}) \text{ SELECTED BY THE ASTRONAUT}$
R0025 -

R0026 $V = \text{THE INERTIAL VELOCITY VECTOR AT TIME } T(\text{ALIGN}) \text{ SELECTED BY THE ASTRONAUT}$
R0028 -

R0029 (C) REFSMMAT ORIENTATION

R00291 (D) LANDING SITE - THIS IS NOT AVAILABLE IN SUNDANCE

R0030 THIS SELECTION CORRECTS THE PRESENT IMU ORIENTATION. THE PRESENT ORIENTATION DIFFERS FROM THAT TO WHICH IT
R0032 WAS LAST ALIGNED ONLY DUE TO GYRO DRIFT(I.E. NEITHER GIMBAL LOCK NOR IMU POWER INTERRUPTION HAS OCCURED
R0034 SINCE THE LAST ALIGNMENT).

R0035 AFTER A IMU ORIENTATION HAS BEEN SELECTED ROUTINE S52.2 IS OPERATED TO COMPUTE THE GIMBAL ANGLES USING THE
R0037 NEW ORIENTATION AND THE PRESENT VEHICLE ATTITUDE. CAL52A THEN USES THESE ANGLES, STORED IN THETAD,+1,+2, TO
R0039 COARSE ALIGN THE IMU. THE STAR SELECTION ROUTINE, R56, IS THEN OPERATED. IF 2 STARS ARE NOT AVAILABLE AN ALARM
R0041 IS FLASHED TO NOTIFY THE ASTRONAUT. AT THIS POINT THE ASTRONAUT WILL MANUEVER THE VEHICLE AND SELECT 2 STARS
R0043 EITHER MANUALLY OR AUTOMATICALLY. AFTER 2 STARS HAVE BEEN SELECTED THE IMU IS FINE ALIGNED USING ROUTINE R51. IF
R0045 THE RENDEZVOUS NAVIGATION PROCESS IS OPERATING(INDICATED BY RNOVZFLG) P20 IS DISPLAYED. OTHERWISE P00 IS
R0047 REQUESTED.

R0048 CALLING SEQUENCE-

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R0049 THE PROGRAM IS CALLED BY THE ASTRONAUT BY DSKY ENTRY.

R0050 SUBROUTINES CALLED-

R0051	1. FLAGDOWN	7. S52.2	13. NEWMODEX
R0052	2. R02BOTH	8. CAL53A	14. PRIOLARM
R0053	3. GOPERF4	9. FLAGUP	
R0054	4. MATMOVE	10. R56	
R0055	5. GOFLASH	11. R51	
R0056	6. S52.3	12. GOPERF3	

R0057 NCRMAL EXIT MODES-

R0058 EXITS TO ENDOFJOB

R0059 ALARM OR ABORT EXIT MODES-

R0060 NONE

R0061 OUTPUT-

R0062 THE FOLLOWING MAY BE FLASHED ON THE DSKY

R0063	1. IMU ORIENTATION CODE
R0064	2. ALARM CODE 215 -PREFERRED IMU ORIENTATION NOT SPECIFIED
R0065	3. TIME OF NEXT IGNITION
R0066	4. GIMBAL ANGLES
R0067	5. ALARM CODE 405 -TWO STARS NOT AVAILABLE
R0068	6. PLEASE PERFORM P00

R0069 THE MODE DISPLAY MAY BE CHANGED TO 20

R0070 ERASABLE INITIALIZATION REQUIRED-

R0071 PFRATFLG SHOULD BE SET IF A PREFERRED ORIENTATION HAS BEEN COMPUTED. IF IT HAS BEEN COMPUTED IT IS STORED IN

R0073 XSMD,YSMD,ZSMD.

R0074 RNDVZFLG INDICATES WHETHER THE RENDEZVOUS NAVIGATION PROCESS IS OPERATING.

R0076 DEBRIS-

R0077 WCRK AREA

0078				33,3755		BANK	33
0079	REF	2	LAST	265	15,2000	SETLOC	P50S
0080					15,2050	BANK	

0081 REF 3 LAST 211 E5,1755

0082 REF 1

0085 REF 245 LAST 895 15,2050 0 4616 1 PROG52

0086 REF 11 LAST 839 15,2051 11175 1

0087 REF 1 15,2052 3 4750 1

0088 REF 26 LAST 863 15,2053 7 0076 1

0089 REF 283 LAST 923 15,2054 10 000 0

EBANK= BEST I

COUNT* \$\$/P52

TC BANKCALL

CADR R02BOTH

CAF PFRATBIT

MASK FLAGWRD2

CCS A

IMU STATUS CHECK

IS PFRATFLG SET?

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0090	REF	1		15,2055	0 2060 0	TC	P52A	YES
0091	REF	48	LAST	906	15,2056 3 4752 0	CAF	BIT2	NO
0092	REF	2	LAST	927	15,2057 0 2061 1	TC	P52A +1	
0093	REF	46	LAST	853	15,2060 3 4753 1	CAF	BIT1	
0094	REF	7	LAST	733	15,2061 55'145 1	TS	OPTION2	
0095	REF	47	LAST	927	15,2062 3 4753 1	CAF	BIT1	
0096	REF	246	LAST	926	15,2063 0 4616 1	TC	BANKCALL	FLASH OPTION CODE AND ORIENTATION CODE
0097	REF	1			15,2064 20566 0	CADR	GOPERF4R	FLASH V04N06
0098	REF	41	LAST	895	15,2065 0 6001 0	TC	GOTOPOOH	
0099					15,2066 1 2073 0	TCF	+5	V33-PROCEED
0100	REF	1			15,2067 0 2062 1	TC	P52B	NEW CODE - NEW ORIENTATION CODE INPUT
0101	REF	81	LAST	863	15,2070 0 5353 1	TC	PHASCHNG	DISPLAY RETURN
0102					15,2071 00014 1	OCT	00014	
0103	REF	142	LAST	895	15,2072 0 5155 0	TC	ENDOFJOB	
0104	REF	8	LAST	927	15,2073 3 1145 0	CA	OPTION2	
0105	REF	28	LAST	867	15,2074 7 6244 1	MASK	THREE	
0106	REF	284	LAST	926	15,2075 50 000 1	INDEX	A	
0107					15,2076 0 2077 0	TC	+1	
0108	REF	1			15,2077 0 2105 1	TC	P52T	
0109	REF	1			15,2100 0 2166 1	TC	P52H	
0110	REF	2	LAST	927	15,2101 0 2105 1	TC	P52T	
0111	REF	163	LAST	919	15,2102 0 6036 1	TC	INTPRET	
0112					15,2103 77650 1	GOTO		
0113	REF	1			15,2104 32162 0		P52F	
0114					15,2105 0 0006 1	P52T	EXTEND	
0115	REF	26	LAST	905	15,2106 3 4755 1	DCA	NEGO	
0116	REF	26	LAST	733	15,2107 53'046 0	DXCH	DSPTM1	
0117	REF	1			15,2110 3 2172 1	CAF	V06N34*	
01171	REF	247	LAST	927	15,2111 0 4616 1	TC	BANKCALL	
01172	REF	26	LAST	854	15,2112 20351 1	CADR	GOFASH	
0118	REF	42	LAST	927	15,2113 0 6001 0	TC	GOTOPOOH	
0119					15,2114 0 2116 0	TC	+2	
0120					15,2115 0 2110 0	TC	-5	
0121	REF	27	LAST	927	15,2116 53'046 0	DXCH	DSPTM1	
0122					15,2117 0 0006 1	EXTEND		
0123					15,2120 6 2122 1	BZMF	+2	IF TIME ZERO OR NEG USE TIME2
0124					15,2121 1 2124 0	TCF	+3	
0125					15,2122 0 0006 1	EXTEND		
0126	REF	27	LAST	894	15,2123 3 0025 0	DCA	TIME2	
0127	REF	3	LAST	217	15,2124 53'775 1	DXCH	TALIGN	
0128	REF	9	LAST	927	15,2125 3 1145 0	CA	OPTION2	
0130	REF	49	LAST	927	15,2126 7 4752 1	MASK	BIT2	
0131	REF	285	LAST	927	15,2127 10 000 0	CCS	A	
0132	REF	1			15,2130 0 2134 0	TC	P52W	
0133	REF	164	LAST	927	15,2131 0 6036 1	TC	INTPRET	OPTION 4 - GET LS ORIENTATION
0134					15,2132 77650 1	GOTO		
0135	REF	1			15,2133 32223 0		P52LS	

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P0151 START ALIGNMENT

0152	REF 165	LAST 927	15,2134	0 6036 1	P52W	TC	INTPRET	
0153			15,2135	77745 1		DLOAD		
0154	REF 4	LAST 927	15,2136	02775 0			TALIGN	PICK UP ALIGN TIME
0155			15,2137	77624 1		CALL		COMPUTE NOMINAL IMU
0156	REF 1		15,2140	31566 0			S52.3	ORIENTATION
0157			15,2141	77624 1	P52D	CALL		READ VEHICLE ATTITUDE AND
0158	REF 1		15,2142	31534 1			S52.2	COMPUTE GIMBAL ANGLES
0162			15,2143	77776 1		EXIT		
0163	REF 1		15,2144	3 2171 1		CAF	V06N22*	
0164	REF 248	LAST 927	15,2145	0 4616 1		TC	BANKCALL	DISPLAY GIMBAL ANGLES
0165	REF 27	LAST 927	15,2146	20351 1		CADR	GOF LASH	
0166	REF 43	LAST 927	15,2147	0 6001 0		TC	GOTOPOCH	
0167	REF 1		15,2150	1 2174 0		TCF	COAPSTYP	V33-PROCEED, SEE IF GYRO TORQUE COARSE
0168	REF 166	LAST 928	15,2151	0 6036 1		TC	INTPRET	RECYCLE - VEHICLE HAS BEEN MANUEVERED
0169			15,2152	77650 1		GOTO		
0170	REF 1		15,2153	32141 1			P52D	
0171	REF 167	LAST 928	15,2154	0 6036 1	REGCOARS	TC	INTPRFT	
0172			15,2155	77624 1		CALL		DO COARSE ALIGN
0173	REF 1		15,2156	31172 1			CAL53A	ROUTINE
0174			15,2157	43014 0		SET	CLEAR	
0175	REF 2	LAST 689	15,2160	01462 0			REFS#FLG	
0176	REF 2	LAST 776	15,2161	01273 0			PERATFLG	
0177			15,2162	77624 1	P52F	CALL		
0178	REF 1		15,2163	30656 1			R51	
0179			15,2164	77776 1	P52OUT	EXIT		
0180	REF 44	LAST 928	15,2165	0 6001 0		TC	GOTOPOCH	
0181	REF 168	LAST 928	15,2166	0 6036 1	P52H	TC	INTPRFT	PREFERRED OPTION, GO COMPUTE GIMBALS
0182			15,2167	77650 1		GOTO		
0183	REF 2	LAST 928	15,2170	32141 1			P52D	
0196	REF 5	LAST 769	5006		V805N09	=	V05N09	
0197			15,2171	01426 0	V06N22*	VN	00622	
0198			15,2172	01442 1	V06N34*	VN	634	
0199			15,2173	01531 1	V06N89*	VN	0689	

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P0200	CHECK FOR GRRO TORQUE COARSE ALIGNMENT						
0201	REF 1		15,2174	3 2222 1	COARSTYP CAF	OCT13	
0202	REF 249 LAST 928		15,2175	0 4616 1	TC	BANKCALL	DISPLAY V 50N25 WITH COARSE ALIGN OPTION
0203	REF 5 LAST 793		15,2176	20476 0	CADR	GOPERF1	
0204	REF 45 LAST 928		15,2177	1 6001 1	TCF	GOTOPOOH	V34-TERMIN&OE
0205	REF 1		15,2200	1 2154 1	TCF	REGCOARS	V33-NORMAL COARSE
0206	REF 169 LAST 928		15,2201	0 6036 1	TC	INTPRET	V32-GYRO TORQUE COARSE
0207			15,2202	64375 1	VLOAD	MXV	
0208	REF 4 LAST 164		15,2203	03605 1		XSMO	GET SM(DESIREO) WRT SM(PRESENT)
0209	REF 38 LAST 881		15,2204	01734 0		REFSMMAT	
0210			15,2205	77656 1	UNIT		
0211	REF 3 LAST 138		15,2206	26665 0	STOVL	XDC	
0212	REF 3 LAST 162		15,2207	03613 0		YSMD	
0213			15,2210	53521 1	MXV	UNIT	
0214	REF 39 LAST 929		15,2211	01734 0		REFSMMAT	
0215	REF 3 LAST 138		15,2212	26673 1	STOVL	YDC	
0216	REF 3 LAST 163		15,2213	03621 1		ZSMD	
0217			15,2214	53521 1	MXV	UNIT	
0218	REF 40 LAST 929		15,2215	01734 0		REFSMMAT	
0219	REF 3 LAST 138		15,2216	36701 1	STCALL	ZDC	
0220	REF 1		15,2217	31025 1		GYCOARS	
02201			15,2220	77650 1	GOTO		
02202	REF 1		15,2221	32164 0		P52OUT	
0221			15,2222	00013 0	OCT13	OCT 13	

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P0222	COMPUTE	LANDING ORIENTATION FOR OPTION 4							
0223			15,2223	43014 0	P52LS	SET	CLEAR	GET LANDING SITE ORIENTATION	
0224	REF	4 LAST 795	15,2224	01463 1			LUNAFLAG		
0225	REF	2 LAST 666	15,2225	00662 0			EPADFLAG	TO PICK UP RLS	
0226			15,2226	77201 1		SFTPD	VLOAD		
0227			15,2227	00001 0			0		
0228	REF	8 LAST 843	15,2230	02023 1			RLS	PICK UP LANDING SITE VEC IN MF	
0229			15,2231	41525 0		PDDL	PUSH	RLS PD 0-5	
0230	REF	5 LAST 928	15,2232	02775 0			TALIGN		
0231			15,2233	77624 1		CALL			
0232	REF	3 LAST 843	15,2234	51504 1			RP-TO-R	TRANS RLS TO REF	
0233			15,2235	77742 0		VSR2			
0234	REF	4 LAST 795	15,2236	16032 1		STODL	ALPHAV	INPUT TO LAT-LONG	
0235	REF	6 LAST 930	15,2237	02775 0			TALIGN		
0236			15,2240	77624 1		CALL			
0237	REF	3 LAST 795	15,2241	26351 1			LAT-LONG	GET LAT, LONG, AND ALT	
0238			15,2242	70545 1		DLOAD	SR1	RESCALE LONG TO DEGREES/2	
0239	REF	9 LAST 604	15,2243	01123 0			LONG		
0240	REF	3 LAST 331	15,2244	16711 1		STODL	LANDLONG		
0241	REF	3 LAST 329	15,2245	01125 0			ALT		
0242	REF	2 LAST 331	15,2246	16713 0		STODL	LANDALT	ALT ALREADY AT 2(29) METERS	
0243	REF	3 LAST 329	15,2247	01121 1			LAT		
0244	REF	3 LAST 331	15,2250	02707 0		STORE	LANDLAT		
0245			15,2251	77776 1		EXIT			
0246	REF	1	15,2252	3 2173 0	LSDISP	CAF	V06N89*	DISPLAY LAT, LONG/2, ALT	
0247	REF	250 LAST 929	15,2253	0 4616 1		TC	BANKCALL		
0248	REF	28 LAST 928	15,2254	20351 1		CADR	GOFLASH		
0249	REF	46 LAST 929	15,2255	1 6001 1		TCF	GOTOPOCH	VB34 TERMINATE	
0250			15,2256	1 2260 0		TCF	+2	VB33 PROCEED	
0251	REF	1	15,2257	1 2252 1		TCF	LSDISP	VB32 RECYCLE	
0252	REF	170 LAST 929	15,2260	0 6036 1		TC	INTPRFT		
0253			15,2261	72545 0		DLOAD	SL1		
0254	REF	4 LAST 930	15,2262	02711 1			LANDLONG		
0255	REF	10 LAST 930	15,2263	15123 0		STODL	LONG		
0256	REF	3 LAST 930	15,2264	02713 0			LANDALT		
0257	REF	4 LAST 930	15,2265	15125 0		STODL	ALT		
0258	REF	4 LAST 930	15,2266	02707 0			LANDLAT		
0259	REF	4 LAST 930	15,2267	15121 1		STODL	LAT		
0260	REF	7 LAST 930	15,2270	02775 0			TALIGN		
0261			15,2271	77624 1		CALL			
0262	REF	1	15,2272	26422 1			LALDORV		
0263			15,2273	53575 0		VLOAD	UNIT	COMPUTE LANDING SITE ORIENT (XSMD)	
0264	REF	5 LAST 930	15,2274	02032 1			ALPHAV		
0265	REF	5 LAST 929	15,2275	37605 0		STCALL	XSMD		
0266	REF	1	15,2276	33647 1			LSORIENT		
0267			15,2277	77650 1		GOTO			
0268	REF	3 LAST 928	15,2300	32141 1			P52D	NOW GO COMPUTE GIMBAL ANGLES	

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R0269 NAME -S50 ALIAS LOCSAM

R0270 BY

R0271 VINCENT

R0272 FUNCTION - COMPUTE INPUTS FOR PICAPAR AND PLANET

R0273 DEFINE

R0274

R0275 U = UNIT(SUN WRT EARTH)

R0276 ES

R0277 U =UNIT(MOON WRT EARTH)

R0278 EM

R0279 R =POSITION VECTOR OF LEM

R0280 L

R0281 R =MEAN DISTANCE (384402KM) BETWEEN EARTH AND MOON

R0282 EM

R0283 P =RATIO R /((DISTANCE SUN TO EARTH) >.00257125

R0284 EM

R0285 R =EQUATORIAL RADIUS (6378.166KM) OF EARTH

R0286 E

R0287 LOCSAM COMPUTES IN EARTH INFLUENCE

R0288

R0289 VSUN = U

R0290 ES

R0291 VEARTH = -UNIT(R)

R0292 L

R0293 VMCON = UNIT(R .U - R)

R0294 EM EM L

R0295 CSUN = CCS 90

R0296 CEARTH = COS(5 +ARCSIN(R /MAG(R)))

R0297 E L

R0298 CMCON = COS 5

R0299

R0300 INPUT - TIME IN MPAC

R0301 OUTPUT - LISTED ABOVE

R0302 SUBROUTINES -LSPOS,LEMPREC

R0303 DEBRIS - VAC AREA ,TSIGHT

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0304	REF	2	LAST	60	14,2000				SETLOC P5J51
0305					14,2347				BANK
0306	REF	16	LAST	401	E5,1642				EBANK= XSM
0307	REF	2	LAST	60 TO	60:	8	8*		COUNT* %\$/LOSAM
0308	REF	1			14,2347			S50	= LOCSAM
0309					14,2347	77620	0	LOCSAM	STQ
0310	REF	2	LAST	139	14,2350	02745	0		QMIN
0311	REF	2	LAST	273	14,2351	37560	0		STCALL TSIGHT
0312	REF	1			14,2352	33663	1		LSPOS
0313					14,2353	77745	1		DLOAD
0314	REF	3	LAST	932	14,2354	03560	1		TSIGHT
0315	REF	52	LAST	840	14,2355	34041	0		STCALL TDEC1
0316	REF	12	LAST	840	14,2356	27057	0		LEMPREC
0317					14,2357	61131	0		SSP TIX,2
0318	REF	9	LAST	729	14,2360	00052	0		S2
0319					14,2361	00000	1		0
0320	REF	1			14,2362	30404	1		MOONCNTR
0321					14,2363	74375	0	EARTCNTR	VLOAD VXSC
0322	REF	3	LAST	499	14,2364	02723	0		VMOON
0323	REF	1			14,2365	30001	0		RSUBEM
0324					14,2366	52372	0		VSL1 VSU
0325	REF	30	LAST	840	14,2367	00001	0		RATT
0326					14,2370	77656	1		UNIT
0327	REF	4	LAST	932	14,2371	26723	0		STOVL VMOON
0328	REF	31	LAST	932	14,2372	00001	0		RATT
0329					14,2373	57456	1		UNIT VCOMP
0330	REF	3	LAST	139	14,2374	16707	0		STODL VEARTH
0331	REF	1			14,2375	30005	1		RSUBE
0332					14,2376	77624	1		CALL
0333	REF	1			14,2377	30436	0		OCCOS
0334	REF	1			14,2400	14017	1		STODL CEARTH
0335	REF	1			14,2401	30445	1		CSS5
0336	REF	1			14,2402	34023	1		STCALL CMOON
0337	REF	1			14,2403	30431	1		ENDSAM
0338					14,2404	74375	0	MOONCNTR	VLOAD VXSC
0339	REF	5	LAST	932	14,2405	02723	0		VMOON
0340	REF	1			14,2406	30007	0		ROE
0341					14,2407	53445	1		BVSU UNIT
0342	REF	2	LAST	139	14,2410	02715	0		VSUN
0343	REF	3	LAST	932	14,2411	26715	0		STOVL VSUN
0344	REF	6	LAST	932	14,2412	02723	0		VMOON
0345					14,2413	53361	0		VAD
0346	REF	2	LAST	932	14,2414	30001	0		RSUBEM
0347	REF	32	LAST	932	14,2415	00001	0		RATT
0348					14,2416	57456	1		UNIT VCOMP
0349	REF	4	LAST	932	14,2417	26707	0		STOVL VEARTH
0350	REF	33	LAST	932	14,2420	00001	0		RATT
0351					14,2421	57456	1		UNIT VCOMP

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0352	REF	7	LAST	932	14,2422	16723 0		STODL	VMOON		
0353	REF	1			14,2423	30003 1			RSUBM		
0354					14,2424	77624 1		CALL			
0355	REF	2	LAST	932	14,2425	30436 0			OCCOS		
0356	REF	2	LAST	932	14,2426	14023 0		STODL	CMOON		
0357	REF	2	LAST	932	14,2427	30445 1			CSS5		
0358	REF	2	LAST	932	14,2430	00017 1		STORE	CEARTH		
0359					14,2431	77745 1	ENDSAM	DLOAD			
0360	REF	1			14,2432	30447 0			CSSUN		
0361	REF	1			14,2433	00021 1		STORE	CSUN		
0362					14,2434	77650 1		GOTO			
0363	REF	3	LAST	932	14,2435	02745 0			QMIN		
0364					14,2436	70471 1	OCCOS	DDV	SR1		
0365					14,2437	00045 0			36D		
0366					14,2440	43336 0		ASIN	DAD		
0367	REF	1			14,2441	30451 1			5DEGREES		
0368					14,2442	70546 1		COS	SR1		
0369					14,2443	77616 0		RVQ			
0370					0016		CEARTH	=	14D		
0371					0020		CSUN	=	16D		
0372					0022		CMOON	=	18D		
0373					14,2444	07760 1	CSS5	2DEC	.2490475	(COS 5)/4	
0373					14,2445	14473 1					
0374					14,2446	04000 0	CSSUN	2DEC	.125	(COS60)/4	
0374					14,2447	00000 1					
0375					14,2450	00343 0	5DEGREES	2DEC	.013888889	SCALED IN REVS	
0375					14,2451	21616 0					

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R0380 PROGRAM NAME - R56
 R0381 MCD 1

DATE DEC 20 66
 LOG SECTION P51-P53
 ASSEMBLY SUNDISK REV40

R0382
 R0383 BY KEN VINCENT

R0384
 R0385 FUNCTION

R0386 THIS PROGRAM READS THE IMU-CDUS AND COMPUTES THE VEHICLE ORIENTATION
 R0387 WITH RESPECT TO INERTIAL SPACE. IT THEN COMPUTES THE SHAFT AXIS (SAX)
 R0388 WITH RESPECT TO REFERENCE INERTIAL. EACH STAR IN THE CATALOG IS TESTED
 R0389 TO DETERMINE IF IT IS OCCULTED BY EITHER THE EARTH, SUN OR MOON. IF A
 R0390 STAR IS NOT OCCULTED THEN IT IS PAIRED WITH ALL STAR OF LOWER INDEX.
 R0391 THE PAIRED STAR IS TESTED FOR OCCULTATION. PAIRS OF STARS THAT PASS
 R0392 THE OCCULTATION TESTS ARE TESTED FOR GOOD SEPARATION. A PAIR OF STARS
 R0393 HAVE GOOD SEPARATION IF THE ANGLE BETWEEN THEM IS LESS THAN 100 DEGREES
 R0394 AND MORE THAN 50 DEGREES. THOSE PAIRS WITH GOOD SEPARATION
 R0395 ARE THEN TESTED TO SEE IF THEY LIE IN CURRENT FIELD OF VIEW. (WITHIN
 R0396 50 DEGREES OF SAX). THE PAIR WITH MAX SEPARATION IS CHOSEN FROM
 R0397 THOSE WITH GOOD SEPARATION, AND IN FIELD OF VIEW.

R0398
 R0399 CALLING SEQUENCE

R0400 L TC BANKCALL

R0401 L+1 CAOR R56

R0402 L+2 ERROR RETURN - NO STARS IN FIELD OF VIEW

R0403 L+3 NORMAL RETURN

R0404

R0405 OUTPUT

R0406 BESTI, BESTJ - SINGLE PREC, INTEGERS, STAR NUMBERS TIMES 6

R0407 VFLAG - FLAG BIT SET IMPLIES NO STARS IN FIELD OF VIEW

R0408

R0409 INITIALIZATION

R0410 1) A CALL TO LOCSAM MUST BE MADE

R0411

R0412 OFBRIS

R0413 WORK AREA

R0414 X, Y, ZNB

R0415 SINCDU, COSCDU

R0416 STARAD - STAR +5

R0417	REF	1		14,2452		R56	=	PICAPAR
R0418	REF	1					COUNT*	\$/R56
R0419	REF	12	LAST	895	14,2452	0 4645	1	PICAPAR TC MAKECADR
R0420	REF	4	LAST	933	14,2453	55.745	1	TS QMIN
R0421	REF	171	LAST	930	14,2454	0 6036	1	TC INTPRET
R0422					14,2455	77624	1	CALL
R0423	REF	4	LAST	559	14,2456	47443	1	CALL COUTRIG
R0424					14,2457	77624	1	CALL
R0425	REF	1			14,2460	31267	0	CALL CALCSMSC
R0426					14,2461	77601	0	SETPD
R0427					14,2462	00001	0	0
R0428					14,2463	71214	0	SET DLJAD
R0429	REF	1			14,2464	01465	1	VFLAG

VFLAG = 1

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0430	REF	1		14,2465	22275	1			DPZERO	
0431	REF	4	LAST	926	14,2466	26756	1		BESTI	
0432	REF	3	LAST	394	14,2467	02665	0		XNB	
0433					14,2470	63361	0		PDVL	
0434	REF	1			14,2471	22273	1		HALFDP	
0435	REF	3	LAST	387	14,2472	02701	0		ZNB	
0436					14,2473	74370	0		VXSC	
0437					14,2474	00344	1		228D	X1 = 37 X 6 +6
0438	REF	2	LAST	935	14,2475	22273	1		HALFDP	
0439					14,2476	77655	1		VAD	
0440					14,2477	53505	1		VXM	UNIT
0441	REF	41	LAST	929	14,2500	01734	0		REFSMAT	
0442	REF	1			14,2501	02731	0		STORE	SAX
0443					14,2502	66331	0		SSP	SAX = SHAFT AXIS
0444	REF	7	LAST	620	14,2503	00051	0			S1=S2=6
0445					14,2504	00006	1			S1
0446	REF	10	LAST	932	14,2505	00052	0			S2
0447					14,2506	00006	1			S2
0448					14,2507	52100	1	PIC1	TIX,1	GOTO
0449	REF	1			14,2510	30512	1			PIC2
0450	REF	1			14,2511	30627	1			PICEND
0451					14,2512	50373	0	PIC2	VLOAD*	DOT
0452	REF	1			14,2513	30347	1			CATLOG,1
0453	REF	2	LAST	935	14,2514	02731	0			SAX
0454					14,2515	50025	0		DSU	BMN
0455	REF	1			14,2516	30626	0			CSS33
0456	REF	1			14,2517	30507	0			PIC1
0457					14,2520	77754	1		LXA,2	
0458	REF	19	LAST	886	14,2521	00046	0			X1
0459					14,2522	52104	0	PIC3	TIX,2	GOTO
0460	REF	1			14,2523	30525	0			PIC4
0461	REF	2	LAST	935	14,2524	30507	0			PIC1
0462					14,2525	50373	0	PIC4	VLOAD*	DOT
0463	REF	2	LAST	935	14,2526	47430	0			CATLOG,2
0464	REF	3	LAST	935	14,2527	02731	0			SAX
0465					14,2530	50025	0		DSU	BMN
0466	REF	2	LAST	935	14,2531	30626	0			CSS33
0467	REF	1			14,2532	30522	1			PIC3
0468					14,2533	47773	1		VLOAD*	DOT*
0469	REF	3	LAST	935	14,2534	30347	1			CATLOG,1
0470	REF	4	LAST	935	14,2535	47430	0			CATLOG,2
0471					14,2536	51025	1		DSU	BPL
0472	REF	1			14,2537	30624	1			CSS40
0473	REF	2	LAST	935	14,2540	30522	1			PIC3
0474					14,2541	45173	0		VLOAD*	CALL
0475	REF	5	LAST	935	14,2542	30347	1			CATLOG,1
0476	REF	1			14,2543	30601	0			OCULT
0477					14,2544	77614	1		BON	
0478	REF	1			14,2545	01710	0			CULTFLAG
0479	REF	3	LAST	935	14,2546	30507	0			PIC1

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0480				14,2547	45173	0		VLOAD*	CALL		
0481	REF	6	LAST	935	14,2550	47430	0		CATLOG,2		
0482	REF	2	LAST	935	14,2551	30601	0		OCCULT		
0483					14,2552	77614	1		BON		
0484	REF	2	LAST	935	14,2553	01710	0		CULTFLAG		
0485	REF	3	LAST	935	14,2554	30522	1		PIC3		
0486					14,2555	77614	1	STRATGY	BONCLR		
0487	REF	2	LAST	934	14,2556	01605	0		VFLAG		
0488	REF	1			14,2557	30574	1		NEWPAR		
0489					14,2560	65120	1		XCHX,1	XCHX,2	
0490	REF	5	LAST	935	14,2561	02755	1		BESTI		
0491	REF	2	LAST	139	14,2562	02756	1		BESTJ		
0492					14,2563	47773	1	STRAT	VLOAD*	DOT*	
0493	REF	7	LAST	936	14,2564	30347	1		CATLOG,1		
0494	REF	8	LAST	936	14,2565	47430	0		CATLOG,2		
0495					14,2566	43006	0		PUSH	BOFINV	
0496	REF	3	LAST	936	14,2567	01545	1		VFLAG		
0497	REF	1			14,2570	30560	1		STRAT -3		
0498					14,2571	45345	1		DLOAD	DSU	
0499					14,2572	77644	1		BPL		
0500	REF	4	LAST	936	14,2573	30522	1			PIC3	
0501					14,2574	67130	1	NEWPAR	SXA,1	SXA,2	
0502	REF	6	LAST	936	14,2575	02755	1		BESTI		
0503	REF	3	LAST	936	14,2576	02756	1		BESTJ		
0504					14,2577	77650	1		GOTO		
0505	REF	5	LAST	936	14,2600	30522	1			PIC3	
0506					14,2601	51321	0	OCCULT	MXV	BVSU	
0507	REF	1			14,2602	02707	0			CULTRIX	
0508	REF	1			14,2603	00017	1			CSS	
0509					14,2604	77654	0		BZE		
0510	REF	1			14,2605	30620	0			CULTED	
0511					14,2606	75240	0		BMN	SIGN	
0512	REF	2	LAST	936	14,2607	30620	0			CULTED	
0513	REF	345	LAST	919	14,2610	00160	0			MPAC +3	
0514					14,2611	75240	0		BMN	SIGN	
0515	REF	3	LAST	936	14,2612	30620	0			CULTED	
0516	REF	346	LAST	936	14,2613	00162	1			MPAC +5	
0517					14,2614	43040	1		BMN	CLRG	
0518	REF	4	LAST	936	14,2615	30620	0			CULTED	
0519	REF	3	LAST	936	14,2616	01630	0			CULTFLAG	
0520	REF	8	LAST	836	14,2617	00052	0			QPRET	
0521					14,2620	77614	1	CULTED	SETGO		
0522	REF	4	LAST	936	14,2621	01430	1			CULTFLAG	
0523	REF	9	LAST	936	14,2622	00052	0			QPRET	
0524	REF	3	LAST	933	0016			CSS	=	CEAPTH	
0525					14,2623	05110	1	CSS40	2DEC	.16070	COS 50 /4
0525					14,2624	35052	0				
0526					14,2625	05110	1	CSS33	2DEC	.15070	COS 50 /4
0526					14,2626	35052	0				
0527					14,2627	77414	0	PICEND	BOFF	EXIT	

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0528	REF	4	LAST	936	14,2630	01745	0		VFLAG
0529	REF	1			14,2631	30633	1		PICGXT
0530	REF	1			14,2632	0 2654	1	TC	PICBXT
0531					14,2633	73150	1	PICGXT LXA,1	LXA,2
0532	REF	7	LAST	936	14,2634	02755	1		BESTI
0533	REF	4	LAST	936	14,2635	02756	1		BESTJ
0534					14,2636	47775	1	VLOAD	DOT*
0535	REF	4	LAST	935	14,2637	02731	0		SAX
0536	REF	9	LAST	936	14,2640	30347	1		CATLOG,1
0537					14,2641	47715	1	PDVL	DOT*
0538	REF	5	LAST	937	14,2642	02731	0		SAX
0539	REF	10	LAST	937	14,2643	47430	0		CATLOG,2
0540					14,2644	77625	0	DSU	
0541					14,2645	66044	1	BPL	SXA,1
0542	REF	1			14,2646	30652	0		PICNSWP
0543	REF	5	LAST	937	14,2647	02756	1		BESTJ
0544					14,2650	77734	1	SXA,2	
0545	REF	8	LAST	937	14,2651	02755	1		BESTI
0546					14,2652	77776	1	PICNSWP	EXIT
0547	REF	5	LAST	934	14,2653	257745	0		INCR
0548	REF	6	LAST	937	14,2654	3 1745	0	PICBXT	CA
0549	REF	4	LAST	503	14,2655	0 4622	0		TC
0550					0000			VPD	=
0551					0006			V0	=
0552					0014			V1	=
0553					0022			V2	=
0554					0030			V3	=
0555					0036			DPO	=
0556					0040			DP1	=

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P0557 NAME-R51 FINE ALIGN
 R0558 FUNCTION-TO ALIGN THE STABLE MEMBER TO REFSMMAT
 R0559 CALLING SEQ- CALL R51
 R0560 INPUT - REFSMMAT
 R0561 OUTPUT- GYRO TORQUE PULSES
 R0562 SUBROUTINES -LOCSAM,PICAPAR,R52,R53,R54,R55

0563	REF	1					COUNT* \$\$/R51
0564				14,2656	77620	0	STQ
0565	REF	3	LAST	792	14,2657	02746	0 QMAJ
0566				14,2660	77776	1	R51.1 EXIT
0567	REF	2	LAST	194	14,2661	3 4761	0 R51C CAF OCT15
0568	REF	251	LAST	930	14,2662	0 4616	1 TC BANKCALL
0569	REF	6	LAST	929	14,2663	20476	0 CADR GOPERF1
0570	REF	47	LAST	930	14,2664	0 6001	0 TC GOTOPPOH
0571				14,2665	0 2667	1	TC +2
0572	REF	1			14,2666	0 2712	1 TC R51E
0573	REF	172	LAST	934	14,2667	0 6036	1 TC INTPRET
0574					14,2670	43234	0 RT8 DAD
0575	REF	23	LAST	853	14,2671	21462	1 LOADTIME
0576	REF	1			14,2672	31024	0 TSIGHT1
0577					14,2673	77624	1 CALL
0578	REF	2	LAST	932	14,2674	30347	1 LOCSAM
0579					14,2675	77776	1 EXIT
0580	REF	252	LAST	938	14,2676	0 4616	1 TC BANKCALL
0581	REF	1			14,2677	30452	1 CADR P56
0582	REF	1			14,2700	0 2702	0 TC R51I
0583	REF	2	LAST	938	14,2701	0 2712	1 R51F TC R51E
0584	REF	36	LAST	923	14,2702	0 5567	0 R51I TC ALARM
0585					14,2703	00405	0 OCT 405
0586	REF	1			14,2704	3 5006	1 CAF VB05N09
0587	REF	253	LAST	938	14,2705	0 4616	1 TC BANKCALL
0588	REF	29	LAST	930	14,2706	20351	1 CADR GOFLASH
0589	REF	48	LAST	938	14,2707	0 6001	0 TC GOTOPPOH
0590	REF	3	LAST	938	14,2710	0 2712	1 TC R51E
0591	REF	1			14,2711	0 2661	1 TC R51C
0592	REF	173	LAST	923	14,2712	3 4755	1 R51E CAF ZERO
0593	REF	3	LAST	753	14,2713	55757	1 TS STARIND
0594	REF	173	LAST	938	14,2714	0 6036	1 R51.2 TC INTPRET
0595					14,2715	77776	1 R51.3 EXIT
0596	REF	82	LAST	927	14,2716	0 5353	1 TC PHASCHNG
0597					14,2717	05024	1 OCT 05024
0598					14,2720	13000	0 OCT 13000
0599	REF	174	LAST	938	14,2721	0 6036	1 TC INTPRET
0600					14,2722	77624	1 CALL
0601	REF	1			14,2723	31610	1 R52
0602					14,2724	77776	1 EXIT
0603	REF	254	LAST	938	14,2725	0 4616	1 TC BANKCALL
0604	REF	1			14,2726	16000	0 CADR ACTMARK
0605	REF	255	LAST	938	14,2727	0 4616	1 TC BANKCALL
0606	REF	1			14,2730	17665	1 CADR OPTSTALL

AOP WILL MAKE CALLS TO SIGHTING

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0607	REF	1		14,2731	0 5703 0	TC	CURTAINS
0608	REF	4	LAST 938	14,2732	11'757 1	CCS	STARIND
0609				14,2733	1 2735 0	TCF	+2
0610	REF	1		14,2734	0 3006 1	TC	R51.4
0611	REF	175	LAST 938	14,2735	0 6036 1	TC	INTPRET
0612				14,2736	77775 1	VLOAD	
0613	REF	14	LAST 331	14,2737	02715 0		STARAD +6
0614	REF	5	LAST 268	14,2740	02767 0	STORE	STAPSAV2
0615				14,2741	77776 1	EXIT	
0616	REF	83	LAST 938	14,2742	0 5353 1	TC	PHASCHNG
0617				14,2743	05024 1	OCT	05024
0618				14,2744	13000 0	OCT	13000
0619	REF	176	LAST 939	14,2745	0 6036 1	TC	INTPRET
0620				14,2746	45145 0	DLOAD	CALL
0621	REF	4	LAST 932	14,2747	03560 1		TSIGHT
0622	REF	1		14,2750	32540 1		PLANET
0623				14,2751	53521 1	MXV	UNIT
0624	REF	42	LAST 935	14,2752	01734 0		REFSMAT
0625	REF	15	LAST 939	14,2753	26715 0	STOVL	STARAD +6
0626	REF	2	LAST 160	14,2754	03552 0		PLANVEC
0627				14,2755	53521 1	MXV	UNIT
0628	REF	43	LAST 939	14,2756	01734 0		REFSMAT
0629	REF	16	LAST 939	14,2757	26707 0	STOVL	STARAD
0630	REF	3	LAST 211	14,2760	02761 0		STARS AV1
0631				14,2761	24007 0	STOVL	6D
0632	REF	6	LAST 939	14,2762	02767 0		STARS AV2
0633				14,2763	34015 1	STCALL	12D
0634	REF	1		14,2764	31121 1		R54
0635				14,2765	45014 0	BOFF	CALL
0636	REF	1		14,2766	00354 0		FREEFLAG
0637	REF	1		14,2767	30775 1		R51K
0638	REF	1		14,2770	47345 0		AXISGEN
0639				14,2771	77624 1	CALL	
0640	REF	1		14,2772	31066 0		R55
0641				14,2773	77614 1	CLEAR	
0642	REF	3	LAST 928	14,2774	01273 0		PFRATFLG
0643				14,2775	77776 1	R51K EXIT	
0644	REF	3	LAST 752	14,2776	3 5742 0	R51P63 CAF	OCT14
0645	REF	256	LAST 938	14,2777	0 4616 1	TC	BANKCALL
0646	REF	7	LAST 938	14,3000	20476 0	CADR	GOPERFI
0647	REF	49	LAST 938	14,3001	0 6001 0	TC	GOTOPOOH
0648	REF	2	LAST 938	14,3002	0 2661 1	TC	R51C
0649	REF	177	LAST 939	14,3003	0 6036 1	TC	INTPRET
0650				14,3004	77650 1	GOTO	
0651	REF	4	LAST 938	14,3005	02746 0		QMAJ
0652	REF	178	LAST 939	14,3006	0 6036 1	R51.4 TC	INTPRET
0653				14,3007	77775 1	VLOAD	
0654	REF	17	LAST 939	14,3010	02715 0		STARAD +6
0655	REF	4	LAST 939	14,3011	02761 0	STORF	STAR SAV1
0656				14,3012	45145 0	DLOAD	CALL

STAR DATA TEST

GYRO TORQUE

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0657	REF	5	LAST	939	14,3013	03560	1			TSIGHT
0658	REF	2	LAST	939	14,3014	32540	1			PLANET
0659	REF	3	LAST	939	14,3015	03552	0		STORE	PLANVEC
0660					14,3016	77731	1		SSP	
0661	REF	5	LAST	939	14,3017	02760	1			STARIND
0662					14,3020	00001	0			1
0663					14,3021	77650	1		GOTO	
0664	REF	1			14,3022	30715	1			P51.3
0665					14,3023	00002	0	TSIGHT1	2DEC	36000
0665					14,3024	06240	1			6 MIN TO MARKING

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P0666	GYRC TORQUE COARSE ALIGNMENT								
0667				14,3025	45020 1	GYCOARS	STQ	CALL	
06671	REF	5	LAST	939	14,3026	02746 0		QMAJ	
0668	REF	1			14,3027	47151 1		CALCGTA	
0669					14,3030	43014 0		CLEAR	
0670	REF	2	LAST	864	14,3031	01260 1		DRIFTFLG	
0671	REF	3	LAST	928	14,3032	01662 1		REFSMFLG	
0672					14,3033	77776 1		EXIT	
0673	REF	1			14,3034	3 3065 1		CAF	MONITOR GIMBALS
0674	REF	257	LAST	939	14,3035	0 4616 1		TC	BANKCALL
0675	REF	3	LAST	852	14,3036	20327 0		CADR	GODSPR
0676	REF	1			14,3037	3 3120 1		CA	R55CDP
0677	REF	258	LAST	941	14,3040	0 4616 1		TC	BANKCALL
0678	REF	4	LAST	401	14,3041	17276 1		CADR	IMUPULSE
0679	REF	259	LAST	941	14,3042	0 4616 1		TC	BANKCALL
0680	REF	8	LAST	391	14,3043	17671 1		CADR	IMUSTALL
0681	REF	2	LAST	939	14,3044	0 5703 0		TC	CURTAINS
0682	REF	84	LAST	939	14,3045	0 5353 1		TC	PHASCHNG
0683					14,3046	05024 1		OCT	05024
0684					14,3047	13000 0		OCT	13000
0685	REF	179	LAST	939	14,3050	0 6036 1		TC	INTPRET
0686					14,3051	75160 1		AXC,1	AXC,2
0687	REF	6	LAST	930	14,3052	03604 0			XSMD
0688	REF	44	LAST	939	14,3053	01733 1			REFSMMAT
0689					14,3054	77624 1		CALL	STORE DESIRED REFSMMAT
0690	REF	1			14,3055	31237 0			MATMOVE
0691					14,3056	43014 0		CLEAR	SET
0692	REF	4	LAST	939	14,3057	01273 0			PFRATFLG
0693	REF	4	LAST	941	14,3060	01462 0			REFSMFLG
0694					14,3061	77624 1		CALL	
0695	REF	1			14,3062	31523 1			NCOARSE
06951					14,3063	77650 1		GOTO	SET DRIFT AND INITIALIZE 1/PIPADT
0696	REF	2	LAST	939	14,3064	30775 1			R51K
0697					14,3065	04024 0	V16N20	VN	1620

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P0698 R55 GYRO TORQUE
R0699 FUNCTION-COMPUTE AND SEND GYRO PULSES
R0700 CALLING SEQ- CALL R55
R0701 INPUT- X,Y,ZDC- REFSMMAT WRT PRESENT STABLE MEMBER
R0702 OUTPUT- GYRO PULSES
R0703 SUBROUTINES- CALCGTA,GOFLASH,GODSPR,IMUFINE,IMUPULSE,GOPERF1
0704 REF 1 COUNT* $$/R55
0705 14,3066 77620 0 R55 STQ
0706 REF 7 LAST 937 14,3067 02745 0 QMIN
0707 14,3070 77624 1 CALL
0708 REF 2 LAST 941 14,3071 47151 1 CALCGTA
0709 14,3072 77776 1 PULSEM EXIT
0710 REF 1 14,3073 3 3117 0 R55.1 CAF V06N93
0711 REF 260 LAST 941 14,3074 0 4616 1 TC BANKCALL
0712 REF 30 LAST 938 14,3075 20351 1 CADR GCF LASH
0713 REF 50 LAST 939 14,3076 0 6001 0 TC GOTOPDOH
0714 REF 1 14,3077 0 3101 1 TC R55.2
0715 REF 1 14,3100 0 3114 0 TC R55RET
0716 REF 85 LAST 941 14,3101 0 5353 1 R55.2 TC PHASCHNG
0717 14,3102 00214 0 OCT 00214
0718 REF 2 LAST 941 14,3103 3 3120 1 CA R55CDR
0719 REF 261 LAST 942 14,3104 0 4616 1 TC BANKCALL
0720 REF 5 LAST 941 14,3105 17276 1 CADR IMJPULSF
0721 REF 262 LAST 942 14,3106 0 4616 1 TC BANKCALL
0722 REF 9 LAST 941 14,3107 17671 1 CADR IMUSTALL
0723 REF 3 LAST 941 14,3110 0 5703 0 TC CURTAINS
0724 REF 86 LAST 942 14,3111 0 5353 1 TC PHASCHNG
0725 14,3112 05024 1 OCT 05024
0726 14,3113 13000 0 OCT 13000
0727 REF 180 LAST 941 14,3114 0 6036 1 R55RET TC INTPRET
0728 14,3115 77650 1 GOTO
0729 REF 8 LAST 942 14,3116 02745 0 QMIN
0730 14,3117 01535 0 V06N93 VN 0693
0731 REF 11 LAST 401 14,3120 02737 0 R55CDR ECADR QGC
0732 REF 1 14,3121 R54 = CHKS DATA
R0733 ROUTINE NAME- CHKS DATA
R0735 MOD NC- 0
R0737 MODIFICATION BY- LONSKE

```

DATE- JAN 9, 1967
LOG SECTION- P51-P53
ASSEMBLY-

R0739 FUNCTIONAL DESCRIPTION - CHECKS THE VALIDITY OF A PAIR OF STAR SIGHTINGS. WHEN A PAIR OF STAR SIGHTINGS ARE MADE
R0741 BY THE ASTRONAUT THIS ROUTINE OPERATES AND CHECKS THE OBSERVED SIGHTINGS AGAINST STORED STAR VECTORS IN THE
R0743 COMPUTER TO INSURE A PROPER SIGHTING WAS MADE. THE FOLLOWING COMPUTATIONS ARE PERFORMED_

```

R0745 OS1 = OBSERVED STAR 1 VECTOR
R0746 OS2 = OBSERVED STAR 2 VECTOR
R0747 SS1 = STORED STAR 1 VECTOR
R0748 SS2 = STORED STAR 2 VECTOR
R0749 A1 = ARCCOS(OS1 - OS2)
R0750 A2 = ARCCOS(SS1 - SS2)
R0751 A = ABS(2(A1 - A2))

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R0759 ERASABLE INITIALIZATION REQUIRED -
R0760 1.MARK VECTORS ARE STORED IN STARAD AND STARAD +6.
R0761 2.CATALOG VECTORS ARE STORED IN 6D AND 12D.
```

0764					14,3121	43020 1	CHKSDATA STQ	SET
0765	REF	9	LAST	942	14,3122	02745 0		QMIN
0766	REF	2	LAST	939	14,3123	00074 1		FREEFLAG
0767					14,3124	77760 0	CHKSAB AXC,1	
0768	REF	18	LAST	939	14,3125	02706 1		STARAD

SET X1 TO STORE EPHEMERIS DATA

0802	REF 182	LAST 943	14,3166	0 6036 1	CHKSDA	TC	INTPRET
------	---------	----------	---------	----------	--------	----	---------

CAL. ANGLE THETA

BRANCH TO CHKSD IF THIS IS 2ND PASS

CLEAR FREEFLAG
SET X1 TO MARK ANGLES

RETURN TO CAL. 2ND ANGLE

COMPUTE POS DIFF

PROCEED

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0803      14,3167  77650 1      GOTO
0804 REF 11 LAST 943      14,3170  02745 0      QMIN
0805      14,3171  01405 1 VB6N5 VN      605
R0806 NAME - CAL53A
R0807 FUNCTION - COMPUTE DESIRED GIMBAL ANGLES AND COARSE ALIGN IF NECESSARY
R0808 CALLING SEQUENCE - CALL CAL53A
R0809 INPUT - X,Y,ZSMO ,CDUX,Y,Z
R0810      DESIRED GIMBAL ANGLES - THETAD,+1,+2
R0811 OUTPUT - THE IMU COORDINATES ARE STORED IN REFSMMAT
R0812 SUBROUTINES - S52.2, IMUCOARSE , IMUFINE
0813 REF 1
0814      14,3172  45020 1 CAL53A COUNT* $$/R50
0815      14,3173  00035 1      STQ CALL
0816 REF 2 LAST 928      14,3174  31534 1      29D
0817      14,3175  66234 1      S52.2 MAKE ONE FINAL COMP OF GIMBLE ANGLES
0818 REF 1      14,3176  31253 1      RTB SSP
0819 REF 8 LAST 935      14,3177  00051 0      RD CDUS READ CDUS
0820      14,3200  00001 0      S1
0821      14,3201  40370 1      AXT,1 SETPD
0822      14,3202  00003 1      3
0823      14,3203  00005 1      4
0824      14,3204  70543 1 CALOOP DLOAD* SR1
0825 REF 10 LAST 391      14,3205  00325 0      THETAD +3D,1
0826      14,3206  70523 1      PDDL* SR1
0827      14,3207  00005 1      4,1
0828      14,3210  51425 0      DSU ABS
0829      14,3211  45206 1      PUSH DSU
0830 REF 1      14,3212  31252 0      DEGREE1
0831      14,3213  71240 1      BMN DLOAD
0832 REF 1      14,3214  31226 0      CALDOPI
0833      14,3215  51025 1      DSU BPL
0834 REF 1      14,3216  31253 1      DEG359
0835 REF 2 LAST 944      14,3217  31226 0      CALDOPI
0836      14,3220  77624 1 COARFINE CALL
0837 REF 1      14,3221  31506 0      COARSE
0838      14,3222  77624 1      CALL
0839 REF 2 LAST 941      14,3223  31523 1      NCOARSE
0840      14,3224  77650 1      GOTO
0841 REF 1      14,3225  31230 1      FINEONLY
0842      14,3226  77700 0 CALOOP1 TIX,1
0843 REF 1      14,3227  31204 0      CALOOP
0844      14,3230  75160 1 FINEONLY AXC,1
0845 REF 17 LAST 932      14,3231  02642 0      XSM
0846 REF 45 LAST 941      14,3232  01733 1      REFSMMAT
0847      14,3233  77624 1      CALL
0848 REF 2 LAST 941      14,3234  31237 0      MATMCVE
0849      14,3235  77650 1      GOTO
0850      14,3236  00035 1      29D
0851      14,3237  77773 1 MATMOVE VLOAD* TRANSFER MATRIX
0852      14,3240  00001 0      0,1

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0853				14,3241	10001 1	STORE	0,2	
0854				14,3242	77773 1	VLOAD*		
0855				14,3243	00007 0		6D,1	
0856				14,3244	10007 1	STORE	6D,2	
0857				14,3245	77773 1	VLOAD*		
0858				14,3246	00015 0		12D,1	
0859				14,3247	10015 1	STORE	12D,2	
0860				14,3250	77616 0	RVQ		
0861				14,3251	00056 1	DEGREE1	46	1 DEG SCALED CDU/2
0862				14,3252	37722 1	DEG359	DEC 16338	359 DEG SCALED CDU/2
0863				14,3253	0 0004 0	RDCDUS	INHINT	READ CDUS
0864	REF	16	LAST	910	14,3254	3 0032 0	CA	CDUX
0865	REF	27	LAST	920	14,3255	50 120 1	INDEX	FIXLOC
0866					14,3256	54 001 1	TS	1
0867	REF	7	LAST	910	14,3257	3 0033 1	CA	CDUY
0868	REF	28	LAST	945	14,3260	50 120 1	INDEX	FIXLOC
0869					14,3261	54 002 1	TS	2
0870	REF	10	LAST	910	14,3262	3 0034 0	CA	CDUZ
0871	REF	29	LAST	945	14,3263	50 120 1	INDEX	FIXLOC
0872					14,3264	54 003 0	TS	3
0873					14,3265	0 0003 1	RELINT	
0874	REF	1			14,3266	0 6060 1	TC	DANZIG
0875	REF	1					COUNT*	\$/INFLT
0876					14,3267	77760 0	CALCSMSC	AXC,1
0877	REF	4	LAST	935	14,3270	02664 1		XNB
0878					14,3271	41345 0	XNBNDX	DLOAD
0879	REF	3	LAST	491	14,3272	00737 1		DMP
0880	REF	7	LAST	916	14,3273	00747 0		SINC DUY
0881					14,3274	77676 0	DCOMP	COSC DUY
0882					14,3275	70525 1	PDDL	SR1
0883	REF	6	LAST	916	14,3276	00741 0		SINC DUY
0884					14,3277	41325 0	PDDL	DMP
0885	REF	3	LAST	491	14,3300	00745 1		COSC DUY
0886	REF	8	LAST	945	14,3301	00747 0		COSC DUY
0887					14,3302	76466 1	VDEF	VSL1
0888					14,3303	04001 1	STORE	0,1
0889					14,3304	41345 0	DLOAD	DMP
0890	REF	5	LAST	916	14,3305	00743 1		SINC DUY
0891	REF	7	LAST	945	14,3306	00741 0		SINC DUY
0892					14,3307	77752 1	SL1	
0893					14,3310	00033 1	STORE	26D
0894					14,3311	77605 1	DMP	
0895	REF	4	LAST	945	14,3312	00737 1		SINC DUY
0896					14,3313	41325 0	PDDL	DMP
0897	REF	6	LAST	916	14,3314	00751 1		COSC DUY
0898	REF	4	LAST	945	14,3315	00745 1		COSC DUY
0899					14,3316	77625 0	DSU	
0900					14,3317	41325 0	PDDL	DMP
0901	REF	6	LAST	945	14,3320	00743 1		SINC DUY

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0902	REF	9	LAST	945	14,3321	00747	0		COSCDUZ
0903					14,3322	77676	0	DCOMP	
0904					14,3323	41325	0	PDDL	DMP
0905	REF	7	LAST	945	14,3324	00751	1		COSCDUX
0906	REF	5	LAST	945	14,3325	00737	1		SINCDUY
0907					14,3326	41325	0	PDDL	DMP
0908	REF	5	LAST	945	14,3327	00745	1		COSCDUY
0909					14,3330	00033	1		26D
0910					14,3331	55415	1	DAD	VDEF
0911					14,3332	77772	0	VSL1	
0912					14,3333	04015	1	STORE	14,1
0913					14,3334	76433	1	VXV*	VSL1
0914					14,3335	00001	0		0,1
0915					14,3336	04007	1	STORE	6,1
0916					14,3337	77616	0	RVQ	

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R0917 NAME - P51 - IMU ORIENTATION DETERMINATION
R0918 MCD.NO.1 23 JAN 67
R0920 MOD BY STURLAUGSON

LOG SECTION - P51-P53
ASSEMBLY SUNDANCE REV56

R0922 FUNCTIONAL DESCRIPTION

R0923 DETERMINES THE INERTIAL ORIENTATION OF THE IMU. THE PROGRAM IS SELECTED BY DSKY ENTRY. THE SIGHTING
R0925 (ACTMARK)ROUTINE IS CALLED TO COLLECT AND PROCESS MARKED-STAR DATA. AOTMARK(R53) RETURNS THE STAR NUMBER AND THE
R0927 STAR LOS VECTOR IN STARAD+6. TWO STARS ARE THUS SIGHTED. THE ANGLE BETWEEN THE TWO STARS IS THEN CHECKED AT
R0929 CHKSDATA(R54). REFSMMAT IS THEN COMPUTED AT AXISGEN.

R0930 CALLING SEQUENCE

R0931 THE PROGRAM IS CALLED BY THE ASTRONAUT BY DSKY ENTRY.

R0932 SUBROUTINES CALLED.

R0933 GOPERF3
R0934 GOPERF1
R0935 GDSRPR
R0936 IMUCOARS
R0937 IMUFIN20
R0938 ACTMARK(R53)
R0939 CHKSDATA(R54)
R0940 MKRELEAS
R0941 AXISGEN
R0942 MATMOVE

R0943 ALAPMS

R0944 NONE.

R0945 ERASABLE INITIALIZATION

R0946 IMU ZERO FLAG SHOULD BE SET.

R0947 OUTPUT

R0948 REFSMMAT
R0949 REFSMFLG

R0950 DEBRIS

R0951 WORK AREA
R0952 STARAC
R0953 STARIND
R0954 BESTI
R0955 BESTJ

0956 REF 1

COUNT* \$\$/P51

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0957	REF 264	LAST 943	14,3340	0 4616 1	P51	TC	BANKCALL	IS ISS ON - IF NOT, IMUCHK WILL SEND
0958	REF 1		14,3341	33635 1		CADR	IMUCHK	ALARM CODE 210 AND EXIT VIA GOTOPOOH.
0959	REF 1		14,3342	3 4761 0		CAF	PRFMSTAQ	
0960	REF 265	LAST 948	14,3343	0 4616 1		TC	BANKCALL	
0961	REF 8	LAST 939	14,3344	20476 0		CADR	GOPERF1	
0962	REF 52	LAST 943	14,3345	0 6001 0		TC	GOTOPOOH	TERM.
0963	REF 1		14,3346	1 3374 0		TCF	P51B	V33
0964	REF 87	LAST 942	14,3347	0 5353 1		TC	PHASCHNG	
0965			14,3350	05024 1		OCT	05024	
0966			14,3351	13000 0		OCT	13000	
0967	REF 1		14,3352	3 4755 1		CAF	P51ZERO	
0968	REF 11	LAST 944	14,3353	54 321 0		TS	THETAD	ZERO THE GIMBALS
0969	REF 12	LAST 948	14,3354	54 322 0		TS	THETAD +1	
0970	REF 13	LAST 948	14,3355	54 323 1		TS	THETAD +2	
0971	REF 1		14,3356	3 3504 0		CAF	V6N22	
0972	REF 266	LAST 948	14,3357	0 4616 1		TC	BANKCALL	
0973	REF 3	LAST 764	14,3360	20324 0		CADR	GODSPRET	
0974	REF 1		14,3361	3 3505 1		CAF	V41K	NOW DISPLAY COARSE ALIGN VERB 41
0975	REF 267	LAST 948	14,3362	0 4616 1		TC	BANKCALL	
0976	REF 4	LAST 948	14,3363	20324 0		CADR	GODSPRET	
0977	REF 183	LAST 943	14,3364	0 6036 1		TC	INTPRET	
0978			14,3365	77624 1		CALL		
0979	REF 2	LAST 944	14,3366	31506 0			COARSE	
0980			14,3367	77776 1		EXIT		
0981	REF 88	LAST 948	14,3370	0 5353 1		TC	PHASCHNG	
0982			14,3371	05024 1		OCT	05024	
0983			14,3372	13000 0		OCT	13000	
0984	REF 2	LAST 248	14,3373	1 3342 0		TCF	P51 +2	
0985	REF 89	LAST 948	14,3374	0 5353 1	P51B	TC	PHASCHNG	
0986			14,3375	00014 1		OCT	00014	
0987	REF 184	LAST 948	14,3376	0 6036 1		TC	INTPRET	
0988			14,3377	77624 1		CALL		
0989	REF 3	LAST 944	14,3400	31523 1			NCOARSE	
0990			14,3401	40331 1		SSP	SETPD	
0991	REF 6	LAST 940	14,3402	02760 1			STAR IND	INDEX-STAR 1 OR 2
0992			14,3403	00000 1			0	
0993			14,3404	00001 0			0	
0994			14,3405	77776 1	P51C	EXIT		
0995	REF 90	LAST 948	14,3406	0 5353 1		TC	PHASCHNG	
0996			14,3407	05024 1		OCT	05024	
0997			14,3410	13000 0		OCT	13000	
0998	REF 268	LAST 948	14,3411	0 4616 1		TC	BANKCALL	
0999	REF 2	LAST 938	14,3412	16000 0		CADR	ADTMARK	R53
1000	REF 269	LAST 948	14,3413	0 4616 1		TC	BANKCALL	
1001	REF 1		14,3414	17665 1		CADR	ACTSTALL	
1002	REF 4	LAST 942	14,3415	0 5703 0		TC	CURTAINS	
1003	REF 7	LAST 948	14,3416	11'757 1		CCS	STAR IND	
1004	REF 1		14,3417	1 3425 0		TCF	P51D +1	

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1005	REF 185	LAST	948	14,3420	0 6036 1	TC	INTPRET	
1006				14,3421	77775 1	VLOAD		
1007	REF 19	LAST	943	14,3422	02715 0		STARAD +6	
1008	REF 5	LAST	939	14,3423	02761 0	STORE	STARSAV1	
1009				14,3424	77776 1	EXIT		
1010	REF 91	LAST	948	14,3425	0 5353 1	TC	PHASCHNG	
1011				14,3426	05024 1	OCT	05024	
1012				14,3427	13000 0	OCT	13000	
1013	REF 8	LAST	948	14,3430	11'757 1	CCS	STARIND	
1014	REF 1			14,3431	1 3446 0	TCF	P51F	
1015	REF 92	LAST	949	14,3432	0 5353 1	TC	PHASCHNG	
1016				14,3433	05024 1	OCT	05024	
1017				14,3434	13000 0	OCT	13000	
1018	REF 186	LAST	949	14,3435	0 6036 1	TC	INTPRET	
1019				14,3436	45145 0	DLOAD	CALL	
1020	REF 6	LAST	940	14,3437	03560 1		TSIGHT	
1021	REF 3	LAST	940	14,3440	32540 1		PLANET	
1022	REF 4	LAST	940	14,3441	03552 0	STORE	PLANVEC	
1023				14,3442	77776 1	EXIT		
1024	REF 48	LAST	927	14,3443	3 4753 1	CAF	BIT1	
1025	REF 9	LAST	949	14,3444	55'757 1	TS	STARIND	
1026	REF 1			14,3445	1 3406 1	TCF	P51C +1	DO SECOND STAR
1027	REF 93	LAST	949	14,3446	0 5353 1	TC	PHASCHNG	
1028				14,3447	05024 1	OCT	05024	
1029				14,3450	13000 0	OCT	13000	
1030	REF 187	LAST	949	14,3451	0 6036 1	TC	INTPRET	
1031				14,3452	45145 0	DLOAD	CALL	
1032	REF 7	LAST	949	14,3453	03560 1		TSIGHT	
1033	REF 4	LAST	949	14,3454	32540 1		PLANET	
1034				14,3455	24015 0	STOVL	12D	
1035	REF 5	LAST	949	14,3456	03552 0		PLANVEC	
1036				14,3457	24007 0	STOVL	6D	
1037	REF 6	LAST	949	14,3460	02761 0		STARSAV1	
1038	REF 20	LAST	949	14,3461	26707 0	STOVL	STARAD	
1039	REF 7	LAST	939	14,3462	02767 0		STARSAV2	
1040	REF 21	LAST	949	14,3463	36715 1	STCALL	STARAD +6	
1041	REF 2	LAST	942	14,3464	31121 1		CHKSDATA	CHECK STAR ANGLES IN STARAD AND
1042				14,3465	77414 0	BON	EXIT	
1043	REF 7	LAST	943	14,3466	00314 1		FREEFLAG	
1044	REF 1			14,3467	31471 1		P51G	
1045	REF 3	LAST	948	14,3470	0 3342 1	TC	P51 +2	
1046				14,3471	77624 1	CALL		
1047	REF 2	LAST	939	14,3472	47345 0		AXISGEN	COME BACK WITH REFSMMAT IN XDC
1048				14,3473	75160 1	AXC,1	AXC,2	
1049	REF 4	LAST	929	14,3474	02664 1		XDC	
1050	REF 46	LAST	944	14,3475	01733 1		REFSMMAT	
1051				14,3476	77624 1	CALL		
1052	REF 3	LAST	944	14,3477	31237 0		MATMOVE	
1053				14,3500	77614 1	SET		
1054	REF 5	LAST	941	14,3501	01462 0		REFSMFLG	

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1055				14,3502	77776 1	EXIT		
1056	REF 53	LAST 948		14,3503	0 6001 0	TC	GOTOPOOH	FINIS
1057	REF 3	LAST 938		4761		PRFMSTAQ	=	0GT15
1058	REF 174	LAST 938		4755		P51ZERO	=	ZERO
1059	REF 18	LAST 859		4756		P51FIVE	=	FIVE
1060				14,3504	01426 0	V6N22	VN	0622
1061				14,3505	12200 0	V41K	VN	4100
1062				14,3506	77776 1	COARSE	EXIT	
1063	REF 270	LAST 948		14,3507	0 4616 1	TC	BANKCALL	
1064	REF 4	LAST 391		14,3510	16753 1	CADR	IMUCOARS	
1065	REF 271	LAST 950		14,3511	0 4616 1	TC	BANKCALL	
1066	REF 10	LAST 942		14,3512	17671 1	CADR	IMUSTALL	
1067	REF 5	LAST 948		14,3513	0 5703 0	TC	CURTAINS	
1068	REF 272	LAST 950		14,3514	0 4616 1	TC	BANKCALL	
1069	REF 3	LAST 391		14,3515	17163 0	CADR	IMUFIN	
1070	REF 273	LAST 950		14,3516	0 4616 1	TC	BANKCALL	
1071	REF 11	LAST 950		14,3517	17671 1	CADR	IMUSTALL	
1072	REF 6	LAST 950		14,3520	0 5703 0	TC	CURTAINS	
1073	REF 188	LAST 949		14,3521	0 6036 1	TC	INTPRET	
1074				14,3522	77616 0	RVQ		
1075				14,3523	77776 1	NCOARSE	EXIT	
1076	REF 15	LAST 900		14,3524	3 0025 0	CA	TIME1	
1077	REF 9	LAST 864		14,3525	55*075 0	TS	1/PIPADT	
1078	REF 189	LAST 950		14,3526	0 6036 1	TC	INTPRET	
1079				14,3527	77775 1	VLOAD		
1080	REF 3	LAST 696		14,3530	22275 1		ZEROVEC	
1081	REF 24	LAST 396		14,3531	01472 1	STORE	GCOMP	
1082				14,3532	43414 1	SET	RVQ	
1083	REF 3	LAST 941		14,3533	01060 0		DRIFTFLG	

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P1084 NAME-S52.2
R1085 FUNCTION=CCMPUTE GIMBAL ANGLES FOR DESIRED SM AND PRESENT VEHICLE
R1086 CALL- CALL S52.2
R1087 INPLT- X,Y,ZSMD
R1088 OUTPUT- OGC,IGC,MGC,THETAD,+1,+2
R1089 SUBROUTINES=CDUTR IG,CALCSMSC,MATMOVE,CALCGA
1090 REF 1 COUNT* $$/S52.1
1091 14,3534 77620 0 S52.2 STQ
1092 REF 6 LAST 941 14,3535 02746 0 QMAJ
1093 14,3536 77624 1 CALL
1094 REF 5 LAST 934 14,3537 47443 1 CDUTRIG
1095 14,3540 77624 1 CALL
1096 REF 2 LAST 934 14,3541 31267 0 CALCSMSC
1097 14,3542 66370 0 AXI,1 SSP
1098 14,3543 00022 1 18D
1099 REF 9 LAST 944 14,3544 00051 0 S1
1100 14,3545 00006 1 6D
1101 14,3546 61373 1 S52.2A VLOAD* VXM
1102 REF 5 LAST 945 14,3547 02707 0 XNB +18D,1
1103 REF 47 LAST 949 14,3550 01734 0 REFSMMAT
1104 14,3551 77656 1 UNIT
1105 REF 6 LAST 951 14,3552 06707 1 STORE XNB +18D,1
1106 14,3553 77700 0 TIX,1
1107 REF 1 14,3554 31546 1 S52.2A
1108 14,3555 75160 1 S52.2.1 AXC,1
1109 REF 7 LAST 941 14,3556 03604 0 XSMD
1110 REF 18 LAST 944 14,3557 02642 0 XSM
1111 14,3560 77624 1 CALL
1112 REF 4 LAST 949 14,3561 31237 0 MATMOVE
1113 14,3562 77624 1 CALL
1114 REF 2 LAST 387 14,3563 47255 0 CALCGA
1115 14,3564 77650 1 GOTO
1116 REF 7 LAST 951 14,3565 02746 0 QMAJ

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P1117 NAME-S52.3
 R1118 FUNCTION XSMD= UNIT R
 R1119 YSMD= UNIT(V X-R)
 R1120 ZSMD= UNIT(XSMD X YSMD)
 R1121 CALL DLOAD CALL
 R1122 TALIGN
 R1123 S52.3
 R1124 INPUT- TIME OF ALIGNMENT IN MPAC
 R1125 OUTPUT- X,Y,ZSMD
 R1126 SUBROUTINES- CSMCONIC

1127	REF	1						COUNT* \$\$/S52.3
1128				14,3566	77620 0	S52.3	STQ	
1129	REF	8	LAST	951	14,3567	02746 0		QMAJ
1130	REF	53	LAST	932	14,3570	34041 0	STCALL	TDEC1
1131	REF	5	LAST	599	14,3571	27100 0		LEMCCNIC
1132					14,3572	77601 0	SETPD	
1133					14,3573	00001 0		0
1134					14,3574	53575 0	VLOAD	UNIT
1135	REF	34	LAST	932	14,3575	00001 0		RATT
1136	REF	8	LAST	951	14,3576	27605 1	STOVL	XSMD
1137	REF	24	LAST	840	14,3577	00007 0		VATT
1138					14,3600	53435 0	VXV	UNIT
1139	REF	35	LAST	952	14,3601	00001 0		RATT
1140	REF	4	LAST	929	14,3602	27613 0	STOVL	YSMD
1141	REF	9	LAST	952	14,3603	03605 1		XSMD
1142					14,3604	53435 0	VXV	UNIT
1143	REF	5	LAST	952	14,3605	03613 0		YSMD
1144	REF	4	LAST	929	14,3606	37621 0	STCALL	ZSMD
1145	REF	9	LAST	952	14,3607	02746 0		QMAJ

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P1146 NAME -R52 (AUTOMATIC OPTICS POSITIONING ROUTINE)

R1147 FUNCTION-PCINT THE AOT OPTIC AXIS BY MANEUVERING THE LEM TO A NAVIGATION
 R1148 STAR SELECTED BY ALIGNMENT PROGRAMS OR DSKY INPUT

R1149 CALLING -CALL R52

R1150 INPUT -BESTI AND BESTJ (STAR CODES TIMES 6)
 R1151 OUTPUT -STAR CODE IN BITS1-6, DETENT CODE IN BITS 7-9
 R1152 {NO CHECK IS MADE TO INSURE THE DETENT CODE TO BE VALID}
 R1153 PCINTVSM-1/2 UNIT NAV STAR VEC IN SM
 R1154 SCAXIS-AOT OPTIC AXIS VEC IN NB X-Z PLANE

R1155 SUBROUT -R60LEM

1156	REF	1			14,3610	77420	1	R52	COUNT*	\$/R52	
1157					14,3611	03663	1		STQ	EXIT	
1158	REF	1			14,3612	51757	0			SAVOR52	
1159	REF	10	LAST	949	14,3613	3	1755	0	INOEX	STARIND	
1160	REF	9	LAST	937	14,3614	0	0006	1	CA	BESTI	PICK UP STARCODE DETERMINED BY R56
1161					14,3615	7	3706	1	EXTEND		
1162	REF	1			14,3616	6	4744	1	MP	1/6TH	
1163	REF	33	LAST	906	14,3617	54	735	1	AD	BIT8	SET DETENT POSITION 2
1164	REF	2	LAST	116					TS	STARCODE	SCALE AND STORE IN STARCODE
1165	REF	1			14,3620	3	3707	1	R52A	CAF	V01N70
1166	REF	274	LAST	950	14,3621	0	4616	1		TC	BANKCALL
1167	RFF	32	LAST	943	14,3622	20351	1		CAOR	G0FLASH	DISPLAY STARCODE AND WAIT FOR RESPONSE
1168	REF	54	LAST	950	14,3623	0	6001	0	TC	G0T0POOH	V34-TERMINATE
1169	REF	1			14,3624	1	3626	1	TCF	R52B	V33-PROCEED TO ORIENT LEM
1170	REF	1			14,3625	1	3620	1	TCF	R52A	ENTER-SELECT NEW STARCODE-RECYCLE
1171	REF	87	LAST	895	14,3626	0	5516	0	R52B	TC	DOWNFLAG
1172	REF	7	LAST	761	14,3627	00124	0		ADRES	3AXISFLG	BIT6 OF FLAGWRO5 ZERO TO ALLOW VECPOINT
1173	REF	3	LAST	953	14,3630	3	0735	0	CA	STARCODE	GRAB DETENT CODE
1174	REF	3	LAST	692	14,3631	7	7743	1	MASK	HIGH9	
1175					14,3632	0	0006	1	EXTEND		
1176	REF	2	LAST	953	14,3633	6	3620	0	BZMF	R52A	DONT ALLOW ZERO CODE-RECYCLE
1177	REF	25	LAST	864	14,3634	7	4743	1	MASK	BIT9	SEE IF CODE 4 OR 5
1178	REF	286	LAST	927	14,3635	10	000	0	CCS	A	
1179	REF	1			14,3636	1	3655	0	TCF	GFTAZEL	CODE 4 OR 5-GET CALIBRATION AZ EL
1180	REF	18	LAST	275	E7,1547				EBANK=	XYMARK	
1181	REF	12	LAST	902	14,3637	3	5016	0	CA	EBANK7	
1182	REF	39	LAST	917	14,3640	54	003	0	TS	EBANK	
1183	REF	4	LAST	953	14,3641	3	7743	0	CAF	HIGH9	FORWARD DETENT, INDEX DETENT AND GRAB
1184	REF	4	LAST	953	14,3642	7	0735	1	MASK	STARCODE	AZIMUTH ANGLE AND ELV = 45 DEG
1185					14,3643	0	0006	1	EXTEND		
1186	REF	26	LAST	953	14,3644	7	4743	1	MP	BIT9	SHIFT DETENT TO BITS1-2 FOR INDEX
1187	REF	287	LAST	953	14,3645	50	000	1	INOEX	A	
1188	REF	4	LAST	262	14,3646	3	1403	1	CA	AOTAZ -1	PICK UP AZ CORRESPONDING TO DETENT

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1189	REF 151	LAST 923	14,3647	54 001 1	TS	L	
1190	REF 19	LAST 951	E5,1642		EBANK=	XSM	
1191	REF 7	LAST 816	14,3650	3 5014 1	CA	EBANK5	CHANGE TO EBANK5 BUT DONT DISTURB L
1192	REF 40	LAST 953	14,3651	54 003 0	TS	EBANK	
1193	REF 39	LAST 875	14,3652	3 4737 0	CA	BIT13	SET ELV TO 45 DEG
1194	REF 152	LAST 954	14,3653	56 001 0	XCH	L	SET C(A)=AZ, C(L)=45 DEG
1195	REF 1		14,3654	1 3665 0	TCF	AZEL	GO COMP OPTIC AXIS
1196	REF 1		14,3655	3 3710 1	GETAZEL	CAF	V06N87
1197	REF 275	LAST 953	14,3656	0 4616 1	TC	BANKCALL	CODE 4 OR 5-GET AZ AND EL FROM ASTRO
1198	REF 33	LAST 953	14,3657	20351 1	CADR	GOFLASH	
1199	REF 55	LAST 953	14,3660	0 6001 0	TC	GOTOPOCH	V34-TERMINATE
1200			14,3661	1 3663 0	TCF	+2	PROCEED-CALC OPTIC AXIS
1201	REF 2	LAST 953	14,3662	1 3655 0	TCF	GETAZEL	ENTER-RECYCLE
1202			14,3663	0 0006 1	EXTEND		
1203	REF 4	LAST 331	14,3664	3 1350 0	DCA	AZ	PICK UP AZ AND EL IN SP 2S COMP
1204	REF 30	LAST 945	14,3665	50 120 1	INDEX	FIXLOC	JAM AZ AND EL IN 8 AND 9 OF VAC
1205			14,3666	52 011 0	DXCH	8D	
1206	REF 190	LAST 950	14,3667	0 6036 1	TC	INTPRET	
1207			14,3670	77624 1	CALL		GO COMPUTE OPTIC AXIS AND STORE IN
1208	REF 2	LAST 263	14,3671	13370 1		DANB	SCAXIS IN NB COORDS
1209			14,3672	45034 1	RTB	CALL	
1210	REF 24	LAST 938	14,3673	21462 1		LOADTIME	
1211	REF 5	LAST 949	14,3674	32540 1		PLANET	
1212			14,3675	53521 1	MXV	UNIT	
1213	REF 48	LAST 951	14,3676	01734 0		REFSMAT	
1214	REF 7	LAST 792	14,3677	03767 1	STORE	POINTVSM	STORE FOR VECPOINT
1215			14,3700	77776 1	EXIT		
1216	REF 276	LAST 954	14,3701	0 4616 1	TC	BANKCALL	
1217	REF 6	LAST 793	14,3702	54101 0	CADR	R60LEM	GO TORQUE LEM OPTIC AXIS TO STAR LOS
1218	REF 191	LAST 954	14,3703	0 6036 1	TC	INTPRET	RETURN FROM KALCMANU
1219			14,3704	77650 1	GOTO		
1220	REF 2	LAST 953	14,3705	03663 1		SAVQR52	RETURN TO CALLER
1221			14,3706	05253 0	1/6TH	DEC	.1666667
1222			14,3707	00306 1	V01N70	VN	0170
1223			14,3710	01527 0	V06N87	VN	687

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P1224 LUNAR SURFACE STAR AQUISITION

1225					15,2301				BANK	15	
1226	REF	3	LAST	926	15,2000				SETLOC	P50S	
1227					15,2301				BANK		
1228	REF	2	LAST	265 TO 266:	40	40*			COUNT*	\$/R59	
12281	REF	15	LAST	877	15,2301	4 0077	0	R59	CS	FLAGWRD3	
12282	REF	3	LAST	228	15,2302	7 4737	1		MASK	REFSMBIT	IF REFSMMAT FLAG CLEAR BYPASS STAR AQUIR
12283	REF	288	LAST	953	15,2303	10 000	0		CCS	A	
12284	REF	1			15,2304	1 2523	0		TCF	R59OUT	NO REFSMMAT GO TO AOTMARK
1229	REF	1			15,2305	3 2531	1		CAF	V01N70*	SELECT STAR CODE FOR ACQUISITION
1230	REF	277	LAST	954	15,2306	0 4616	1		TC	BANKCALL	
1231	REF	34	LAST	954	15,2307	20351	1		CADR	GOFLASH	
1232	REF	56	LAST	954	15,2310	0 6001	0		TC	GOTOPOOH	V34-TERMINATE
1233	REF	1			15,2311	1 2313	0		TCF	R59A	V33-PROCEED
1234	REF	1			15,2312	1 2301	0		TCF	R59	V32-RECYCLE
1235	REF	5	LAST	953	15,2313	4 7743	1	R59A	CS	HIGH9	GRAB STARCODE FOR INDEX
1236	REF	9	LAST	330	15,2314	7 0735	1		MASK	AOTCCODE	
1237					15,2315	0 0006	1		EXTEND		
1238	REF	2	LAST	307	15,2316	7 6241	1		MP	REVCNT	JUST 6
1239	REF	153	LAST	954	15,2317	56 001	0		XCH	L	
1240	REF	11	LAST	953	15,2320	51 757	0		INDEX	STARIND	
1241	REF	10	LAST	953	15,2321	55 755	0		TS	BESTI	
1242	REF	31	LAST	954	15,2322	50 120	1		INDEX	FIXLCC	
1243	REF	20	LAST	935	15,2323	54 046	1		TS	X1	CODE X 6 FOR CATLOG STAR INDEX
1244					15,2324	0 0006	1		EXTEND		
1245	REF	2	LAST	955	15,2325	1 2523	0		BZF	R59OUT	BYPASS AQUISITION IF NOT CATLOG STAR
1246					15,2326	4 0000	0		COM		
1247	REF	1			15,2327	6 2625	1		AD	DEC227	
1248					15,2330	0 0006	1		EXTEND		
1249	REF	3	LAST	955	15,2331	6 2523	1		BZMF	R59OUT	
1250	REF	192	LAST	954	15,2332	0 6036	1		TC	INTPRET	
1251					15,2333	77624	1		CALL		
1252	REF	6	LAST	951	15,2334	47443	1			CDUTRIG	GET CDU JAZZ FOR SMNB
1253					15,2335	64373	1		VLOAD*	MXV	
1254	REF	11	LAST	937	15,2336	30347	1			CATLOG,1	GRAB STAR VECTOR
1255	REF	49	LAST	954	15,2337	01734	0			REFSMMAT	TRANSFORM TO SM
1256					15,2340	45056	0		UNIT	CALL	
1257	REF	7	LAST	911	15,2341	47575	0			*SMNB*	TRANSFORM TO NB
1258	REF	4	LAST	256	15,2342	02731	0		STORE	STAR	TEMP STORE STAR VEC(NB)
1259					15,2343	77776	1		EXIT		
1260	REF	49	LAST	949	15,2344	3 4753	1		CAF	BIT1	INITIALIZE POS TO ONE
1261	REF	2	LAST	331	15,2345	55 052	0		TS	POSCODE	
1262	REF	1			15,2346	4 2537	0		CS	DEG60	AS(N) TO -60 DEG
12621	REF	12	LAST	944	15,2347	55 745	1		TS	QMIN	

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1263	REF 289	LAST	955	15,2350	54 000 0	STORPOS	TS	A	DETECT OVF AZ = -120
12631				15,2351	1 2354 0		TCF	+3	NO OVF
12632	REF 37	LAST	899	15,2352	3 4735 1		CAF	BIT15	OVF SKIP-ADD NEGMAX TO OVF CORRECT QMIN
12633	REF 13	LAST	955	15,2353	27 745 1		ADS	QMIN	
1264	REF 40	LAST	954	15,2354	3 4737 0		CAF	BIT13	ELV=45 DEG
1265	REF 154	LAST	955	15,2355	54 001 1		TS	L	
1266	REF 14	LAST	956	15,2356	3 1745 0		CA	QMIN	
1267	REF 32	LAST	955	15,2357	50 120 1		INDEX	FIXLOC	
1268				15,2360	52 011 0		DXCH	80	JAM AZ IN 8D, 45 DEG IN 9D FOR OANB
1269	REF 193	LAST	955	15,2361	0 6036 1		TC	INTPRET	
1270				15,2362	77624 1		CALL		
1271	REF 3	LAST	954	15,2363	13370 1			OANB	GO CALC OPTIC AXIS WRT NB
1272				15,2364	50375 0		VLOAD	DOT	
1273	REF 5	LAST	955	15,2365	02731 0			STAR	DOT STAR WITH OA
1274	REF 22	LAST	792	15,2366	03761 1			SCAXIS	
1275				15,2367	65552 0		SL1	ARCCOS	
1276				15,2370	00031 0		STORE	240	TEMP STORE ARCCOS(STAR.OPTAXIS)
1277				15,2371	51025 1		DSU	BPL	
1278	REF 2	LAST	266	15,2372	32534 1			DEG30	SEE IF STAR IN AOT FIELD-OF-VIEW
1279	REF 1			15,2373	32455 1			NXAX	NOT IN FIELD - TRY NEXT POSITION
1280				15,2374	45345 1		DLOAD	DSU	SEE IF STAR AT FIELD CENTER
1281				15,2375	00031 0			240	
1282	REF 1			15,2376	32536 0			DEG.5	
1283				15,2377	71240 1		BMN	DLOAD	CALC SPIRAL AND CURSOR
1284	REF 1			15,2400	32450 1			ZSPCR	GO ZERO CURSOR AND SPIRAL
1285				15,2401	00031 0			240	GET SPIRAL
1286				15,2402	42405 0		DMP	SL4	
1287	REF 1			15,2403	23710 0			3/4	12 SCALED AT 16
1288				15,2404	24031 0		STOVL	240	12(ARCCOS(AO.STAR)) SCALED IN REVS
1289	REF 23	LAST	956	15,2405	03761 1			SCAXIS	OA
1290				15,2406	53435 0		VXV	UNIT	
1291	REF 3	LAST	36	15,2407	22273 1			XUNIT	
1292				15,2410	47206 0		PUSH	VXV	OA X UNITX PD 0-5
1293	REF 24	LAST	956	15,2411	03761 1			SCAXIS	
1294				15,2412	77676 0		VCOMP		
1295				15,2413	63256 0		UNIT	PDVL	UNIT(OA X(OA X UNITX)) PD 6-11
1296	REF 25	LAST	956	15,2414	03761 1			SCAXIS	
1297				15,2415	53435 0		VXV	UNIT	
1298	REF 6	LAST	956	15,2416	02731 0			STAR	
1299				15,2417	50206 0		PUSH	DOT	1/2(OA X STAR) PD 12-17
1300				15,2420	00001 0			0	DOT WITH 1/2(OA X UNITX) FOR YROT
1301				15,2421	65552 0		SL1	ARCCOS	
1302				15,2422	24033 1		STOVL	260	STORE THET SCALED IN REVS
1303				15,2423	77641 1		DOT		UP 12-17, UP 6-11 FOR C2
1304				15,2424	71244 0		BPL	DLOAD	IF THET NEG-GET 360-THET
1305	REF 1			15,2425	32432 0			R59D	

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1306	REF	2	LAST	265	15,2426	32047 0		A8OUTONE	
1307					15,2427	77625 0	DSU	26D	
1308					15,2430	00033 1			
1309					15,2431	00033 1	STORE	26D	360-THET SCALED IN REVS
1310					15,2432	70535 0	R59D	SLOAD	SR1
1311	REF	15	LAST	956	15,2433	02746 0		QMIN	RESCALE AZ(N) TO REVS
1312					15,2434	41415 1	DAD	PUSH	PUSH YROT + AZIN) REVS
1313					15,2435	00033 1		26D	
1314					15,2436	77634 0	RT8		
1315	REF	2	LAST	386	15,2437	21520 0		1ST02S	
1316	REF	3	LAST	331	15,2440	15046 1	STODL	CURSOR	YROT IN 1/2 REVS
1317					15,2441	00031 0		24D	LOAD SROT IN REVS
1318					15,2442	77615 0	DAD		12ISEP) + YROT
1319					15,2443	77634 0	RTB		
1320	REF	3	LAST	957	15,2444	21520 0		1ST02S	
1321	REF	3	LAST	331	15,2445	01047 0	STORE	SPIRAL	SROT IN 1/2 REVS
1322					15,2446	77776 1	EXIT		
1323	REF	1			15,2447	1 2476 1	TCF	79DISP	GO DISPLAY CURSOR-SPIRAL-POS CODE
1324					15,2450	77776 1	ZSPCR	EXIT	
1325	REF	175	LAST	950	15,2451	3 4755 1	CAF	ZERO	STAR ALMOST OPTIC AXIS,ZERO CURSOR
1326	REF	4	LAST	957	15,2452	55'045 0	TS	CURSOR	AND SPIRAL ANGLES
1327	REF	4	LAST	957	15,2453	55'046 0	TS	SPIRAL	
1328	REF	2	LAST	957	15,2454	1 2476 1	TCF	79DISP	
1329					15,2455	77776 1	NXAX	EXIT	
1330	REF	3	LAST	955	15,2456	25'052 1	INCR	POSCODE	
1331	REF	4	LAST	957	15,2457	4 1052 0	CS	POSCODE	
1332	REF	12	LAST	859	15,2460	6 4757 0	AD	SEVEN	
1333					15,2461	0 0006 1	EXTEND		
1334	REF	1			15,2462	6 2466 1	8ZMF	R59ALM	THIS STAR NOT AT ANY POSITION
1335	REF	2	LAST	955	15,2463	3 2537 1	CAF	DEG60	ADVANCE AZIN) BY 60 DEG
1336	REF	16	LAST	957	15,2464	27'745 1	ADS	QMIN	IF OV, QMIN CONTAINS OV CORRECTED
1337	REF	1			15,2465	1 2350 1	TCF	STDR POS	
1338	REF	37	LAST	938	15,2466	0 5567 0	TC	ALARM	THIS STAR CANT BE LOCATED IN AOT FIELD
1339					15,2467	00404 1	OCT	404	
1340	REF	2	LAST	938	15,2470	3 5006 1	CAF	V805N09	DISPLAY ALARM
1341	REF	278	LAST	955	15,2471	0 4616 1	TC	BANKCALL	
1342	REF	35	LAST	955	15,2472	20351 1	CADR	GOFLASH	
1343	REF	57	LAST	955	15,2473	1 6001 1	TCF	GOTOP00H	V834-TERMINATE
1344	REF	4	LAST	955	15,2474	1 2523 0	TCF	R59CUT	V833-PROCEED, GO WITHOUT ACQUIRE
1345	REF	2	LAST	955	15,2475	1 2301 0	TCF	R59	V832-RECYCLE AND TRY ANOTHER STAR
1346	REF	1			15,2476	3 2532 1	79DISP	CAF	DISPLAY CURSOR, SPIRAL AND POS CODE
1347	REF	279	LAST	957	15,2477	0 4616 1	TC	BANKCALL	
1348	REF	36	LAST	957	15,2500	20351 1	CADR	GOFLASH	
1349	REF	58	LAST	957	15,2501	1 6001 1	TCF	GOTOP00H	V34-TERMINATE
1350	REF	1			15,2502	1 2504 0	TCF	R59F	V33-PROCEED TO MARK ROUTINE
1351	REF	3	LAST	957	15,2503	1 2301 0	TCF	R59	V32-RECYCLE TO TOP OF R59 AGAIN

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1352	REF	36	LAST	901	15,2504	3 4751 0	R59E	CAF	BIT3	GET DETENT CORRESPONDING TO POSITION COD
1353	REF	5	LAST	957	15,2505	7 1052 0		MASK	POSCODE	KEYED IN POS CODE
1354					15,2506	0 0006 1		EXTEND		
1355					15,2507	1 2511 1		BZF	+2	FORWARD DETENT
1356					15,2510	1 2513 0		TCF	+3	ITS REAR DETENT, 4 ALREADY IN (A)
1357	REF	13	LAST	957	15,2511	3 4757 0		CAF	SEVEN	GET FORWARD DETENT
1358	REF	6	LAST	958	15,2512	7 1052 0		MASK	POSCODE	
1359					15,2513	0 0006 1		EXTEND		
1360	REF	39	LAST	899	15,2514	7 4745 1		MP	BIT7	
1361	REF	155	LAST	956	15,2515	56 001 0		XCH	L	
1362	REF	17	LAST	957	15,2516	55 745 1		TS	QMIN	
1363	REF	6	LAST	955	15,2517	4 7743 1		CS	HIGH9	
1364	REF	10	LAST	955	15,2520	7 0735 1		MASK	AOTCODE	
1365	REF	18	LAST	958	15,2521	6 1745 0		AD	QMIN	
1366	REF	11	LAST	958	15,2522	54 735 1		TS	AOTCODE	STORE DETENT IN 7-9
1367	REF	280	LAST	957	15,2523	0 4616 1	R59OUT	TC	BANKCALL	GO TO AOTMARK FOR SIGHTING
1368	REF	3	LAST	948	15,2524	16000 0		CADR	AOTMARK	
1369	REF	281	LAST	958	15,2525	0 4616 1		TC	BANKCALL	
1370	REF	2	LAST	948	15,2526	17665 1		CADR	AOTSTALL	SLEEP TILL SIGHTING DONE
1371	REF	7	LAST	950	15,2527	0 5703 0		TC	CURTAINS	BADEND RETURN FROM AOTMARK
1372	REF	1			15,2530	1 3123 0		TCF	R59RET	RETURN TO 1 STAR OR 2STAR
1373					15,2531	00306 1	V01N70*	VN	170	
1374					15,2532	01517 0	V06N79	VN	679	
1375					15,2533	02525 1	DEG30	2DEC	.083333333	30 DEGRESS
1375					15,2534	12525 0				
1376					15,2535	00026 0	DEG.5	2DEC	.00138888	.5 DEGRESS SCALED IN REVS
1376					15,2536	30131 1				
1377					15,2537	12525 0	DEG60	OCT	12525	60 DEG CDU SCALING
1378	REF	28	LAST	927	1045		CURSOR	EQUALS	DSPTM1	
1379	REF	29	LAST	958	1046		SPIRAL	EQUALS	DSPTM1 +1	
1380	REF	13	LAST	394	1052		POSCODE	EQUALS	DSPTM2 +2	

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P1381 NAME - PLANET
 R1382 FUNCTION - TO PROVIDE THE REFERENCE VECTOR FOR THE SIGHTED CELESTIAL
 R1383 BODY. STARS ARE FETCHED FROM THE CATALOG, SUN, EARTH AND
 R1384 MOON ARE COMPUTED BY LOCSAM, PLANET VECTORS ARE ENTERED
 R1385 BY DSDY INPUT
 R1386 CALL - CALL
 R1387 PLANET
 R1388 INFLT - TIME IN MPAC
 R1389 OUTPUT - VECTOR IN MPAC
 R1390 SUBROUTINES - LOCSAM
 R1391 DEBRIS - VAC, STARAD - STARAD +17

1392	REF	4	LAST	955	15,2000		SETLOC P50S
1393					15,2540		BANK
1394	REF	1					COUNT* \$\$/P51
1395	REF	8	LAST	949	15,2540	03560 1	PLANET STORE TSIGHT
1396					15,2541	77420 1	STQ EXIT
1397	REF	4	LAST	264	15,2542	02736 1	GCTR
1398	REF	7	LAST	958	15,2543	4 7743 1	CS HIGH9
1399	REF	12	LAST	958	15,2544	7 0735 1	MASK AOTCODE
1400					15,2545	0 0006 1	EXTEND
1401	REF	3	LAST	955	15,2546	7 6241 1	MP REVCNT
1402	REF	156	LAST	958	15,2547	56 001 0	XCH L
1403	REF	12	LAST	955	15,2550	51'757 0	INOEX STARIND
1404	REF	11	LAST	955	15,2551	55'755 0	TS BESTI
1405	REF	290	LAST	956	15,2552	10 000 0	CCS A
1406	REF	1			15,2553	1 2567 0	TCF NOTPLAN
1407	REF	1			15,2554	3 2626 1	CAF VNPLANV
1408	REF	282	LAST	958	15,2555	0 4616 1	TC BANKCALL
1409	REF	37	LAST	957	15,2556	20351 1	CADR GDFLASH
1410					15,2557	0 2554 1	TC -3
1411					15,2560	0 2562 1	TC +2
1412					15,2561	0 2554 1	TC -5
1413	REF	194	LAST	956	15,2562	0 6036 1	TC INTPRET
1414					15,2563	53575 0	VLOAD UNIT
1415	REF	22	LAST	949	15,2564	02707 0	STARAD
1416					15,2565	77650 1	GOTO
1417	REF	5	LAST	959	15,2566	02736 1	GCTR
1418	REF	291	LAST	959	15,2567	4 0000 0	NOTPLAN CS A
1419	REF	2	LAST	955	15,2570	6 2625 1	AD DEC227
1420					15,2571	0 0006 1	EXTEND
1421	REF	1			15,2572	6 2603 0	BZMF CALSAM1
1422	REF	13	LAST	959	15,2573	51'757 0	INDEX STARINO
1423	REF	12	LAST	959	15,2574	3 1755 1	CA BESTI
1424	REF	33	LAST	956	15,2575	50 120 1	INDEX FIXLOC
1425	REF	21	LAST	955	15,2576	54 046 1	TS X1
1426	REF	195	LAST	959	15,2577	0 6036 1	TC INTPRET
1427					15,2600	52173 0	VLOAD* GOTO
1428	REF	12	LAST	955	15,2601	30347 1	CATALOG,1

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1429	REF	6	LAST	959	15,2602	02736 1			GCTP
1430	REF	196	LAST	959	15,2603	0 6036 1	CALSAM1	TC	INTPRET
1431					15,2604	45145 0	CALSAM	DLOAD	CALL
1432	REF	9	LAST	959	15,2605	03560 1			TSIGHT
1433	REF	3	LAST	938	15,2606	30347 1			LOCSAM
1434					15,2607	77340 0		LXC,1	VLOAD
1435	REF	14	LAST	959	15,2610	02757 0			STARIND
1436	REF	5	LAST	932	15,2611	02707 0			VEARTH
1437					15,2612	24001 0		STOVL	OD
1438	REF	4	LAST	932	15,2613	02715 0			VSUN
1439	REF	6	LAST	960	15,2614	26707 0		STOVL	VEARTH
1440					15,2615	00001 0			OD
1441	REF	5	LAST	960	15,2616	02715 0		STORE	VSUN
1442					15,2617	70143 0		DLOAD*	LXC,1
1443	REF	13	LAST	959	15,2620	02756 1			BESTI,1
1444	REF	347	LAST	936	15,2621	00154 1			MPAC
1445					15,2622	52173 0		VLOAD*	GOTO
1446	REF	23	LAST	959	15,2623	02343 1			STARAD -2280,1
1447	REF	7	LAST	960	15,2624	02736 1			GCTP
1448					15,2625	00343 0	DEC227	DEC	227
1449					15,2626	01530 0	VNPLANV	VN	0688
1450	REF	4	LAST	859	37,3533		PIPSRINE	=	PIPASR +3

EBANK NOT 4 SO DONT LOAD PIPTIME1

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P1451 GRAVITY VECTOR DETERMINATION ROUTINE

R1452 BY KEN VINCENT

R1453 FOR DETAILED DESCRIPTION SEE 504GSOP 5.6.3.2.5

R1454 THIS PROGRAM FINDS THE DIRECTION OF THE MOONS GRAVITY

R1455 WHILE THE LM IS ON THE MOONS SURFACE. IT WILL BE USED

R1456 FOR LUNAR SURFACE ALIGNMENT. THE GRAVITY VECTOR IS

R1457 DETERMINED BY READING THE PIPAS WITH THE IMU AT TWO

R1458 PARTICULAR ORIENTATIONS. THE TWO READINGS ARE AVERAGED

R1459 AND UNITIZED AND TRANSFORMED TO NB COORDINATES. THE TWO

R1460 ORIENTATION WERE CHOSEN TO REDUCE BIAS ERRORS IN THE

R1461 READINGS.

R1462

R1463 CALL-

R1464 TC BANKCALL

R1465 CADR GVDETER

R1466 INPLTS-

R1467 PIPAS,CDUS

R1468 OUTPLTS-

R1469 STARSAT1 = UNIT GRAVITY

R1470 GSAV = DITTO

R1471 GRAVBIT = 1

R1472 SUBROUTINES-

R1473 PIPASR,IMUCOARS,IMUFIN,IMUSTALL,1/PIPA,DELAYJOB,CDUTRIG,

R1474 *NBSM*,*SNMB*,CALCGA,FOFLASH

R1475 DEBRIS-

R1476 VAC,SAC,STARAD,XSM,XNB,THETAD,DELV,COSCDU,SINCDU

R1477 REF 41 LAST 956 15,2627 4 4737 1 GVDETER CS BIT13

JAM 45 DEG IN DESIRED GIMBAL ANGLES

R1478 REF 14 LAST 948 15,2630 54 322 0 TS THETAD +1

R1479 15,2631 4 0000 0 COM

R1480 REF 15 LAST 961 15,2632 54 323 1 TS THETAD +2

R1481 REF 16 LAST 961 15,2633 54 321 0 TS THETAD

R1482 REF 197 LAST 960 15,2634 0 6036 1 TC INTPRET

R1483 15,2635 45014 0 CLEAR CALL

R1484 REF 6 LAST 949 15,2636 01662 1 REFSMFLG

R1485 REF 1 15,2637 32734 0 LUNG

R1486 FIND GIMBAL ANGLES WHICH ROTATE SM 180DEG ABOUT G VEC

R1487

R1488 DEFINE G COOR SYS

R1489

R1490 X UNIT G

R1491 * - -

R1492 M= Y = UNITEZSM * X)

R1493 - -

R1494 Z UNIT(X * Y)

R1495 THEN ROTATED SM WRT PRESENT IS

R1496

R1497

R1498 1, 0, 0

R1499 * *T * * *

R1500 XSM = M 0, -1, 0 M = 2 (X X) - 1/2 I *

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R1501                                I J
R1502                                0, 0 ,-1
R1503
R1504    ALSO    NB WRT PRES SM IS
R1505
R1506            *      *      *
R1507            XNB = NBSM I
R1508            *      *
R1509    GIMBAL ANGLES = CALCGA( XSM , XNB )
R1510
1511    REF    5    LAST    959    15,2000    SETLOC P50S
1512                                15,2640    BANK
1513    REF    1                                COUNT* $$/P57
1514                                15,2640    66370 0    AXT,1    SSP    X1=18
1515                                15,2641    00022 1    18D    S1= 6
1516    REF    10    LAST    951    15,2642    00051 0    S1    X2, -2
1517                                15,2643    00006 1    6D
1518                                15,2644    77744 0    LXC,2
1519    REF    11    LAST    962    15,2645    00050 1    S1
1520                                15,2646    45173 0    GRAVEL    VLOAD*    CALL
1521    REF    4    LAST    956    15,2647    55512 1    XUNIT -6,2
1522    REF    5    LAST    887    15,2650    47577 1    *NBSM*
1523    REF    7    LAST    951    15,2651    06707 1    STORE    XNB +18D,1    SIN AND COS COMPUTED IN LUNG
1524                                15,2652    77775 1    VLOAD
1525    REF    7    LAST    956    15,2653    02731 0    STAR
1526                                15,2654    73744 1    LXC,2    VXSC*    COMPLEMENT- UNITX ARE BACKWARD -
1527    REF    14    LAST    881    15,2655    00047 1    X2
1528    REF    8    LAST    962    15,2656    75040 1    STAP +6,2    OUTER PRODUCT
1529                                15,2657    71152 1    VSL2    LXC,2
1530    REF    15    LAST    962    15,2660    00047 1    X2
1531                                15,2661    63047 1    VSU*    INCR,2
1532    REF    5    LAST    962    15,2662    55512 1    XUNIT -6,2
1533                                15,2663    00002 0    2D
1534    REF    20    LAST    954    15,2664    06665 1    STORE    XSM +18D,1
1535                                15,2665    45100 1    TIX,1    CALL
1536    REF    1                                15,2666    32646 1    GRAVEL
1537    REF    3    LAST    951    15,2667    47255 0    CALCGA
1538                                15,2670    74575 0    VLOAD    VSR1
1539    REF    1                                15,2671    02715 0    GOUT
1540    REF    24    LAST    960    15,2672    36723 1    STCALL    STARAD +12D
1541    REF    2    LAST    961    15,2673    32734 0    LUNG
1542                                15,2674    74575 0    VLOAD    VSR1
1543    REF    2    LAST    962    15,2675    02715 0    GOUT
1544                                15,2676    53455 0    VAD    UNIT
1545    REF    25    LAST    962    15,2677    02723 0    STARAD +12D
1546    REF    7    LAST    949    15,2700    02761 0    STORE    STARSAT1
1547                                15,2701    77641 1    DOT
1548    REF    6    LAST    796    15,2702    02235 1    GSAV
1549                                15,2703    65552 0    SL1    ACOS
1550    REF    30    LAST    958    15,2704    01046 1    STORE    DSPTEM1

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1551				15,2705	77776	1		EXIT		
1552	REF	88	LAST	953	15,2706	0 5516	0	TC	DOWNFLAG	CLEAR FREEFLAG IN CASE OF RECYCLE
1553	REF	8	LAST	949	15,2707	00014	1	ADRES	FREEFLAG	
1554	REF	1			15,2710	3 3040	0	CA	DISGRVER	
1555	REF	283	LAST	959	15,2711	0 4616	1	TC	8ANKCALL	
1556	REF	38	LAST	959	15,2712	20351	1	CADR	GOFLASH	
1557	REF	59	LAST	957	15,2713	0 6001	0	TC	GOTOPDOH	
1558	REF	1			15,2714	1 2717	0	TCF	PROGRAV	VB33-PROCEED
1559	REF	60	LAST	891	15,2715	0 5504	0	TC	UPFLAG	VB32-RECYCLE-STORE GRAV AND DO IT AGAIN
1560	REF	9	LAST	963	15,2716	00014	1	ADRES	FREEFLAG	AND SET FREEFLAG TO SHOW RECYCLE
1561	REF	94	LAST	949	15,2717	0 5353	1	PROGRAV	TC	PHASCHNG
1562					15,2720	05024	1	OCT	05024	
1563					15,2721	13000	0	OCT	13000	
1564	REF	198	LAST	961	15,2722	0 6036	1	TC	INTPRET	
1565					15,2723	77775	1	VLOAD		
1566	REF	8	LAST	962	15,2724	02761	0		STARSAV1	
1567	REF	7	LAST	962	15,2725	02235	1	STORE	GSAV	
1568					15,2726	77776	1	EXIT		
1569	REF	1			15,2727	3 4751	0	CAF	FREEF8IT	IF FREEFLAG SET, RE-COMPUTE GRAVITY.
1570	REF	29	LAST	906	15,2730	7 0074	0	MASK	FLAGWRDO	
1571	REF	292	LAST	959	15,2731	10 000	0	CCS	A	
1572	REF	1			15,2732	1 2627	1	TCF	GVDETER	SET
1573	REF	1			15,2733	1 3535	0	TCF	ATTCHK	EXIT FROM GVDETER
1574					15,2734	77220	1	LUNG	STQ	VLOAD
1575	REF	19	LAST	958	15,2735	02745	0		QMIN	
1576	REF	4	LAST	950	15,2736	22275	1		ZEROVEC	
1577	REF	1			15,2737	02707	0	STORE	GACC	
1578					15,2740	77776	1	EXIT		
1579	REF	95	LAST	963	15,2741	0 5353	1	TC	PHASCHNG	
1580					15,2742	05024	1	OCT	05024	
1581					15,2743	13000	0	OCT	13000	
1582	REF	284	LAST	963	15,2744	0 4616	1	TC	8ANKCALL	
1583	REF	5	LAST	950	15,2745	16753	1	CADR	IMUCOARS	
1584	REF	285	LAST	963	15,2746	0 4616	1	TC	8ANKCALL	
1585	REF	12	LAST	950	15,2747	17671	1	CADR	IMUSTALL	
1586	REF	8	LAST	958	15,2750	0 5703	0	TC	CURTAINS	
1587	REF	286	LAST	963	15,2751	0 4616	1	TC	8ANKCALL	
1588	REF	4	LAST	950	15,2752	17163	0	CADR	IMUFIN	
1589	REF	287	LAST	963	15,2753	0 4616	1	TC	8ANKCALL	
1590	REF	13	LAST	963	15,2754	17671	1	CADR	IMUSTALL	
1591	REF	9	LAST	963	15,2755	0 5703	0	TC	CURTAINS	
1592	REF	1			15,2756	3 3037	0	CA	T/2SFC	
1593	REF	8	LAST	960	15,2757	55'736	0	TS	GCTP	
1594	REF	4	LAST	861	15,2760	3 7715	0	CA	PRIO31	
1595	REF	10	LAST	950	15,2761	55'075	0	TS	1/PI PADT	
1596	REF	288	LAST	963	15,2762	0 4616	1	TC	BANKCALL	
1597	REF	1			15,2763	15701	0	CADR	GCOMPZER	INITIALIZE COMPENSATION

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1598	REF	96	LAST	963	15,2764	0 5353	1	TC	PHASCHNG	
1599					15,2765	05024	1	OCT	05024	
1600					15,2766	13000	0	OCT	13000	
1601	REF	289	LAST	963	15,2767	0 4616	1	TC	BANKCALL	DONT NEED TO INHINY THIS USED TO
1602	REF	1			15,2770	77533	1	CADR	PIPSRINE	INITIALIZE PIPAS DONT USE DATA
1603	REF	199	LAST	963	15,2771	0 6036	1	TC	INTPRET	
1604					15,2772	77776	1	GREED	EXIT	= MASK 7776 IN BASIC SO DONT CARE
1605	REF	6	LAST	858	15,2773	3 5000	1	CAF	2SECS	
1606	REF	28	LAST	899	15,2774	0 5173	1	TC	TWIDDLE	SET UP 2 SEC TASK TO READ PIPAS
1608	REF	1			15,2775	02777	1	ADRES	GRABGRAV	
1609	REF	143	LAST	927	15,2776	0 5155	0	TC	ENDOFJOB	
1610	REF	47	LAST	923	15,2777	0 4674	0	GRABGRAV	TC	
1611	REF	2	LAST	964	15,3000	77533	1	CADR	PIPSRINE	
16141	REF	3	LAST	835	15,3001	3 5023	0	CAF	PRI013	RE-ESTABLISH MAINLINE JOB
16142	REF	38	LAST	874	15,3002	0 5105	0	TC	FINDVAC	
16143	REF	26	LAST	962	15,1706			EBANK=	STARAD	
16144	REF	1			15,3003	03006	1	2CADR	ADDGRAV	
16144	REF	1			15,3004	32065	0			
16145	REF	64	LAST	906	15,3005	0 5261	1	TC	TASKOVER	
16146	REF	290	LAST	964	15,3006	0 4616	1	ADDGRAV	TC	
16147	REF	3	LAST	861	15,3007	15263	1	CADR	1/PIPA	
16148	REF	9	LAST	963	15,3010	25736	1	INCR	GCTR	
1615	REF	200	LAST	964	15,3011	0 6036	1	TC	INTPRET	
1616					15,3012	53375	0	VLOAD	VAD	
1617	REF	9	LAST	911	15,3013	00325	0		DELV	
1618	REF	2	LAST	963	15,3014	02707	0		GACC	
1619	REF	3	LAST	964	15,3015	02707	0	STORE	GACC	ACCUMULATE G VECTOR
1620					15,3016	50135	0	SLOAD	BMN	
1621	REF	10	LAST	964	15,3017	02737	0		GCTR	
1622	REF	1			15,3020	32772	1		GREED	
1623					15,3021	53575	0	VLOAD	UNIT	
1624	REF	4	LAST	964	15,3022	02707	0		GACC	
1625	REF	9	LAST	962	15,3023	36731	1	STCALL	STAR	
1626	REF	7	LAST	955	15,3024	47443	1		CDUTRIG	TRANSFORM IN NB COOR AND STORE
1627					15,3025	77624	1	CALL		IN OUTPUT
1628	REF	8	LAST	955	15,3026	47575	0		*SMNB*	
1629	REF	3	LAST	962	15,3027	02715	0	STORE	GOUT	
1630					15,3030	77776	1	EXIT		
1631	REF	57	LAST	964	15,3031	0 5353	1	TC	PHASCHNG	
1632					15,3032	05024	1	OCT	05024	
1633					15,3033	13000	0	OCT	13000	
1634	REF	201	LAST	964	15,3034	0 6036	1	TC	INTPRET	
1635					15,3035	77650	1	GOTO		
1636	REF	20	LAST	963	15,3036	02745	0		QMIN	
1637					15,3037	77751	1	T/2SEC	DEC	-22
1638					15,3040	01404	0	DISGRVER	VN	0604

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P1639 NAME GYROTRIM

R1640

R1641 THIS PROGRAM COMPUTES AND SENDS GYRO COMMANDS WHICH CAUSE THE CDUS

R1642 TO ATTAIN A PRESCRIBED SET OF ANGLES. THIS ROUTINE ASSJMES THE

R1643 VEHICLES ATTITUDE REMAINS STATIONARY DURING ITS OPERATION.

R1644

R1645 CALL CALL
R1646 GYROTRIM

R1647

R1648 INPUT THETAD,+1,+2 = DESIRED CDU ANGLES

R1649 CDUX,CDUY,CDUZ

R1650

R1651 OUTPUT - GYRO TORQUE PULSES

R1652

R1653 SUBROUTINES- TRG*N8SM,*N8SM*,CDUTRIG,AXISGEN,CALCGTA,IMUFIN

R1654 IMPULSE,IMUSTALL

R1655

R1656 DEBRIS - CDUSPOT ,SINCDU ,COSCDU , STARAD ,VAC , XDC , OGC

1657 REF 2 LAST 962 TO 965: 129 129* COUNT* \$\$/P57

1658 15,3041 71220 1 GYROTRIM STQ DLOAD

1659 REF 21 LAST 964 15,3042 02745 0 QMIN

1660 REF 17 LAST 961 15,3043 00322 1 THETAD

1661 15,3044 65325 0 PDDL PDDL

1662 REF 18 LAST 965 15,3045 00324 1 THETAD +2

1663 REF 19 LAST 965 15,3046 00323 0 THETAD +1

1664 15,3047 77666 1 VDEF

1665 REF 25 LAST 896 15,3050 24767 1 STOVL CDUSPOT

1666 REF 6 LAST 962 15,3051 22273 1 XUNIT

1667 15,3052 77624 1 CALL

1668 REF 5 LAST 590 15,3053 47570 0 TRG*N8SM

1669 REF 27 LAST 964 15,3054 26707 0 STOVL STARAD

1670 REF 2 LAST 36 15,3055 22271 0 YUNIT

1671 15,3056 77624 1 CALL

1672 REF 6 LAST 962 15,3057 47577 1 *N8SM*

1673 REF 28 LAST 965 15,3060 36715 1 STCALL STARAD +6

1674 REF 8 LAST 964 15,3061 47443 1 CDUTRIG

1675 15,3062 77624 1 CALL

1676 REF 3 LAST 951 15,3063 31267 0 CALCSMSC

1677 15,3064 77775 1 VLOAD

1678 REF 8 LAST 962 15,3065 02665 0 XNB

1679 15,3066 24007 0 STOVL 6D

1680 REF 3 LAST 387 15,3067 02673 1 YNB

1681 15,3070 34015 1 STCALL 12D

1682 REF 3 LAST 949 15,3071 47345 0 AXISGEN

1683 15,3072 77624 1 CALL

1684 REF 3 LAST 942 15,3073 47151 1 CALCGTA

1685 15,3074 77776 1 JUSTTRIM EXIT

1686 REF 291 LAST 964 15,3075 0 4616 1 TC BANKCALL

1687 REF 5 LAST 963 15,3076 17163 0 CADR IMUFIN

1688 REF 292 LAST 965 15,3077 0 4616 1 TC BANKCALL

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1689	REF	14	LAST	963	15,3100	17671	1	CADR	IMUSTALL
1690	REF	10	LAST	963	15,3101	0 5703	0	TC	CURTAINS
1691	REF	1			15,3102	3 3113	1	CA	GYRCDR
1692	REF	293	LAST	965	15,3103	0 4616	1	TC	BANKCALL
1693	REF	6	LAST	942	15,3104	17276	1	CADR	IMUPULSE
1694	REF	294	LAST	966	15,3105	0 4616	1	TC	BANKCALL
1695	REF	15	LAST	966	15,3106	17671	1	CADR	IMUSTALL
1696	REF	11	LAST	966	15,3107	0 5703	0	TC	CURTAINS
1697	REF	202	LAST	964	15,3110	0 6036	1	TC	INTPRET
1698					15,3111	77650	1	GOTO	
1699	REF	22	LAST	965	15,3112	02745	0		QMIN
1700	REF	12	LAST	942	15,3113	02737	0	GYRCDR	ECADR DGC

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P1701 PERFORM STAR AQUISITION AND STAR SIGHTINGS

1702	REF 176	LAST 957	15,3114	3 4755 1	2STARS	CAF	ZERO	INITIALIZE STARIND
1703			15,3115	1 3117 1		TCF	+2	ZERO FOR 1ST STAR, ONE FOR 2ND STAR
1704	REF 50	LAST 955	15,3116	3 4753 1	1STAR	CAF	BIT1	
1705	REF 15	LAST 960	15,3117	55 757 1		TS	STARIND	
17051	*REF 98	LAST 964	15,3120	0 5353 1		TC	PHASCHNG	
17052	*		15,3121	04024 0		OCT	04024	
1706	REF 4	LAST 957	15,3122	1 2301 0		TCF	R59	GO DO STAR AQUIRE AND ADT MARK
1707	REF 16	LAST 967	15,3123	3 1757 0	R59RET	CA	STARIND	BACK FROM SURFACE MARKING
1708			15,3124	0 0006 1		EXTEND		
1709	REF 1		15,3125	1 3144 1		BZF	ASTAR	1ST STAR MARKED
1710	REF 203	LAST 966	15,3126	0 6036 1		TC	INTPRET	2ND STAR MARKED
1711			15,3127	77775 1		VLOAD		
1712	REF 29	LAST 965	15,3130	02715 0			STARAD +6	
1713	REF 8	LAST 949	15,3131	02767 0		STORE	STARSAV2	2ND STAR IN SM
1714			15,3132	77776 1		EXIT		
1715	REF 99	LAST 967	15,3133	0 5353 1		TC	PHASCHNG	
1716			15,3134	05024 1		OCT	05024	
1717			15,3135	13000 0		OCT	13000	
1718	REF 204	LAST 967	15,3136	0 6036 1		TC	INTPRET	
1719			15,3137	45145 0		DLOAD	CALL	
1720	REF 10	LAST 960	15,3140	03560 1			TSIGHT	TIME OF 2ND MARK
1721	REF 6	LAST 954	15,3141	32540 1			PLANET	
1722	REF 1		15,3142	36731 1		STCALL	VEC2	STORE 2ND CATALOG VEC (REF)
1723	REF 1		15,3143	33156 0			SURFLINE	
1724	REF 205	LAST 967	15,3144	0 6036 1	ASTAR	TC	INTPRET	
1725			15,3145	77775 1		VLOAD		
1726	REF 30	LAST 967	15,3146	02715 0			STARAD +6	
1727	REF 9	LAST 963	15,3147	02761 0		STORE	STARSAV1	1ST OBSERVED STAR (SM)
1728			15,3150	45145 0		DLOAD	CALL	
1729	REF 11	LAST 967	15,3151	03560 1			TSIGHT	TIME OF 1ST MARK
1730	REF 7	LAST 967	15,3152	32540 1			PLANET	
1731	REF 1		15,3153	02723 0		STORE	VEC1	STORE 1ST CATALOG VEC (REF)
1732			15,3154	77776 1		EXIT		
1733	REF 1		15,3155	1 3116 0		TCF	1STAR	GO GET 2ND STAR SIGHTING

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P1734 DO FINE OR COARSE ALIGNMENT OF IMU

1735				15,3156	77131	1	SURFLINE	SSP	AXT,2	
1736	REF	11	LAST	935	15,3157	00052	0		S2	
1737					15,3160	00006	1		6	
1738					15,3161	00014	1		12D	
1739					15,3162	64373	1	WRTDESIR	VLOAD*	MXV
1740	REF	2	LAST	967	15,3163	75040	1		VEC1 +12D,2	PICK UP VEC IN REF, TRANS TO DESIRED SH
1741	REF	10	LAST	952	15,3164	03605	1		XSMO	
1742					15,3165	77656	1		UNIT	
1743	REF	31	LAST	967	15,3166	12723	1		STORE	STAPAD +12D,2 VEC IN SM
1744					15,3167	77773	1		VLOAD*	
1745	REF	10	LAST	967	15,3170	75002	1		STAPSAVI +12D,2	PICK UP VEC IN PRESENT SM
1746					15,3171	10023	1		STORE	18D,2
1747					15,3172	43104	0		TIX,2	BON
1748	REF	1			15,3173	33162	1		WRTDESIR	
17481	REF	1			15,3174	04315	1		INITALGN	IF INITIAL PASS (OPTION 0) BYPASS R54
17482	REF	1			15,3175	33203	0		INITBY	
1749					15,3176	77624	1	DOALIGN	CALL	
1750	REF	2	LAST	939	15,3177	31121	1		R54	DO CHKSDATA
1751					15,3200	77614	1		BOFF	
1752	REF	10	LAST	963	15,3201	00354	0		FRFEFLAG	
1753	REF	1			15,3202	33264	1		P57POST	ASTRO DOES NOT LIKE DATA TEST RESULTS
17531					15,3203	77624	1	INITBY	CALL	
1754	REF	4	LAST	965	15,3204	47345	0		AXISGEN	GET DESIRED ORIENT WRT PRES.XDC,YDC,ZDC
1755					15,3205	77624	1		CALL	
1756	REF	4	LAST	965	15,3206	47151	1		CALCGTA	GET GYRO TORQ ANGLES, OGC,IGC,MGC
1757					15,3207	77776	1		EXIT	
17571	REF	1			15,3210	3 4752	0		CAF	INITABIT
17572	REF	12	LAST	861	15,3211	7 0104	0		MASK	FLAGWRD8
17573	REF	293	LAST	963	15,3212	10 000	0		CCS	A
17574	REF	1			15,3213	1 3222	1		TCF	5DEGTEST
1758	REF	1			15,3214	3 3316	0		CAF	DISPGYRO
1759	REF	295	LAST	966	15,3215	0 4616	1		TC	BANKCALL
1760	REF	39	LAST	963	15,3216	20351	1		CADR	GOFASH
1761	REF	60	LAST	963	15,3217	0 6001	0		TC	GOTOPDOH
1762	REF	2	LAST	968	15,3220	1 3222	1		TCF	5DEGTEST
1763	REF	2	LAST	968	15,3221	1 3265	1		TCF	P57POST +1
1764	REF	206	LAST	967	15,3222	0 6036	1	5DEGTEST	TC	INTPRET
1765					15,3223	40175	0		VLOAD	BOV
1766	REF	13	LAST	966	15,3224	02740	0			OGC
1767	REF	1			15,3225	33226	1			SURFSUP
1768	REF	2	LAST	139	15,3226	02750	1	SURFSUP	STORE	OGCT
1769					15,3227	40141	1		V/SC	BOV
1770	REF	2	LAST	933	15,3230	30451	1			5DEGREFS
1771	REF	1			15,3231	33273	1			COATRIM
1772					15,3232	52131	0		SSP	GOTO
1773	REF	23	LAST	966	15,3233	02746	0			OMIN
1774	REF	1			15,3234	33236	0			SURFDISP
										IF ANGLES GREATER THAN 5 DEGS, DO COARSE

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1775	REF	1		15,3235	33074	1		JUSTTRIM	ANGLES LESS THAN 5DEG, DO GYRO TORQ
1776				15,3236	77776	1	SURFDISP	EXIT	
1777	REF	100	LAST	967	15,3237	0 5353	1	TC	PHASCHNG
1778					15,3240	05024	1	OCT	05024
1779					15,3241	13000	0	OCT	13000
1780	REF	207	LAST	968	15,3242	0 6036	1	TC	INTPRET
1781					15,3243	75160	1	AXC,1	AXC,2
1782	REF	11	LAST	968	15,3244	03604	0		XSMD
1783	REF	50	LAST	955	15,3245	01733	1		REFSMMAT
1784					15,3246	45014	0	SET	CALL
1785	REF	7	LAST	961	15,3247	01462	0		REFSMFLG
1786	REF	5	LAST	951	15,3250	31237	0		MATMOVE
1787					15,3251	77776	1	EXIT	
1788	REF	10	LAST	927	15,3252	11'145	1	CCS	OPTION2
1789	REF	1			15,3253	1 3255	1	TCF	B2F8
1790	REF	3	LAST	968	15,3254	1 3265	1	TCF	P57POST +1
1791	REF	2	LAST	968	15,3255	3 4752	0	B2F8	CAF
1792	REF	13	LAST	968	15,3256	7 0104	0		INITABIT
1793	REF	294	LAST	968	15,3257	10 000	0	MASK	FLAGWRD8
1794	*REF	1			15,3260	1 3543	1	CCS	A
1795	REF	208	LAST	969	15,3261	0 6036	1	TCF	P57JUMP
1796					15,3262	77624	1	TC	INTPRET
1797	REF	2	LAST	796	15,3263	33470	1	CALL	
1798					15,3264	77776	1	REFMF	GO GFT ATTITUDE VEC IN MF(YNBSAV,XNBSAV)
1799	REF	4	LAST	939	15,3265	3 5742	0	P57POST	EXIT
1800	REF	296	LAST	968	15,3266	0 4616	1	CAF	OCT14
1801	REF	9	LAST	948	15,3267	20476	0	TC	BANKCALL
1802	REF	61	LAST	968	15,3270	1 6001	1	CADR	GOPERF1
1803	*REF	2	LAST	969	15,3271	1 3543	1	TCF	GOTOPCOH
1804	REF	62	LAST	969	15,3272	1 6001	1	TCF	P57JUMP
								TCF	GOTOPCOH

STORE REFSMMAT ,SET REFSMFLG AND
DISPLAY ORIGINAL TORQ ANGLES

IF OPTION ZERO DO FINISH

IF INITIAL FLAG SET, RE-CYCLE.

ITS SET

GO GFT ATTITUDE VEC IN MF(YNBSAV,XNBSAV)

DISPLAY V50N25 CHK CODE 14

VB34-TERMINATE

VB33-PROCEED TO RE-ALIGN

VB32-R59 DONE-GO TO PROG 00

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P1805	COARSE AND FINE ALIGN IMU							
1806				15,3273	75160 1	COATRIM	AXC,1	AXC,2
1807	REF	5	LAST	949 15,3274	02664 1			XDC
1808	REF	21	LAST	962 15,3275	02642 0			XSM
1809				15,3276	77624 1		CALL	
1810	RFF	6	LAST	969 15,3277	31237 0			MATMOVE
1811				15,3300	77624 1		CALL	
1812	REF	9	LAST	965 15,3301	47443 1			CDUTRIG
1813				15,3302	77624 1		CALL	
1814	REF	4	LAST	965 15,3303	31267 0			CALCSMSC
1815				15,3304	77624 1		CALL	
1816	REF	4	LAST	962 15,3305	47255 0			CALCGA
1817				15,3306	77624 1		CALL	
1818	REF	3	LAST	948 15,3307	31506 0			COARSE
1819				15,3310	77624 1		CALL	
1820	REF	4	LAST	948 15,3311	31523 1			NCOARSE
1821				15,3312	77624 1		CALL	
1822	REF	1		15,3313	33041 1			GYROTRIM
1823				15,3314	77650 1		GOTO	
1824	REF	2	LAST	968 15,3315	33236 0			SURFDISP
1825				15,3316	01535 0	DISPGYRO	VN	0693

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P1826 LUNAR SURFACE IMU ALIGNMENT PROGRAM

1827	REF	297	LAST	969	15,3317	0 4616	1	P57	TC	BANKCALL	IS ISS ON - IF NOT, IMUCHK WILL SEND
1828	REF	2	LAST	948	15,3320	33635	1		CADR	IMUCHK	ALARM CODE 210 AND EXIT VIA GOTOPOOH.
1829	REF	209	LAST	969	15,3321	0 6036	1		TC	INTPRET	
1830					15,3322	77745	1		DLOAD		
1831	REF	42	LAST	840	15,3323	03440	1			TIG	LOAD ASCENT TIME FOR DISPLAY
1832	REF	31	LAST	962	15,3324	01046	1	P57A	STORE	DSPTM1	
1833					15,3325	77776	1		EXIT		
1834	REF	2	LAST	927	15,3326	3 2172	1	P57AA	CAF	VO6N34*	DISPLAY TALIGN, TALIGN : DSPTM1
1835	REF	298	LAST	971	15,3327	0 4616	1		TC	BANKCALL	
1836	*REF	9	LAST	766	15,3330	20510	1		CADR	GOF LASHR	
1837	REF	63	LAST	969	15,3331	1 6001	1		TCF	GOTOPOOH	V34-TERMINATE
1838	*				15,3332	1 3337	1		TCF	+5	
1839	REF	1			15,3333	1 3326	1		TCF	P57AA	VB32-RECYCLE
18391	*REF	101	LAST	969	15,3334	0 5353	1		TC	PHASCHNG	
18392	*				15,3335	00014	1		OCT	00014	
18393	*REF	144	LAST	964	15,3336	0 5155	0		TC	ENDOFJOB	
1840	REF	210	LAST	971	15,3337	0 6036	1		TC	INTPRET	
1841					15,3340	50145	1		DLOAD	BMN	
1842	REF	32	LAST	971	15,3341	01046	1			DSPTM1	
1843	REF	1			15,3342	33367	0			PACKOPTN -1	NEG TIME-PREF ORIENT IN XSMD MATRIX
1844					15,3343	65234	1		RTB	PDDL	
1845	REF	25	LAST	954	15,3344	21462	1			LOADTIME	PUSH CURRENT TIME AND PICK UP KEY IN
1846	REF	33	LAST	971	15,3345	01046	1			DSPTM1	
1847					15,3346	65254	1		BZE	PDDL	
1848	REF	1			15,3347	33357	0			P57C	IF KEY IN TIME ZERO-TALIGN=CURRENT TIME
1849					15,3350	51025	1		DSU	BPL	NOT ZERO SO EXCHANGE PD WITH DSPTM1
1850	REF	34	LAST	971	15,3351	01046	1			DSPTM1	
1851	REF	2	LAST	971	15,3352	33357	0			P57C	
1852					15,3353	45545	1		DLOAD	STADR	IF KEYIN TIME GREATER THAN CURRENT TIME
18521	REF	43	LAST	971	15,3354	74337	0		STORE	TIG	STORE IT IN TIG
18522	REF	8	LAST	930	15,3355	36775	1		STCALL	TALIGN	
18523	REF	1			15,3356	33361	0			P57D	
18524					15,3357	45545	1	P57C	DLOAD	STADR	
18525	REF	9	LAST	971	15,3360	75002	1		STORE	TALIGN	
18526	REF	54	LAST	952	15,3361	34041	0	P57D	STCALL	TDEC1	
1853	REF	13	LAST	932	15,3362	27057	0			LEMPREC	COMPUTE DESIRED IMU ORIENTATION STORE
1854					15,3363	53575	0		VLOAD	UNIT	IN X,Y,ZSMD
1855	REF	36	LAST	952	15,3364	00001	0			RATT	
1856	REF	12	LAST	969	15,3365	37605	0		STCALL	XSMD	
1857	REF	2	LAST	930	15,3366	33647	1			LSORIENT	
1858					15,3367	77776	1		EXIT		
1859	REF	177	LAST	967	15,3370	3 4755	1	PACKOPTN	CAF	ZERO	PACK FLAG BITS FOR OPTION DISPLAY
1860	REF	3	LAST	733	15,3371	55'145	1		TS	OPTION1 +1	JAM ZERO IN ALIGNMENT OPTION
1861	REF	4	LAST	971	15,3372	55'146	1		TS	OPTION1 +2	INITIALIZE FLAG BIT CONFIGURATION
1862	REF	4	LAST	955	15,3373	3 4737	0		CAF	REFSMBIT	

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1863	REF	16	LAST	955	15,3374	7 0077 0	MASK	FLAGWRD3	REFSMFLG
1864	REF	295	LAST	969	15,3375	10 000 0	CCS	A	
1865	REF	40	LAST	958	15,3376	3 4745 0	CAF	BIT7	SET
1866	REF	5	LAST	971	15,3377	27'146 1	ADS	OPTICN1 +2	CLEAR-JUST ZERO
1867	REF	1			15,3400	3 4753 1	CAF	ATTFLBIT	
1868	REF	14	LAST	866	15,3401	7 0102 0	MASK	FLAGWRD6	ATTFLG
1869	REF	296	LAST	972	15,3402	10 000 0	CCS	A	
1870	REF	39	LAST	919	15,3403	3 4750 1	CAF	BIT4	SET
1871	REF	6	LAST	972	15,3404	27'146 1	ADS	OPTION1 +2	CLEAR-ZERO IN A
1872	REF	40	LAST	972	15,3405	3 4750 1	CAF	BIT4	
1873	REF	7	LAST	972	15,3406	55'144 0	TS	OPTICN1	JAM 00010 IN OPTION1 FOR CHECK LIST
1874	REF	1			15,3407	3 3634 0	DSPOPTN	CAF	V805N06
1875	REF	299	LAST	971	15,3410	0 4616 1		TC	BANKCALL
1876	REF	40	LAST	968	15,3411	20351 1		CADR	GOFLASH
1877	REF	64	LAST	971	15,3412	1 6001 1		TCF	GOTOPOOH
1878					15,3413	1 3415 0		TCF	+2
1879	REF	1			15,3414	1 3407 0		TCF	DSPOPTN
1880	REF	102	LAST	971	15,3415	0 5353 1		TC	PHASCHNG
1881					15,3416	05024 1		OCT	05024
1882					15,3417	13000 0		OCT	13000
1883	REF	5	LAST	971	15,3420	3 4737 0		CAF	REFSMBIT
1884	REF	17	LAST	972	15,3421	7 0077 0	MASK	FLAGWRD3	
1885	REF	297	LAST	972	15,3422	10 000 0	CCS	A	
1886	REF	1			15,3423	1 3523 1	TCF	GETLMATT	SET, GO COMPUTE LM ATTITUDE
1887	REF	2	LAST	972	15,3424	3 4753 1	CAF	ATTFLBIT	CLEAR-CHECK ATTFLAG FOR STORED ATTITUDE.
1888	REF	15	LAST	972	15,3425	7 0102 0	MASK	FLAGWRD6	
1889	REF	298	LAST	972	15,3426	10 000 0	CCS	A	
1890	REF	1			15,3427	1 3527 0	TCF	BYLMATT	ALLFLG SET, CHK OPTION FOR GRAVITY COMP
1891	REF	50	LAST	927	15,3430	3 4752 0	CAF	BIT2	SEE IF OPTION 2 OR 3
1892	REF	11	LAST	969	15,3431	7 1145 1	MASK	OPTION2	
1893	REF	299	LAST	972	15,3432	10 000 0	CCS	A	
1894	REF	2	LAST	972	15,3433	1 3527 0	TCF	8YLMATT	OPTION 2 OR 3 BUT DONT HAVE ATTITUDE
1895	REF	38	LAST	957	15,3434	0 5567 0	TC	ALARM	OPTION INCONSISTANT WITH FLAGS-ALARM 701
1896					15,3435	00701 1	OCT	701	
1897	REF	3	LAST	957	15,3436	3 5006 1	CAF	V805N09	DISPLAY ALARM FOR ACTION
1898	REF	300	LAST	972	15,3437	0 4616 1	TC	BANKCALL	
1899	REF	41	LAST	972	15,3440	20351 1	CADR	GOFLASH	
1900	REF	65	LAST	972	15,3441	1 6001 1	TCF	GOTOPOOH	V834-TERMINATE
1901	REF	2	LAST	972	15,3442	1 3407 0	TCF	DSPOPTN	V33-PROCEED *****TEMPORARY
1902	REF	3	LAST	972	15,3443	1 3407 0	TCF	DSPOPTN	V832-RECYCLE TO OPTION DISPLAY V 05N06

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P1914 TRANSFORM VEC1,2 FROM MOON FIXED TO REF AND JAM BACK IN VEC1,2

1915				15,3444	40220 0	MFREF	STQ	SETPD
1916	REF	10	LAST	952	15,3445			QMAJ
1917					15,3446			0
1918					15,3447		RTB	
1919	REF	26	LAST	971	15,3450			LOADTIME
1920	REF	12	LAST	967	15,3451		STOVL	TSIGHT
19201	REF	3	LAST	968	15,3452			VEC1
1921					15,3453		PDDL	PUSH
19211	REF	13	LAST	973	15,3454			TSIGHT
19212					15,3455		CALL	
1922	REF	4	LAST	930	15,3456			RP-TC-R
1923	REF	4	LAST	973	15,3457		STOVL	VEC1
1924	REF	2	LAST	967	15,3460			VEC2
1925					15,3461		SETPD	PDDL
1926					15,3462			0
1927	REF	14	LAST	973	15,3463			TSIGHT
1928					15,3464		PUSH	CALL
1929	REF	5	LAST	973	15,3465			RP-TC-R
1930	REF	3	LAST	973	15,3466		STCALL	VEC2
1931	REF	11	LAST	973	15,3467			QMAJ

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P1947 COMPUTE LM ATTITUDE IN MOON FIXED COORDINATES USING REFSMMAT AND
R1948 STORE IN YNBSAV AND ZNBSAV

1949				15,3470	45020 1	REFMF	STQ	CALL	
1950	REF	12	LAST	973	15,3471			QMAJ	
1951	REF	10	LAST	970	15,3472			CDUTPIG	GET SIN AND COS OF CDUS
1952					15,3473		RTB	SETPD	
1953	REF	27	LAST	973	15,3474			LOADTIME	
1954					15,3475			0	
1955	REF	15	LAST	973	15,3476		STCALL	TSIGHT	
1956	REF	5	LAST	970	15,3477			CALCSMSC	GET YNB IN SM
1957					15,3500		VLOAD	VXM	
1958	REF	4	LAST	965	15,3501			YNB	
1959	REF	51	LAST	969	15,3502			REFSMMAT	YNB TO REF
1960					15,3503		UNIT	PDDL	
1961	REF	16	LAST	974	15,3504			TSIGHT	
1962					15,3505		PUSH	CALL	
1963	REF	2	LAST	795	15,3506			R-TO-RP	
1964	REF	3	LAST	217	15,3507		STOVL	YNBSAV	YNB TO MF
1965	REF	4	LAST	935	15,3510			ZNB	
1966					15,3511		VXM	UNIT	
1967	REF	52	LAST	974	15,3512			REFSMMAT	ZNB TO REF
1968					15,3513		PDDL	PUSH	
1969	REF	17	LAST	974	15,3514			TSIGHT	
1970					15,3515		CALL		
1971	REF	3	LAST	974	15,3516			R-TO-RP	ZNB TO MF
1972	REF	1			15,3517		STORE	ZNBSAV	
1973					15,3520		SETGO		
19731	REF	1			15,3521			ATTFLAG	
19732	REF	13	LAST	974	15,3522			QMAJ	

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P1974 BRANCH TO ALIGNMENT OPTION

1975	REF 211	LAST	971	15,3523	0 6036 1	GETLMATT	TC	INTPRET	
1976				15,3524	77624 1		CALL		
1977	REF 3	LAST	969	15,3525	33470 1			REFMF	GO TRANSFORM TO MF IN YNBSAV,ZNBSAV
1978				15,3526	77776 1		EXIT		
1981	REF 61	LAST	963	15,3527	0 5504 0	BYLMATT	TC	UPFLAG	SET INITIAL ALIGN FLAG
1982	REF 2	LAST	968	15,3530	00205 0		ADRES	INITALGN	
1983	REF 51	LAST	967	15,3531	3 4753 1		CAF	BIT1	
1984	REF 12	LAST	972	15,3532	7 1145 1		MASK	OPTION2	SEE IF OPTION 1 OR 3
1985	REF 300	LAST	972	15,3533	10 000 0		CCS	A	
1986	REF 2	LAST	963	15,3534	1 2627 1		TCF	GVDETER	OPTION 1 OR 2, GET GRAVITY
19861	*REF 103	LAST	972	15,3535	0 5353 1	ATTCHK	TC	PHASCHNG	
19862	*			15,3536	04024 0		OCT	04024	
1987	*REF 3	LAST	972	15,3537	3 4753 1		CAF	ATTFLBIT	NOT 1 OR 3, CHECK ATTFLAG
1988	REF 16	LAST	972	15,3540	7 0102 0		MASK	FLAGWRD6	
1989	REF 301	LAST	975	15,3541	10 000 0		CCS	A	
1990	REF 1			15,3542	1 3557 1		TCF	P57OPT0	GET ALIGNMENT VECs FOR OPTION 0
19901	*REF 104	LAST	975	15,3543	0 5353 1	P57JUMP	TC	PHASCHNG	
19902	*			15,3544	04024 0		OCT	04024	
1991	REF 89	LAST	963	15,3545	0 5516 0		TC	DOWNFLAG	ATTFLG CLEAR-RESET INTALIGN FLAG
1992	RFF 3	LAST	975	15,3546	00205 0		ADRES	INITALGN	
1993	*REF 29	LAST	927	15,3547	3 6244 0		CAF	THREE	
1994	REF 13	LAST	975	15,3550	7 1145 1		MASK	OPTION2	BRANCH ON OPTION CODE
1995	REF 302	LAST	975	15,3551	50 000 1		INDEX	A	
1996				15,3552	1 3553 0		TCF	+1	
1997	REF 2	LAST	975	15,3553	1 3557 1		TCF	P57OPT0	OPTION IS 0
1998	REF 1			15,3554	1 3600 0		TCF	P57OPT1	OPTION IS 1
1999	REF 1			15,3555	1 3616 1		TCF	P57OPT2	OPTION IS 2
2000	REF 1			15,3556	1 3617 0		TCF	P57OPT3	OPTION IS 3

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P2001 OPTION 0, GET TWO ATTITUDE VECs

2002	REF 212	LAST 975	15,3557	0 6036 1	P57OPT0	TC	INTPRET	
2003			15,3560	77775 1		VLOAD		
2004	REF 4	LAST 974	15,3561	02243 0			YNBSAV	Y AND Z ATTITUDE WILL BE PUT IN REF
2005	REF 5	LAST 973	15,3562	26723 0		STOVL	VEC1	
2006	REF 2	LAST 974	15,3563	02251 0			ZNBSAV	
2007	REF 4	LAST 973	15,3564	36731 1		STCALL	VEC2	
20071	REF 11	LAST 974	15,3565	47443 1			CDUTRIG	
20072			15,3566	77624 1		CALL		
2008	REF 6	LAST 974	15,3567	31267 0			CALCSMSC	COMPUTE SC AXIS WRT PRESENT SM
2009			15,3570	77775 1		VLOAD		
2010	REF 5	LAST 974	15,3571	02673 1			YNB	
2011	REF 11	LAST 968	15,3572	26761 0	SAMETYP	STOVL	STARSAV1	Y SC AXIS WRT PRESENT SM
2012	REF 5	LAST 974	15,3573	02701 0			ZNB	
2013	REF 9	LAST 967	15,3574	36767 1		STCALL	STARSAV2	Z SC AXIS WRT PRESENT SM
2014	REF 1		15,3575	33444 0			MREF F	TRANSFORM VEC1,2 FROM MF TO REF
2017			15,3576	77650 1		GOTO		
2018	REF 2	LAST 967	15,3577	33156 0			SURFLINE	

R2019 OPTION 1, GET LANDING SITE AND Z-ATTITUDE VEC

2020	REF 213	LAST 976	15,3600	0 6036 1	P57OPT1	TC	INTPRET	
2021			15,3601	53575 0		VLOAD	UNIT	
2022	REF 9	LAST 930	15,3602	02023 1			RLS	LANDING SITE VEC
2023	REF 6	LAST 976	15,3603	26723 0		STOVL	VEC1	
2024	REF 3	LAST 976	15,3604	02251 0			ZNBSAV	Z ATTITUDE VEC
2025	REF 5	LAST 976	15,3605	36731 1		STCALL	VEC2	
20251	REF 12	LAST 976	15,3606	47443 1			CDUTRIG	
20252			15,3607	77624 1		CALL		
2026	REF 7	LAST 976	15,3610	31267 0			CALCSMSC	GET ZNB AXIS WRT PRES SM FOR STARSAV2
2027			15,3611	45175 0		VLOAD	CALL	
2028	REF 8	LAST 963	15,3612	02235 1			GSAV	TRANS GSAV FROM NB TO SM FOR STARSAV1
20281	REF 2	LAST 713	15,3613	47565 1			CDU*NBSM	
2029			15,3614	77650 1		GOTO		
2030	REF 1		15,3615	33572 1			SAMETYP	NOW DO SAME AS OPTION 0

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P2031 OPTICA 2, GET TWO STAR SIGHTINGS

2032 REF 1 15,3616 1 3114 1 P57OPT2 TCF 2STARS DO SIGHTING ON 2 STARS

R2033 OPTION 3, GET LANDING SITE VEC AND ONE STAR SIGHTING

2034	REF	214	LAST	976	15,3617	0 6036	1	P57OPT3	TC	INTPRET	
2035					15,3620	53575	0		VLOAD	UNIT	
2036	REF	10	LAST	976	15,3621	02023	1			RLS	LANDING SITE VEC
2037	REF	7	LAST	976	15,3622	02723	0		STORE	VEC1	
2038	REF	6	LAST	976	15,3623	26731	0		STOVL	VEC2	DUMMY VEC2 FOR 2ND CATALOG STAR
2039	REF	9	LAST	976	15,3624	02235	1			GSAV	GRAVITY VEC NB
2040					15,3625	77624	1		CALL		
2041	REF	3	LAST	976	15,3626	47565	1			CDU*NBSM	TRANS GSAV FROM NB TO SM FOR STARS AV1
2042	REF	12	LAST	976	15,3627	36761	1		STCALL	STARS AV1	
2043	REF	2	LAST	976	15,3630	33444	0			MFPFF	STARS AV2 IS STORED AS 2ND OBSERVED STAR
2047					15,3631	77776	1		EXIT		
2048	REF	2	LAST	967	15,3632	1 3116	0		TCF	1STAR	1STAR GET VEC2, STARS AV2, GOES TO SURFLINE
2049					15,3633	00701	1	BADOPT	OCT	00701	**** TEMP ****
2050					15,3634	01206	1	VB05N06	VN	506	

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P2051 CHECK IMODES30 TO VARIFY IMU IS ON

2052	REF	46	LAST	483	15,3635	4 1302 0	IMUCHK	CS	IMODES30	
2053	REF	27	LAST	953	15,3636	7 4743 1		MASK	BIT9	
2054	REF	303	LAST	975	15,3637	10 000 0		CCS	A	IS IMU ON
2055					15,3640	1 3644 0		TCF	+4	YES
2056	REF	39	LAST	972	15,3641	0 5567 0		TC	ALARM	NO, SEND ALARM AND EXIT
2057					15,3642	00210 1		DCT	210	
2058	REF	66	LAST	972	15,3643	0 6001 0		TC	GOTOPOOH	
2059	REF	62	LAST	975	15,3644	0 5504 0		TC	UPFLAG	
2060	REF	5	LAST	401	15,3645	00007 0		ADRES	IMUSE	SET IMUSE FLAG
2061	REF	5	LAST	879	15,3646	0 4631 1		TC	SWRETURN	
2062					15,3647	77220 1	LSORIENT	STQ	VLOAD	
2063	REF	14	LAST	974	15,3650	02746 0			QMAJ	
2064	REF	6	LAST	842	15,3651	01555 0			RRECTCSM	
2065					15,3652	47235 0		VXV	VXV	
2066	REF	2	LAST	842	15,3653	01563 0			VRECTCSM	
2067	REF	13	LAST	971	15,3654	03605 1			XSMD	
2068					15,3655	77656 1		UNIT		
2069	REF	5	LAST	952	15,3656	03621 1		STORE	ZSMD	
2073					15,3657	53435 0		VXV	UNIT	
2074	REF	14	LAST	978	15,3660	03605 1			XSMD	
2075	REF	6	LAST	952	15,3661	37613 1		STCALL	YSMD	
2076	REF	15	LAST	978	15,3662	02746 0			QMAJ	

L LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

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R2000 NAME - LSPCS - LCCATE SUN AND MOON
 R2002 MCD NO.1
 R2004 MOD BY NEVILLE

DATE - 25 OCT 67

ASSEMBLY SUNDANCE

R2006 FUNCTIONAL DESCRIPTION

R2007 COMPUTES UNIT POSITION VECTOR OF THE SUN AND MOON IN THE BASIC REFERENCE SYSTEM. THE SUN VECTOR S IS
 R2009 LOCATED VIA TWO ANGLES. THE FIRST ANGLE(OBLIQUITY) IS THE ANGLE BETWEEN THE EARTH EQUATOR AND THE ECLIPTIC. THE
 R2011 SECOND ANGLE IS THE LONGITUDE OF THE SUN MEASURED IN THE ECLIPTIC.
 R2012 THE POSITION VECTOR OF THE SUN IS

R2013
$$S = (\cos(LOS), \cos(OBL) * \sin(LOS), \sin(OBL) * \sin(LOS)), \text{ WHERE}$$

 R2014

R2015
$$LOS = LOS_0 + LOS_R * T - (C * \sin(2\pi * T) / 365.24 + C * \cos(2\pi * T) / 365.24)$$

 R2016

R2017 LOS (RAD) IS THE LONGITUDE OF THE SUN FOR MIDNIGHT JUNE 30TH OF THE PARTICULAR YEAR.
 R2019

R2020 LOS (RAD/DAY) IS THE MEAN RATE FOR THE PARTICULAR YEAR.
 R2021

R2022 LCS AND LCS_R ARE STORED AS LOS_0 AND LOS_R IN RATEP.
 R2023

R2024 $\cos(OBL)$ AND $\sin(OBL)$ ARE STORED IN THE MATRIX KONMAT.
 R2025 T , TIME MEASURED IN DAYS(24 HOURS), IS STORED IN TIMEP.

R2026 C AND C_R ARE FUDGE FACTORS TO MINIMIZE THE DEVIATION. THEY ARE STORED AS ONE CONSTANT(CMOD), SINCE
 R2028

R2029 $C * \sin(X) + C_R * \cos(X)$ CAN BE WRITTEN AS $(C + C_R) * \sin(X + \Phi)$, WHERE $\Phi = \arctan(C_R / C)$.
 R2031

R2033 THE MOON IS LOCATED VIA FOUR ANGLES. THE FIRST IS THE OBLIQUITY. THE SECOND IS THE MEAN LONGITUDE OF THE MOON,
 R2035 MEASURED IN THE ECLIPTIC FROM THE MEAN EQUINOX TO THE MEAN ASCENDING NODE OF THE LUNAR ORBIT, AND THEN ALONG THE
 R2037 ORBIT. THE THIRD ANGLE IS THE ANGLE BETWEEN THE ECLIPTIC AND THE LUNAR ORBIT. THE FOURTH ANGLE IS THE LONGITUDE
 R2039 OF THE NODE OF THE MOON, MEASURED IN THE LUNAR ORBIT. LET THESE ANGLES BE OBL,LOM,IM, AND LON RESPECTIVELY.

R2041 THE SIMPLIFIED POSITION VECTOR OF THE MOON IS

R2042
$$M = (\cos(LOM), \cos(OBL) * \sin(LOM) - \sin(OBL) * \sin(IM) * \sin(LOM - LON), \sin(OBL) * \sin(LOM) + \cos(OBL) * \sin(IM) * \sin(LOM - LON))$$

 R2043

R2045 WHERE

R2046
$$LOM = LOM_0 + LOM_R * T - (A * \sin(2\pi * T / 27.5545) + A * \cos(2\pi * T / 27.5545) + B * \sin(2\pi * T / 32) + B * \cos(2\pi * T / 32)), \text{ AND}$$

 R2048

R2050
$$LON = LON_0 + LON_R * T$$

 R2051

R2052 A , A_R , B AND B_R ARE STORED AS AMOD AND BMOD (SEE DESCRIPTION OF CMOD, ABOVE). $\cos(OBL)$, $\sin(OBL) * \sin(IM)$,
 R2054

R2055 $\sin(OBL)$, AND $\cos(OBL) * \sin(IM)$ ARE STORED IN KONMAT AS $K1$, $K2$, $K3$ AND $K4$, RESPECTIVELY. LOM , LOM_R , LON , LON_R
 R2057 ARE STORED AS LOM0, LOMR, LON0, AND LONR IN RATEP.

R2059 THE THREE PHIS ARE STORED AS AARG, BARG, AND CARG(SUN). ALL CONSTANTS ARE UPDATED BY YEAR.

R2061 CALLING SEQUENCE

L LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

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R2062 CALL LSPCS. RETURN IS VIA QPRET.

R2063 ALARMS OR ABORTS

R2064 NCNE

R2065 ERASABLE INITIALIZATION REQUIRED

R2066 TEPHEM - TIME FROM MIDNIGHT 1 JULY PRECEDING THE LAUNCH TO THE TIME OF THE LAUNCH (WHEN THE AGC CLOCK WENT
 R2068 TO ZERO). TEPHEM IS TP WITH UNITS OF CENTI-SECONDS.
 R2069 TIME2 AND TIME1 ARE IN MPAC AND MPAC +1 WHEN PROGRAM IS CALLED.

R2070 OUTPUT

R2071 UNIT POSITIONAL VECTOR OF SUN IN VSUN. (SCALED 8-1)
 R2072 UNIT POSITIONAL VECTOR OF MOON IN VMOON. (SCALED 8-1)

R2073 SUBROUTINES USED

R2074 NCNE

R2075 DEBRIS

R2076 CURRENT CORE SET, WORK AREA AND FREEFLAG

2077				04,2750		BANK	04
207701	REF	1		15,2000		SETLOC	EPHEM
207702				15,3663		BANK	

2078	REF	6	LAST	960	E5,1714		EBANK= VSUN
20785	REF	1					COUNT* \$\$/EPHEM
20786	REF	2	LAST	932	15,3663	LUNPOS	EQUALS LSPCS

2079				15,3663	54201 0	LSPOS	SETPD	SR	
2080				15,3664	00001 0			0	
2082				15,3665	20617 0			14D	TP
2083				15,3666	56371 1		TAD	DDV	
2084	REF	3	LAST	258	15,3667	01707 0		TEPHEM	TIME OF LAUNCH
2086	REF	1			15,3670	12024 1		CSTODAY	24 HOURS-8640000 CENTI-SECS/DAY 8-33
2087	REF	1			15,3671	00031 0	STORE	TIMEP	T IN DAYS
2088					15,3672	77170 1	AXT,1	AXT,2	
2089					15,3673	00000 1		0	
2090					15,3674	00000 1		0	
2091					15,3675	77614 1	CLEAR		
2092	REF	11	LAST	968	15,3676	00274 0		FREEFLAG	SWITCH BIT
2093					15,3677	77745 1	POSITA	DLOAD	
2094	REF	1			15,3700	12004 0		KONMAT +2	ZEROS
2095	REF	1			15,3701	00027 1	STORE	GTMP	
2096					15,3702	40745 0	POSITB	DLOAD	DMP*
2097	REF	2	LAST	980	15,3703	00031 0		TIMEP	T
2098	REF	1			15,3704	12050 1		VAL67 +4,1	1/27 OR 1/32 OR 1/365

L LUNAR AND SOLAR EPHEMERIDES SUBROUTINES

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2099				15,3705	42661 0	SL	DAD*	
2100				15,3706	20211 1		8D	
2101	REF	2	LAST	980	15,3707		VAL67 +2,1	AARG
2102					15,3710			SIN(T/27+PHI) OR T/32 OR T/365
2103	REF	3	LAST	981	15,3711		VAL67,1	(A0**2+A1**2)**1/2SIN(X+PHIA)
2104					15,3712	DAD	INCR,1	PLUS
2105	REF	2	LAST	980	15,3713		GTMP	(B0**2+B1**2)**1/2SIN(X+PHIB)
2106					15,3714	DEC	-6	
2107	REF	3	LAST	981	15,3715	STORE	GTMP	OR (C0**2+C1**2)**1/2SIN(X+PHIC)
2108					15,3716	BOFSET		
2109	REF	12	LAST	980	15,3717		FREEFLAG	
2110	REF	1			15,3720		POSITB	
2111					15,3721	POSITD	DMP*	
2112	REF	3	LAST	980	15,3722		TIMEP	T
2113	REF	1			15,3723		RATESP,2	LOMP,LOSR,LONR
2114					15,3724	SL	DAD*	
2115					15,3725		SD	
2116	REF	2	LAST	981	15,3726		RATESP +6,2	LOMO,LOSO,LONO
2117					15,3727	DSU		
2118	REF	4	LAST	981	15,3730		GTMP	
2119	REF	1			15,3731	STORE	STMP,2	LOM,LOS,LON
2120					15,3732	SLOAD	INCR,2	
2121	REF	16	LAST	962	15,3733		X2	
2122					15,3734	DEC	-2	
2123					15,3735	DAD	BZE	
2124	REF	1			15,3736		RCB-13	PLUS 2
2125	REF	1			15,3737		POSITE	2ND
2126					15,3740	BPL		
2127	REF	1			15,3741		POSITA	1ST
2128					15,3742	POSITE	DSU	3RD
2129	REF	2	LAST	981	15,3743		STMP	LOM
2130	REF	3	LAST	981	15,3744		STMP +4	LON
2131					15,3745	SIN	PDDL	SIN(LOM-LON)
2132	REF	4	LAST	981	15,3746		STMP	
2133					15,3747	SIN	PDDL	SIN LOM
2134	REF	5	LAST	981	15,3750		STMP	
2135					15,3751	COS	VDEF	COS LOM
2136					15,3752	MXV	UNIT	
2137	REF	2	LAST	980	15,3753		KONMAT	K1,K2,K3,K4,
2138	REF	8	LAST	933	15,3754	STORE	VMOON	
2139					15,3755	DLOAD	PDDL	
2140	REF	3	LAST	981	15,3756		KONMAT +2	ZERO
2141	REF	6	LAST	981	15,3757		STMP +2	
2142					15,3760	SIN	PDDL	SIN LOS
2143	REF	7	LAST	981	15,3761		STMP +2	
2144					15,3762	COS	VDEF	COS LOS
2145					15,3763	MXV	UNIT	
2146	REF	4	LAST	981	15,3764		KONMAT	
2147	REF	7	LAST	980	15,3765	STORE	VSUN	
2148					15,3766	RVQ		

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2149					15,3767	77745 1	POSITE	DLOAD		
2150	REF	5	LAST	981	15,3770	12004 0			KCNMAT +2	ZEROS
2151	REF	5	LAST	981	15,3771	00027 1		STORE	GTMP	
2152					15,3772	77650 1		GOTO		
2153	REF	1			15,3773	33721 0			POSITD	
21535					15,3774	77616 0	LUNVEL	RVQ		TO FOOL INTEGRATION
21536	REF	2	LAST	67	05,2000			SETLOC	EPHEM1	
21537					05,3430			BANK		
21538	REF	2	LAST	67 TO	68:	52	52*	COUNT*	\$/EPHEM	
2163					0020		STMP	EQUALS	16D	
2164					0026		GTMP	EQUALS	22D	
2165					0030		TIMEP	EQUALS	24D	

*** END OF LEMP50S .103 ***

L DOWN-TELEMETRY PROGRAM

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R0001 PROGRAM NAME- DOWN TELEMETRY PROGRAM
R0002 MCD NO.- 0 TO COMPLETELY REWRITE THE DOWN TELEMETRY PROGRAM AND DOWNLINK ERASABLE DUMP PROGRAM FOR THE
R0004 PURPOSE OF SAVING APPROXIMATELY 150 WORDS OF CORE STORAGE.
R0006 THIS CHANGE REQUIRES AN ENTIRELY NEW METHOD OF SPECIFYING DOWNLINK LISTS. REFER TO DOWNLINK
R0008 LISTS LOG SECTION FOR MORE DETAILS. HOWEVER THIS CHANGE WILL NOT AFFECT THE GROUND PROCESSING
R0010 OF DOWN TELEMETRY DATA.

R0011 MCD BY- KILROY, SMITH, DEWITT
R0012 DATE- 02OCT67
R0013 AUTHORS- KILROY, SMITH, DEWITT, DEWOLF, FAGIN
R0014 LOG SECTION- DOWN-TELEMETRY PROGRAM
R0015 FUNCTIONAL DESCRIPTION- THIS ROUTINE IS INITIATED BY TELEMETRY END
R0016 PULSE FROM THE DOWNLINK TELEMETRY CONVERTER. THIS PULSE OCCURS
R0017 AT 50 TIMES PER SEC (EVERY 20 MS) THEREFORE DODOWNTM IS
R0018 EXECUTED AT THESE RATES. THIS ROUTINE SELECTS THE APPROPRIATE
R0019 AGC DATA TO BE TRANSMITTED DOWNLINK AND LOADS IT INTO OUTPUT
R0020 CHANNELS 34 AND 35. THE INFORMATION IS THEN GATED OUT FROM THE
R0021 LGC IN SERIAL FASHION.
R0022 THIS PROGRAM IS CODED FOR A 2 SECOND DOWNLIST. SINCE DOWNRUPTS
R0023 OCCUR EVERY 20MS AND 2 AGC COMPUTER WORDS CAN BE PLACED IN
R0024 CHANNELS 34 AND 35 DURING EACH DOWNRUPT THE PROGRAM IS CAPABLE
R0025 OF SENDING 200 AGC WORDS EVERY 2 SECONDS.

R0026 CALLING SEQUENCE- NONE
R0027 PROGRAM IS ENTERED VIA TCF DODOWNTM WHICH IS EXECUTED AS A
R0028 RESULT OF A DOWNRUPT. CONTROL IS RETURNED VIA TCF RESUME WHICH
R0029 IN EFFECT IS A RESUME.

R0030 SUBROUTINES CALLED- NONE
R0031 NORMAL EXIT MODE- TCF RESUME
R0032 ALARM OR ABORT EXIT MODE- NONE
R0033 RESTART PROTECTION:
R0034 ON A FRESH START AND RESTART THE 'STARTSUB' SUBROUTINE WILL INITIALIZE THE DOWNLIST POINTER (ACTUALLY
R0036 DNTMGOTO) TO THE BEGINNING OF THE CURRENT DOWNLIST (I.E. CURRENT CONTENTS OF DNLSTADR). THIS HAS THE
R0038 EFFECT OF IGNORING THE REMAINDER OF THE DOWNLIST WHICH THE DOWN-TELEMETRY PROGRAM WAS WORKING ON WHEN
R0040 THE RESTART (OR FRESH START) OCCURRED AND RESUME DOWN-TELEMETRY FROM THE BEGINNING OF THE CURRENT
R0042 DOWNLIST.
R0043 ALSO OF INTEREST IS THE FACT THAT ON A RESTART THE AGC WILL ZERO DOWNLINK CHANNELS 13, 34 AND 35.

R0047 DOWNLINK LIST SELECTION:
R0048 THE APPROPRIATE DOWNLINK LISTS ARE SELECTED BY THE FOLLOWING:
R0049 1. FRESH START
R0050 2. V37EXXE WHERE XX = THE MAJOR MODE BEING SELECTED.
R0051 3. UPDATE PROGRAM (P27)
R0052 4. NON-V37 SELECTABLE TYPE PROGRAMS (E.G. AGS INITIALIZATION (SUNDANCE, LUMINARY) AND P61-P62
R00522 TRANSITION (COLOSSUS) ETC.).

R00525 DOWNLINK LIST RULES AND LIMITATIONS:
R00526 READ SECTION(S) WHICH FOLLOW 'DEBRIS' WRITEUP.
R0053 OUTPUT- EVERY 2 SECONDS 100 DOUBLE PRECISION WORDS (I.E. 200 LGC
R0054 COMPUTER WORDS) ARE TRANSMITTED VIA DOWNLINK.
R0055 ERASABLE INITIALIZATION REQUIRED- NONE
R0056 'DNTMGOTO' AND 'DNLSTADR' ARE INITIALIZED BY THE FRESH START PROGRAM.
R0058 DEBRIS (ERASABLE LOCATIONS DESTROYED BY THIS PROGRAM)-
R0059 LDATALST, DNTMBUFF TO DNTMBUFF +21D, TMINDEX, DNQ.

GAP: ASSEMBLE REVISION 069 OF AGC PROGRAM LUMINARY BY NASA 2021112-011

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R0060

L DOWN-TELEMETRY PROGRAM

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P0065 DOWNTM IS ENTERED EVERY 20 MS BY AN INTERRUPT TRIGGERED BY THE
R0066 RECEIPT OF AN ENDPULSE FROM THE SPACECRAFT TELEMETRY PROGRAMMER.

R0067 NOTES REGARDING DOWNLINK LISTS ASSOCIATED WITH THIS PROGRAM:

- R0068 1. DOWNLISTS. - DOWNLISTS MUST BE COMPILED IN THE SAME BANK AS THE
R0069 DOWN-TELEMETRY PROGRAM. THIS IS DONE FOR EASE OF CODING, FASTER
R0070 EXECUTION.
R0075 2. EACH DOWNLINK LIST CONSISTS OF A CONTROL LIST AND A NUMBER OF
R0076 SUBLISTS.
R0077 3. A SUBLIST REFERS TO A SNAPSHOT OR DATA COMMON TO THE SAME OR OTHER
R0078 DOWNLINK LISTS. ANY SUBLIST CONTAINING COMMON DATA NEEDS TO BE
R0079 CODED ONLY ONCE FOR THE APPLICABLE DOWNLINK LISTS.
R0080 4. SNAPSHOT SUBLISTS REFER SPECIFICALLY TO HOMOGENOUS DATA WHICH MUST BE
R0081 SAVED IN A BUFFER DURING ONE DOWNRUPT.
R0082 5. THE 1DNADR FOR THE 1ST WORD OF SNAPSHOT DATA IS FOUND AT THE END
R0083 OF EACH SNAPSHOT SUBLIST, SINCE THE PROGRAM CODING SENDS THIS DP WORD
R0084 IMMEDIATELY AFTER STORING THE OTHERS IN THE SNAPSHOT BUFFER.
R0085 6. ALL LISTS ARE COMBINATIONS OF CODED ERASABLE ADDRESS CONSTANTS
R0086 CREATED FOR THE DOWNLIST PROGRAM.
R0087 A. 1DNADR 1-WORD DOWNLIST ADDRESS.
R0088 SAME AS ECADR, BUT USED WHEN THE WORD ADDRESSED IS THE LEFT
R0089 HALF OF A DOUBLE-PRECISION WORD FOR DOWN TELEMETRY.
R0090 B. 2DNADR - 6DNADR N-WORD DOWNLIST ADDRESS, N = 2 - 6.
R0091 SAME AS 1DNADR, BUT WITH THE 4 UNUSED BITS OF THE ECADR FORMAT
R0092 FILLED IN WITH 0001-0101. USED TO POINT TO A LIST OF N DOUBLE-
R0093 PRECISION WORDS, STORED CONSECUTIVELY, FOR DOWN TELEMETRY.
R0094 C. DNCHAN DOWNLIST CHANNEL ADDRESS.
R0095 SAME AS 1DNADR, BUT WITH PREFIX BITS 0111. USED TO POINT TO
R0096 A PAIR OF CHANNELS FOR DOWN TELEMETRY.
R0097 D. DNPTR DOWN TELEMETRY SUBLIST POINTER.
R0098 SAME AS CAF BUT TAGGED AS A CONSTANT. USED IN CONTROL LIST TO POINT TO A SUBLIST.
R0100 CAUTION--- A DNPTR CANNOT BE USED IN A SUBLIST.
R0101 7. THE WORD ORDER CODE IS SET TO ZERO AT THE BEGINNING OF EACH DOWNLIST (I.E. CONTROL LIST) AND WHEN
R0103 A '1DNADR TIME2' IS DETECTED IN THE CONTROL LIST(ONLY).
R0104 B. IN THE SNAPSHOT SUBLIST ONLY, THE DNADR'S CANNOT POINT TO THE FIRST WORD OF ANY EBANK.

R0106 DOWNLINK LIST RESTRICTIONS:

R0107 (THE FOLLOWING POINTS MAY BE LISTED ELSEWHERE BUT ARE LISTED HERE SO IT IS CLEAR THAT THESE THINGS CANNOT BE
R0109 DONE)

- R0110 1. SNAPSHOT DOWNLIST:
R0111 (A) CANNOT CONTAIN THE FOLLOWING ECADRS(I.E. 1DNADR'S): 0, 400, 1000, 1400, 2000, 2400, 3000, 3400.
R0113 (B) CAN CONTAIN ONLY 1DNADR'S

R0114 2. ALL DOWNLINKED DATA(EXCEPT CHANNELS) IS PICKED UP BY A <DCA<SO DOWNLINK LISTS CANNOT CONTAIN THE
R0116 EQUIVALENT OF THE FOLLOWING ECADRS(I.E. 1DNADRS): 377, 777, 1377, 1777, 2377, 27777, 3377, 3777.

R0118 (NOTE: THE TERM EQUIVALENT ' MEANT THAT THE 1DNADR TO 6DNADR WILL BE PROCESSED LIKE 1 TO 6 ECADRS)

R0120 3. CONTROL LISTS AND SUBLISTS CANNOT HAVE ENTRIES = OCTAL 00000 OR OCTAL 77777

L DOWN-TELEMETRY PROGRAM

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RO122 4. THE '1DNADR TIME2' WHICH WILL CAUSE THE DOWNLINK PROGRAM TO SET THE WORDER CODE TO 3 MUST APPEAR IN THE
RO124 CONTROL SECTION OF THE DOWNLIST.

RO125 5. 'DNCHAN 0' CANNOT BE USED.

RO126 6. 'DNPTR 0' CANNOT BE USED.

RO127 7. DNPTR CANNOT APPEAR IN A SUBLIST.

RO128

RO129 FBANK SETTINGS

RO130 IN THE PROCESS OF SETTING THE FBANK (WHEN PICKING UP DOWNLINK DATA) THE DOWN TELEMETRY PROGRAM PUTS
RO132 'GARBAGE' INTO BITS15-12 OF FBANK. HUGH BLAIR-SMITH WARNS US THAT BITS15-12 OF FBANK MAY BECOME
RO134 SIGNIFICANT SOMEDAY IN THE FUTURE. IF/WHEN THAT HAPPENS, THE PROGRAM SHOULD INSURE (BY MASKING ETC.)
RO136 THAT BITS15-12 OF FBANK ARE ZERO.

RO137 INITIALIZATION REQUIRED- TO INTERRUPT CURRENT LIST AND START A NEW ONE..

RO138 1. ADRES OF DOWNLINK LIST INTO DNLSTADR

RO139 2. NEGONE INTO SUBLIST

RO140 3. NEGONE INTO DNECADR

0142 22,3647

0143 REF 2 LAST 208 05,2000

0144 05,3430

BANK 22
SETLOC DOWNTELM
BANK

0145 RFF 17 LAST 219 0340

EBANK= DNTMBUFF

0146 REF 1

0147 RFF 5 LAST 819 05,3430 54 016 1 DDDOWN TM COUNT* \$\$/DPRG

0148 05,3431 0 0006 1 TS BANKRUPT

0149 RFF 5 LAST 819 05,3432 22 012 1 EXTEND QXCH QRUPT

0150 RFF 41 LAST 972 05,3433 3 4745 0 CA BIT7

0151 05,3434 0 0006 1 EXTEND

0152 RFF 17 LAST 820 05,3435 05 013 0 WOR CHAN13

0153 REF 4 LAST 303 05,3436 0 0335 1 TC DNTMGOTO

SAVE Q
SET WORD ORDER CODE TO 1. EXCEPTION- AT
THE BEGINNING OF EACH LIST THE WORD
CODE WILL BE SET BACK TO 0.
GO TO APPROPRIATE PHASE OF PROGRAM

0154 RFF 2 LAST 234 05,3437 3 7746 0 DNPHEASE1 CA NEGONE

0155 REF 1 05,3440 54 337 1 TS SUBLIST

0156 RFF 1 05,3441 54 336 0 TS DNECADR

0157 RFF 1 05,3442 3 3562 0 CA DNPHEASE2

0158 REF 5 LAST 986 05,3443 54 335 0 TS DNTMGOTO

0159 RFF 1 05,3444 1 3460 1 TCF NFWLIST

0160 REF 2 LAST 986 05,3445 10 336 0 DNPHEASE2 CCS DNECADR

0161 RFF 1 05,3446 0 3575 0 DDDNADR TC FFTCH2WD

0162 REF 28 LAST 927 05,3447 77753 0 MINTIME2-1DNADR TIME2

0163 05,3450 1 3451 0 TCF +1

INITIALIZE ALL CONTROL WORDS
WORDS TO MINUS ONE

SET DNTMGOTO =0 ALL SUBSEQUENT DOWNRUPTS
GO TO DNPHEASE2

SENDING OF DATA IN PROGRESS
YES - THEN FFTCH THE NEXT 2 SP WORDS
NEGATIVE OF TIME2 1DNADR
(ECADR OF 3776 + 74001 = 77777)

0164 RFF 2 LAST 986 05,3451 10 337 1

0165 REF 1 05,3452 1 3610 1

CCS SUBLIST
TCF NFWTINSL

IS THE SUBLIST IN CONTROL
YES

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0166				05,3453	74001 0	DNADRD CR	OCT	74001	DNADR COUNT AND ECADR DECREMETER
0167	REF	1		05,3454	3 0334 0	CHKLST	CA	CTLIST	
0168				05,3455	0 0006 1		EXTEND		
0169	REF	2	LAST	986	05,3456	6 3460 0	BZMF	NEWLIST	IT WILL BE NEGATIVE AT END OF LIST
0170	REF	1			05,3457	1 3465 1	TCF	NEXTINCL	
0171	REF	8	LAST	835	05,3460	50 332 0	NEWLIST	INDEX	DNLSTCOD
0172	REF	1			05,3461	3 2441 1	CA	DNTABLE	INITIALIZE CTLIST WITH
0173	REF	2	LAST	987	05,3462	54 334 1	TS	CTLIST	STARTING ADDRESS OF NEW LIST
0174	REF	9	LAST	987	05,3463	4 0332 1	CS	DNLSTCOD	
0175	REF	1			05,3464	1 3700 1	TCF	SEND ID +3	
0177	REF	3	LAST	987	05,3465	50 334 0	NEXTINCL	INDEX	CTLIST
0178					05,3466	3 0000 1	CA	0	
0179	REF	304	LAST	978	05,3467	10 000 0	CCS	A	
0180	REF	4	LAST	987	05,3470	24 334 0	INCR	CTLIST	SET POINTER TO PICK UP NEXT CTLIST WORD
0181					05,3471	1 3475 0	TCF	+4	ON NEXT ENTRY TO PROG. (A SHOULD NOT =0)
0182	REF	5	LAST	987	05,3472	56 334 0	XCH	CTLIST	SET CTLIST TO NEGATIVE AND PLACE(CODING)
0183					05,3473	4 0000 0	COM		UNCOMPLEMENTED DNADR INTO A. (FOR LA)
0184	REF	6	LAST	987	05,3474	56 334 0	XCH	CTLIST	(ST IN)
0185	REF	305	LAST	987	05,3475	24 000 1	+4	INCR	(CTLIST)
0186	REF	3	LAST	986	05,3476	54 336 0	TS	DNECADR	SAVE DNADR
0187	REF	1			05,3477	6 3447 0	AD	MINTIME2	TEST FOR TIME2 (NEG. OF ECADR)
0188	REF	306	LAST	987	05,3500	10 000 0	CCS	A	
0189	REF	1			05,3501	1 3505 0	TCF	SETWD +1	DON'T SET WORD ORDER CODE
0190					05,3502	47777 0	MINB1314	OCT	47777
0191	REF	2	LAST	987	05,3503	1 3505 0	TCF	SETWD +1	MINUS BIT 13 AND 14 (CAN'T GET HERE)
0192	REF	1			05,3504	0 3527 1	SETWD	TC	DON'T SET WORD ORDER CODE
0193	REF	4	LAST	987	05,3505	3 0336 1	+1	CA	GO SET WORD ORDER CODE TO ZERO.
0194	REF	1			05,3506	6 3502 0	+2	AD	RELOAD A WITH THE DNADR.
0195					05,3507	0 0006 1	EXTEND		IS THIS A REGULAR DNADR?
0196	REF	2	LAST	986	05,3510	6 3575 0	BZMF	FETCH2WD	YES. (A MUST NEVER BE ZERO)
0197	REF	1			05,3511	6 7740 0	AD	MINB12	NO- IS IT A POINTER (DNPTR) OR A
0198					05,3512	0 0006 1	EXTEND		CHANNEL(DNCHAN)
0199	REF	1			05,3513	6 3533 1	BZMF	DODNPTR	IT'S A POINTER. (A MUST NEVER BE ZERO)
0200					05,3514	0 0006 1	DODNCHAN	TC	5
0201	REF	5	LAST	987	05,3515	50 336 1	INDEX	DNECADR	(EXECUTED AS EXTEND) IT'S A CHANNEL
0202					05,3516	44'000 1	INDEX	0 -4000	(EXECUTED AS READ)
0203	REF	157	LAST	959	05,3517	54 001 1	TS	L	
0204					05,3520	0 0006 1	TC	5	(EXECUTED AS EXTEND)
0205	REF	6	LAST	987	05,3521	50 336 1	INDEX	DNECADR	
0206					05,3522	43'777 1	INDEX	0 -4001	(EXECUTED AS READ)
0207	REF	7	LAST	987	05,3523	54 336 0	TS	DNECADR	SET DNECADR
0208	REF	3	LAST	986	05,3524	3 7746 0	CA	NEGONE	TO MINUS
0209	REF	8	LAST	987	05,3525	56 336 1	XCH	DNECADR	WHILE PRESERVING A.
0210	REF	1			05,3526	1 3623 1	TCF	DNTMEXIT	GO SEND CHANNELS
0211	REF	42	LAST	986	05,3527	4 4745 1	WOZERO	CS	BIT7
0212					05,3530	0 0006 1	EXTEND		
0213	REF	18	LAST	986	05,3531	03 013 0	WAND	CHAN13	SET WORD ORDER CODE TO ZERO

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0214	REF 228	LAST	923	05,3532	0 0002 0	TC	Q	RETURN TO CALLER
0215	REF 9	LAST	987	05,3533	50 336 1	DODNPTR	INDEX DNECADR	DNECADR CONTAINS ADRES OF SUBLIST
0216				05,3534	0 0000 1		0 0	CLEAR AND ADD LIST ENTRY INTO A.
0217	REF 307	LAST	987	05,3535	10 000 0	CCS	A	IS THIS A SNAPSHOT SUBLIST
0218	REF 10	LAST	988	05,3536	3 0336 1	CA	DNECADR	NO, IT IS A REGULAR SUBLIST.
0219	REF 1			05,3537	1 3607 1	TCF	DOSUBLST	A MUST NOT BE ZERO.
0220	REF 11	LAST	988	05,3540	56 336 1	XCH	DNECADR	YES, IT IS A SNAPSHOT SUBLIST.
0221	REF 3	LAST	986	05,3541	54 337 1	TS	SUBLIST	C(DNECADR) INTO SUBLIST
0222	REF 178	LAST	971	05,3542	3 4755 1	CAF	ZERO	A INTO A
0223	REF 3	LAST	115	05,3543	56 336 1	XCH	TMINDEX	(NOTE.. TMINDEX = DNECADR)

R0224 THE FOLLOWING CODING (FROM SNAPLOOP TO SNAPEND) IS FOR THE PURPOSE OF TAKING A SNAPSHOT OF 12 DP REGISTERS.
 R0226 THIS IS DONE BY SAVING 11 DP REGISTERS IN DNTMBUFF AND SENDING THE FIRST DP WORD IMMEDIATELY.
 R0228 THE SNAPSHOT PROCESSING IS THE MOST TIME CONSUMING AND THEREFORE THE CODING AND LIST STRUCTURE WERE DESIGNED
 R0230 TO MINIMIZE TIME. THE TIME OPTIMIZATION RESULTS IN RULES UNIQUE TO THE SNAPSHOT PORTION OF THE DOWNLIST.
 R0232 THESE RULES ARE.....

1. ONLY 1DNADR'S CAN APPEAR IN THE SNAPSHOT SUBLIST
2. THE 1DNADR'S CANNOT REFER TO THE FIRST LOCATION IN ANY BANK.

0236	REF 41	LAST	954	05,3544	54 003 0	SNAPLOOP	TS EBANK	SET EBANK
0237	REF 5	LAST	799	05,3545	7 4357 0		MASK LOW8	ISOLATE RELATIVE ADDRESS
0238				05,3546	0 0006 1		EXTEND	
0239	REF 308	LAST	988	05,3547	5 0000 1		INDEX A	
0240				E3,1401			EBANK= 1401	
0241				05,3550	3 1402 0		DCA 1401	PICK UP 2 SNAPSHOT WORDS.
0242	REF 18	LAST	986	0340			EBANK= DNTMBUFF	
0243	REF 4	LAST	988	05,3551	50 336 1		INDEX TMINDEX	
0244	REF 19	LAST	988	05,3552	52 341 0		DXCH DNTMBUFF	STORE 2 SNAPSHOT WORDS IN BUFFER
0245	REF 5	LAST	988	05,3553	24 336 1		INCR TMINDEX	SET BUFFER INDEX FOR NEXT 2 WORDS.
0246	REF 6	LAST	988	05,3554	24 336 1		INCR TMINDEX	
0247	REF 4	LAST	988	05,3555	24 337 0	SNAPAGN	INCR SUBLIST	SET POINTER TO NEXT 2 WORDS OF SNAPSHOT
0248	REF 5	LAST	988	05,3556	50 337 0		INDEX SUBLIST	
0249				05,3557	0 0000 1		0 0	= CA SSSS (SSSS = NEXT ENTRY IN SUBLIST)
0250	REF 309	LAST	988	05,3560	10 000 0		CCS A	TEST FOR LAST TWO WORDS OF SNAPSHOT.
0251	REF 1			05,3561	1 3544 0		TCF SNAPLOOP	NOT LAST TWO.
0252	REF 1			05,3562	03445 1	LDNPHAS2	GENADR DNPBASE2	
0253	REF 6	LAST	988	05,3563	54 337 1		TS SUBLIST	YES, LAST. SAVE A.
0254	REF 4	LAST	987	05,3564	3 7746 0		CA NEGONE	SET DNECADR AND
0255	REF 12	LAST	988	05,3565	54 336 0		TS DNECADR	SUBLIST POINTERS
0256	REF 7	LAST	988	05,3566	56 337 0		XCH SUBLIST	TO NEGATIVE VALUES.
0257	REF 42	LAST	988	05,3567	54 003 0		TS EBANK	
0258	REF 6	LAST	988	05,3570	7 4357 0		MASK LOW8	
0259				05,3571	0 0006 1		EXTEND	
0260	REF 310	LAST	988	05,3572	5 0000 1		INDEX A	
0261				E3,1401			EBANK= 1401	
0262				05,3573	3 1402 0		DCA 1401	PICK UP FIRST 2 WORDS OF SNAPSHOT.

L DOWN-TELEMETRY PROGRAM

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0263	REF	20	LAST	988	0340			EBANK=	DNTMBUFF	
0264	REF	2	LAST	987	05,3574	1 3623 1	SNAPEND	TCF	DNTMEXIT	NOW GO SEND THEM.
0265	REF	13	LAST	988	05,3575	3 0336 1	FETCH2WD	CA	DNECADR	
0266	REF	43	LAST	988	05,3576	54 003 0		TS	EBANK	SET EBANK
0267	REF	7	LAST	988	05,3577	7 4357 0		MASK	LOW8	ISOLATE RELATIVE ADDRESS
0268	REF	158	LAST	987	05,3600	54 001 1		TS	L	
0269	REF	1			05,3601	3 3453 0		CA	DNADRDRCR	DECREMENT COUNT AND ECADR
0270	REF	14	LAST	989	05,3602	26 336 0		ADS	DNECADR	
0271					05,3603	0 0006 1		EXTEND		
0272	REF	159	LAST	989	05,3604	5 0001 0		INDEX	L	
0273					E3,1400			EBANK=	1400	
0274					05,3605	3 1401 0		DCA	1400	PICK UP 2 DATA WORDS
0275	REF	21	LAST	989	0340			EBANK=	DNTMBUFF	
0276	REF	3	LAST	989	05,3606	1 3623 1		TCF	DNTMEXIT	NOW GO SEND THEM.
0277	REF	8	LAST	988	05,3607	54 337 1	DOSUBLST	TS	SUBLIST	SET SUBLIST POINTER
0278	REF	9	LAST	989	05,3610	50 337 0	NEXTINSL	INDEX	SUBLIST	
0279					05,3611	0 0000 1		0	0	= CA SSSS (SSSS = NEXT ENTRY IN SUBLIST)
0280	REF	311	LAST	988	05,3612	10 000 0		CCS	A	IS IT THE END OF THE SUBLIST
0281	REF	10	LAST	989	05,3613	24 337 0		INCR	SUBLIST	NO-
0282					05,3614	1 3620 1		TCF	+4	
0283	REF	11	LAST	989	05,3615	54 337 1		TS	SUBLIST	SAVE A.
0284	REF	5	LAST	988	05,3616	3 7746 0		CA	NEGONE	SET SUBLIST TO MINUS
0285	REF	12	LAST	989	05,3617	56 337 0		XCH	SUBLIST	RETRIEVE A.
0286	REF	312	LAST	989	05,3620	24 000 1	+4	INCR	A	
0287	REF	15	LAST	989	05,3621	54 336 0		TS	DNECADR	SAVE DNADR
0288	REF	3	LAST	987	05,3622	1 3506 0		TCF	SETWD +2	GO USE COMMON CODING (PROBLEMS WOULD OCCUR IF THE PROGRAM ENCOUNTERED A DNPTIR NOW)
A0289										
A0290										
0291					05,3623	0 0006 1	DNTMEXIT	EXTEND		DOWN-TELEMETRY EXIT
0292	REF	1			05,3624	01 034 1		WRITE	DNTM1	TO SEND A + L TO CHANNELS 34 + 35
0293	REF	160	LAST	989	05,3625	3 0001 0		CA	L	RESPECTIVELY
0294					05,3626	0 0006 1	TMEXITL	EXTEND		
0295	REF	1			05,3627	01 035 0		WRITE	DNTM2	
0296	REF	21	LAST	822	05,3630	1 5270 0	TMRESUME	TCF	RESUME	EXIT TELEMETRY PROGRAM VIA RESUME.
0297	REF	2	LAST	539	7740		MINB12	EQUALS	~1/8	
0298	REF	7	LAST	988	0336		DNECADR	EQUALS	TMINDEX	
0299	REF	2	LAST	115	0334		CTLIST	EQUALS	LDATA1ST	
0300	REF	2	LAST	115	0337		SUBLIST	EQUALS	DNQ	

L DOWN-TELEMETRY PROGRAM

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R0301 SUBROUTINE NAME- DNDUMP
R0302 FUNCTIONAL DESCRIPTION - TO SEND(DUMP) ALL ERASABLE STORAGE 'N' TIMES.(N = 1 TO 4). BANKS ARE SENT ONE AT A TIME
R0304 EACH BANK IS PRECEDED BY AN ID WORD, SYNCH BITS, ECADR AND TIME1 FOLLOWED BY THE 256D WORDS OF EACH
R0306 EBANK. EBANKS ARE DUMPED IN ORDER(I.E. EBANK 0 FIRST, THEN EBANK1 ETC.)
R0308 CALLING SEQUENCE- THE GROUND OR ASTRONAUT BY KEYING V74E CAN INITIALIZE THE DUMP.
R0310 AFTER KEYING IN V74E THE CURRENT DOWNLIST WILL BE IMMEDIATELY TERMINATED AND THE DOWNLINK ERASABLE DUMP
R0312 WILL BEGIN.
R0313 ONCE INITIATED THE DOWNLINK ERASABLE DUMP CAN BE TERMINATED (AND INTERRUPTED DOWNLIST REINSTATED) ONLY
R0315 BY THE FOLLOWING:
R0316 1. A FRESH START
R0317 2. COMPLETION OF ALL DOWNLINK DUMPS REQUESTED (ACCORDING TO BITS SET IN DUMPCNT). NOTE THAT DUMPCNT
R0319 CAN BE ALTERED BY A V21N01.
R0320 3. AND INVOLUNTARILY BY A RESTART.
R0321 NORMAL EXIT MODE- TCF DNPHE1
R0322 ALARM OR ABORT MODE- NONE
R0323 *SUBROUTINES CALLED- NONE.
R0324 ERASABLE INITIALIZATION REQUIRED-
R0325 DUMPCNT OCT 20000 IF 4 COMPLETE ERASABLE DUMPS ARE DESIRED
R0326 DUMPCNT OCT 10000 IF 2 COMPLETE ERASABLE DUMPS ARE DESIRED
R0327 DUMPCNT OCT 04000 IF 1 COMPLETE ERASABLE DUMP IS DESIRED
R0328 DEPRIS- DUMPLOC, DUMPSW, DNTMGOTO, EBANK AND CENTRAL REGISTERS
R0329 TIMING- $\text{TIME(IN SECS)} = ((\text{NO.DUMPS}) * (\text{NO.EBANKS}) * (\text{WDSPEREBANK} + \text{NO.IDWDS})) / \text{NO.WDSPERSEC}$
R0331 $\text{TIME(IN SECS)} = (4) * (8) * (256 + 4) / 100$
R0333 THUS TIME(IN SECS TO SEND DUMP OF ERASABLE 4 TIMES VIA DOWNLINK) = 83.2 SECONDS

R0335 STRUCTURE OF ONE EBANK AS IT IS SENT BY DOWNLINK PROGRAM-
R0336 (REMINDER-THIS ONLY DESCRIBES ONE OF THE 8 EBANKS X 4 (DUMPS) = 32 EBANKS WHICH WILL BE SENT BY DNDUMP)
R0338 DOWNLIST W
R0339 WORD TAKEN FROM CONTENTS OF EXAMPLE 0 COMMENTS

R0340	1	ERASID	0177X	0	DOWNLIST I.D. FOR DOWNLINK ERASABLE DUMP (X=7 CSM, 6 LM)
R0342	2	LOWIDCOD	77340	1	DOWNLINK SYNCH BITS.(SAME ONE USED IN ALL OTHER DOWNLISTS)
R0344	3	DUMPLOC	13400	1	(SEE NOTES ON DUMPLOC)1= 3RD ERAS DUMP, 3400=ECADR OF 5TH WD
R0346	4	TIME1	14120	1	TIME IN CENTISECONDS
R0347	5	FIRST WORD OF EBANK X	03400	1	IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1400 (ECADR 3400)
R0349	6	2ND WORD OF EBANK X	00142	1	IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1401 (ECADR 3401)
R0351	7	3RD WORD OF EBANK X	00142	1	IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1402 (ECADR 3402)
R0353	.		1		
R0354	.		1		
R0355	.		1		
R0356	260D	256TH WORD OF EBANK X	03777	1	IN THIS EXAMPLE THIS WORD = CONTENTS OF E7,1777 (ECADR 3777)

R0358 NOTE- DUMPLOC CONTAINS THE COUNTER AND ECADR FOR EACH WORD BEING SENT.
R0359 THE BIT STRUCTURE OF DUMPLOC IS FOLLOWS---
R0360 X = NOT USED
R0361 X ABC EEE RRRRRRRR ABC = ERASABLE DUMP COUNTER(I.E. ABC = 0,1,2 OR 3 WHICH MEANS THAT
R0363 COMPLETE ERASABLE DUMP NUMBER 1,2,3 OR 4 RESPECTIVELY IS IN PROGRESS)
R0365 EEE = EBANK BITS
R0366 RRRRRRRR = RELATIVE ADDRESS WITHIN AN EBANK.

L DOWN-TELEMETRY PROGRAM

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0368	REF	179	LAST	988	05,3631	3 4755 1	DNDUMPI	CA	ZERO	INITIALIZE DOWNLINK
0369	REF	1			05,3632	54 336 0		TS	DUMPLOC	ERASABLE DUMP
0370	REF	2	LAST	987	05,3633	0 3675 0	+2	TC	SENDID	GO SEND ID AND SYNCH BITS
0371	REF	1			05,3634	3 3643 0		CA	LDNDUMPI	SET DNTMGOTO
0372	REF	6	LAST	986	05,3635	54 335 0		TS	DNTMGOTO	TO LOCATION FOR NEXT PASS
0373	REF	16	LAST	950	05,3636	3 0025 0		CA	TIME1	PLACE TIME1
0374	REF	161	LAST	989	05,3637	56 001 0		XCH	L	INTO L
0375	REF	2	LAST	991	05,3640	3 0336 1		CA	DUMPLOC	AND ECADR OF THIS EBANK INTO A
0376	REF	4	LAST	989	05,3641	1 3623 1		TCF	DNTMEXIT	SEND DUMPLOC AND TIME1
0377	REF	1			05,3642	03644 1	LDNDUMP	ADRES	DNDUMP	
0378	REF	1			05,3643	03657 0	LDNDUMPI	ADRES	DNDUMPI	
0379	REF	63	LAST	917	05,3644	3 4752 0	DNDUMP	CA	TWO	INCREMENT ECADR IN DUMPLOC
0380	REF	3	LAST	991	05,3645	26 336 0		ADS	DUMPLOC	TO NEXT DP WORD TO BE
0381	REF	8	LAST	989	05,3646	7 4357 0		MASK	LOW8	DUMPED AND SAVE IT.
0382	REF	313	LAST	989	05,3647	10 000 0		CCS	A	IS THIS THE BEGINNING OF A NEW EBANK
0383	REF	1			05,3650	1 3661 1		TCF	DNDUMP2	NO- THEN CONTINUE DUMPING
0384	REF	4	LAST	991	05,3651	3 0336 1		CA	DUMPLOC	YES- IS THIS THE END OF THE
0385	REF	2	LAST	226	05,3652	7 0333 0		MASK	DUMPCNT	N TH(N = 1 TO 4) COMPLETE ERASABLE
0386	REF	1			05,3653	7 7721 0		MASK	PRIO34	DUMP(BIT14 FOR 4, BIT13 FOR 2 OR BIT12
0387	REF	314	LAST	991	05,3654	10 000 0		CCS	A	FOR 1 COMPLETE ERASABLE DUMP(S)).
0388	REF	2	LAST	237	05,3655	1 3437 0		TCF	DNPHASE1	YES- START SENDING INTERRUPTED DOWNLIST
A0389										AGAIN
0390	REF	2	LAST	303	05,3656	1 3633 0		TCF	DNDUMPI +2	NO- GO BACK AND INITIALIZE NEXT BANK
0391	REF	1			05,3657	3 3642 1	DNDUMPI	CA	LDNDUMP	SET DNTMGOTO
0392	REF	7	LAST	991	05,3660	54 335 0		TS	DNTMGOTO	FOR WORDS 3 TO 2560 OF CURRENT EBANK
0393	REF	5	LAST	991	05,3661	3 0336 1	DNDUMP2	CA	DUMPLOC	
0394	REF	44	LAST	989	05,3662	54 003 0		TS	EBANK	SET EBANK
0395	REF	9	LAST	991	05,3663	7 4357 0		MASK	LOW8	ISOLATE RELATIVE ADDRESS.
0396	REF	229	LAST	988	05,3664	54 002 1		TS	3	(NOTE: MASK INSTRUCTION IS USED TO PICK
0397	REF	27	LAST	927	05,3665	3 4754 0		CA	NEGO	UP ERASABLE REGISTERS SO THAT EDITING
0398	REF	162	LAST	991	05,3666	54 001 1		TS	L	REGISTERS 20-23 WILL NOT BE ALTERED.)
0399	REF	230	LAST	991	05,3667	50 002 0		INDEX	0	
0400					E3,1400			EBANK=	1400	PICK UP LOW ORDER REGISTER OF PAIR
0401					05,3670	7 1401 1		MASK	1401	OF ERASABLE REGISTERS.
0402	REF	163	LAST	991	05,3671	56 001 0		XCH	L	
0403	REF	231	LAST	991	05,3672	50 002 0		INDEX	0	PICK UP HIGH ORDER REGISTER OF PAIR
0404					05,3673	7 1400 0		MASK	1400	OF ERASABLE REGISTERS.
0405	REF	22	LAST	989	0340			EBANK=	DNTMBUFF	
0406	REF	5	LAST	991	05,3674	1 3623 1		TCF	DNTMEXIT	GO SEND THEM
0407					05,3675	0 0006 1	SENDID	EXTEND		**ENTRANCE USED BY ERASABLE DUMP PROG.**
0408	REF	8	LAST	991	05,3676	22 335 1		QXCH	DNTMGOTO	SET DNTMGOTO SO NEXT TIME PROG WILL GO
0409	REF	1			05,3677	3 5011 1		CAF	ERASID	TO LOCATION FOLLOWING :TC SENDID:
0410	REF	164	LAST	991	05,3700	54 001 1		TS	L	**ENTRANCE USED BY REGULAR DOWNLINK PG**

L DOWN-TELEMETRY PROGRAM

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0411	REF	2	LAST	987	05,3701	0 3527 1
0412	REF	1			05,3702	3 2065 0
0413	REF	165	LAST	991	05,3703	56 001 0
0414	REF	6	LAST	991	05,3704	1 3623 1

TC	WOZERD
CAF	LOWIDCOD
XCH	L
TCF	DNTMFEXIT

GO SET WORD ORDER CODE TO ZERO
PLACE SPECIAL ID CODE INTO L
AND ID BACK INTO A
SEND DOWNLIST ID CODE(S).

L INTER-BANK COMMUNICATION

USER'S PAGE NO. 1 EO S3

R0001 THE FOLLOWING ROUTINE CAN BE USED TO CALL A SUBROUTINE IN ANOTHER BANK. IN THE BANKCALL VERSION, THE
 R0003 CADR OF THE SUBROUTINE IMMEDIATELY FOLLOWS THE TC BANKCALL INSTRUCTION, WITH C(A) AND C(L) PRESERVED.

0005				4616		BLOCK	02		
00055	REF	1				COUNT*	\$/BANK		
0006	REF	7	LAST	879	4616 52 134 0	BANKCALL	DXCH	BUF2	SAVE INCOMING A,L.
0007	REF	232	LAST	991	4617 50 002 0		INDEX	Q	PICK UP CADR.
0008					4620 3 0000 1		CA	0	
0009	REF	233	LAST	993	4621 24 002 0		INCR	Q	SO WE RETURN TO THE LOC. AFTER THE CADR.

R0010 SWCALL IS IDENTICAL TO BANKCALL, EXCEPT THAT THE CADR ARRIVES IN A.

0012	REF	166	LAST	992	4622 54 001 1	SWCALL	TS	L	
0013	REF	3	LAST	477	4623 22 004 0		LXCH	FBANK	SWITCH BANKS, SAVING RETURN.
0014	REF	8	LAST	758	4624 7 5012 0		MASK	LOW10	GET SUB-ADDRESS OF CADR.
0015	REF	234	LAST	993	4625 56 002 0		XCH	Q	A,L NOW CONTAINS DP RETURN.
0016	REF	8	LAST	993	4626 52 134 0		DXCH	BUF2	RESTORING INPUTS IF THIS IS A BANKCALL.
0017	REF	235	LAST	993	4627 50 002 0		INDEX	Q	
0018					4630 0 2000 0		TC	10000	SETTING Q TO SWRETURN.
0019	REF	9	LAST	993	4631 56 134 1	SWRETURN	XCH	BUF2 +1	COMES HERE TO RETURN TO CALLER. C(A,L)
0020	REF	4	LAST	993	4632 56 004 0		XCH	FBANK	ARE PRESERVED FOR RETURN.
0021	REF	10	LAST	993	4633 56 134 1		XCH	BUF2 +1	
0022	REF	11	LAST	993	4634 0 0133 0		TC	BUF2	

R0023 THE FOLLOWING ROUTINE CAN BE USED AS A UNILATERAL JUMP WITH C(A,L) PRESERVED AND THE CADR IMMEDIATELY
 R0025 FOLLOWING THE TC POSTJUMP INSTRUCTION.

0026	REF	236	LAST	993	4635 56 002 0	POSTJUMP	XCH	Q	SAVE INCOMING C(A).
0027	REF	315	LAST	991	4636 50 000 1		INDEX	A	GET CADR.
0028					4637 3 0000 1		CA	0	

R0029 BANKJUMP IS THE SAME AS POSTJUMP, EXCEPT THAT THE CADR ARRIVES IN A.

0031	REF	5	LAST	993	4640 54 004 1	BANKJUMP	TS	FBANK	
0032	REF	9	LAST	993	4641 7 5012 0		MASK	LOW10	
0033	REF	237	LAST	993	4642 56 002 0		XCH	Q	RESTORING INPUT C(A) IF THIS WAS A
0034	REF	238	LAST	993	4643 50 002 0	Q+10000	INDEX	Q	POSTJUMP.
0035					4644 1 2000 1	PRI012	TCF	10000	PRI012 = TCF 10000 = 12000

L INTER-BANK COMMUNICATION

USER'S PAGE NO. 2 EO S3

P0036 THE FOLLOWING ROUTINE GETS THE RETURN CADR SAVED BY SWCALL OR BANKCALL AND LEAVES IT IN A.

0038	REF	10	LAST	993	4645	3 5012 1	MAKECADR CAF	LOW10	
0039	REF	12	LAST	993	4646	7 0133 1	MASK	BUF2	
0040	REF	13	LAST	994	4647	6 0134 1	AD	BUF2 +1	
0041	REF	239	LAST	993	4650	0 0002 0	TC	Q	
00465	REF	5	LAST	886	4651	54 135 1	SUPDACAL TS	MPTEMP	
0047	REF	6	LAST	993	4652	56 004 0	XCH	FBANK	SET FBANK FOR DATA.
00475					4653	0 0006 1	EXTEND		
0048	REF	11	LAST	566	4654	04 007 1	ROR	SUPERBNK	SAVE FBANK IN BITS 15-11, AND
00485	REF	6	LAST	994	4655	56 135 0	XCH	MPTEMP	SUPERBANK IN BITS 7-5.
0049	REF	11	LAST	994	4656	7 5012 0	MASK	LOW10	
00495	REF	167	LAST	993	4657	56 001 0	XCH	L	SAVE REL. ADR. IN BANK, FETCH SUPERBITS.
0050					4660	0 0004 0	INHINT		BECAUSE RUPT DOES NOT SAVE SUPERBANK.
00505					4661	0 0006 1	EXTEND		
0051	REF	12	LAST	994	4662	01 007 1	WRITE	SUPERBNK	SET SUPERBANK FOR DATA.
0052	REF	168	LAST	994	4663	50 001 0	INDEX	L	
00525					4664	3 2000 0	CA	10000	PINBALL (FIX MEM DISP) PREVENTS DCA HERE
0053	REF	7	LAST	994	4665	56 135 0	XCH	MPTEMP	SAVE 1ST WD, FETCH OLD FBANK AND SBANK.
00534					4666	0 0006 1	EXTEND		
00535	REF	13	LAST	994	4667	01 007 1	WRITE	SUPERBNK	RESTORE SUPERBANK.
0054					4670	0 0003 1	RELINT		
00545	REF	7	LAST	994	4671	54 004 1	TS	FBANK	RESTORE FBANK.
0055	REF	8	LAST	994	4672	3 0135 0	CA	MPTEMP	RECOVER FIRST WORD OF DATA.
00555					4673	0 0002 0	RETURN		24 WDS. DATACALL 516 MU, SUPDACAL 432 MU

L INTER-BANK COMMUNICATION

USER'S PAGE NO. 3 EO S3

P0056 THE FOLLOWING ROUTINES ARE IDENTICAL TO BANKCALL AND SWCALL EXCEPT THAT THEY ARE USED IN INTERRUPT.

0058	REF	7	LAST	906	4674	52 073 1	IBNKCALL	DXCH	RUPTREG3	USES RUPTREG3,4 FOR DP RETURN ADDRESS.
0059	REF	240	LAST	994	4675	50 002 0		INDEX	Q	
0060					4676	3 0000 1		CAF	0	
0061	REF	241	LAST	995	4677	24 002 0		INCR	Q	
0062	REF	169	LAST	994	4700	54 001 1	ISWCALL	TS	L	
0063	REF	8	LAST	994	4701	22 004 0		LXCH	FBANK	
0064	REF	12	LAST	994	4702	7 5012 0		MASK	LOW10	
0065	REF	242	LAST	995	4703	56 002 0		XCH	Q	
0066	REF	8	LAST	995	4704	52 073 1		DXCH	RUPTREG3	
0067	REF	243	LAST	995	4705	50 002 0		INDEX	Q	
0068					4706	0 2000 0		TC	10000	
0069	REF	3	LAST	111	4707	56 073 0	ISWRETRN	XCH	RUPTREG4	
0070	REF	9	LAST	995	4710	56 004 0		XCH	FBANK	
0071	REF	4	LAST	995	4711	56 073 0		XCH	RUPTREG4	
0072	REF	9	LAST	995	4712	0 0072 1		TC	RUPTREG3	

R0090 2. USPRCADR ACCESSES INTERPRETIVE CODING IN OTHER THAN THE USER'S FBANK. THE CALLING SEQUENCE IS AS FOLLOWS:

A0092							L	TC	USPRCADR	
A0093							L+1	CADR	INTPRETX	INTPRETX IS THE INTERPRETIVE CODING
A0094										RETURN IS TO L+2
0103	REF	5	LAST	471	4713	54 164 0	USPRCADR	TS	LOC	SAVE A
0104	REF	34	LAST	953	4714	3 4744 1		CA	BIT8	
0105	REF	7	LAST	466	4715	54 023 1		TS	EDOP	EXIT INSTRUCTION TO EDOP
0106	REF	21	LAST	816	4716	3 0006 1		CA	BBANK	
0107	REF	1			4717	54 165 1		TS	BANKSET	USER'S BBANK TO BANKSET
0108	REF	244	LAST	995	4720	50 002 0		INDEX	Q	
0109					4721	3 0000 1		CA	Q	
0110	REF	10	LAST	995	4722	54 004 1		TS	FBANK	INTERPRETIVE BANK TO FBANK
0111	REF	13	LAST	995	4723	7 5012 0		MASK	LOW10	YIELDS INTERPRETIVE RELATIVE ADDRESS
0112	REF	245	LAST	995	4724	56 002 0		XCH	Q	INTERPRETIVE ADDRESS TO Q, FETCHING L+1
0113	REF	6	LAST	995	4725	56 164 1		XCH	LOC	L+1 TO LOC, RETRIEVING ORIGINAL A
0114	REF	1			4726	1 4643 0		TCF	Q+10000	

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RO145 SUPERSW MAYBE CALLED IN THIS FASHION:

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R0146      CAF      ABBCON      WHERE  --  ABBCON      BBCON      SOMETHIN  --
R0147      TCR      SUPERSW      (THE SUPERBNK BITS ARE IN THE BBCON)  --
R0148      ...      ...
R0149      .      .
R0150      .      .

```

RO151 OR IN THIS FASHION :

R0152	CAF	SUPERSET	WHERE SUPERSET IS ONE OF THE FOUR AVAILABLE
R0154	TCR	SUPERSW	SUPERBANK BIT CONSTANTS:
R0155	...	...	SUPER011 OCTAL 60
R0157	.	.	SUPER100 OCTAL 100
R0159	.	.	SUPER101 OCTAL 120
R0161			SUPER110 OCTAL 140

[illegible]

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R0002      ENTRY TO THE INTERPRETER. INTPRET SETS LOC TO THE FIRST INSTRUCTION, BANKSET TO THE BBANK OF THE
R0004 OBJECT INTERPRETIVE PROGRAM, AND INTRBIT15 TO THE BIT15 CONTENTS OF FBANK. INTERPRETIVE PROGRAMS MAY BE IN
R0006 VIRTUALLY ALL BANKS PRESENT UNDER ANY SUPER-BANK SETTING, WITH THE RESTRICTION THAT PROGRAMS IN HIGH BANKS
R0008 (BIT15 OF FBANK = 1) DO NOT REFER TO LOWBANKS, AND VICE-VERSA. THE INTERPRETER DOES NOT SWITCH SUPERBANKS.
R0010 E-BANK SWITCHING OCCURS WHENEVER GENERAL ERASABLE (100 - 3777) IS ADDRESSED.

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0012				6036				BLOCK 03			
0013	REF	1						COUNT*	\$\$/INTER		
00135				6036	0 0003	1	INTPRET	REFINT			
0014				6037	0 0006	1		EXTEND			SET LOC TO THE WORD FOLLOWING THE TC.
0015	REF	7	LAST	995	6040	22 164	1	QXCH	LOC		
0016	RFF	22	LAST	995	6041	3 0006	1	+2	CA	BBANK	INTERPRETIVE BRANCHES FINISH HERE.
0017	REF	2	LAST	995	6042	54 165	1		TS	BANKSET	
0018	REF	38	LAST	956	6043	7 4735	0		MASK	BIT15	GET 15TH BIT FOR INDEXABLE ADDRESSES.
0019	REF	5	LAST	112	6044	54 115	0		TS	INTBIT15	
0020	REF	8	LAST	995	6045	54 023	1		TS	EDCP	MAKE SURE NO INSTRUCTIONS LEFT OVER
0021	REF	1			6046	1 6067	1		TCF	NEWOPS	PICK UP OP CODE PAIR AND BEGIN.
0022	REF	23	LAST	997	6047	22 006	1	INTRSM	LXCH	BBANK	RESUME SUSPENDED INTERPRETIVE JOB
0023	REF	215	LAST	977	6050	1 6041	0		TCF	INTPRET +3	
0024			DLOAD	LOADS	MPAC,	MPAC	+1,	LEAVING	ZERO	IN MPAC	+2.
0025					6051	0 0006	1	DLOAD	EXTEND		
0026	REF	4	LAST	920	6052	5 0116	1		INDEX	ADDRWD	
0027					6053	3 0001	0		DCA	0	LOAD DP C(C(ADDRWD)) INTO MPAC,MPAX +1
0028	REF	348	LAST	960	6054	52 155	1	SLOAD2	DXCH	MPAC	
0029	REF	180	LAST	991	6055	3 4755	1		CAF	ZERO	ZERO MPAC +2

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P0030 AT THE END OF MOST INSTRUCTIONS, CONTROL IS GIVEN TO DANZIG TO DISPATCH THE NEXT OPERATION.

0032	REF 349	LAST 997	6056 54 156 1	TS	MPAC +2	AND DECLARE DP MODE
0033	REF 13	LAST 887	6057 54 163 1	NEWMODE TS	MODE	PROLOGUE FOR MODE-CHANGING INSTRUCTIONS.
0034	REF 3	LAST 997	6060 3 0165 0	DANZIG CA	BANK SET	SET BBANK BEFORE TESTING NEWJOB SO THAT
0035	REF 24	LAST 997	6061 54 006 0	TS	BBANK	IT MAY BE SAVED DIRECTLY BY CHANJOB.
0036	REF 9	LAST 997	6062 10 023 1	NOIBNKSW CCS	EDOP	SEE IF AN ORDER CODE IS LEFT OVER FROM
0037	REF 1		6063 1 6076 1	TCF	OPJUMP	THE LAST PAIR RETRIEVED. IF SO, EXECUTE.
A0038						EDOP IS SET TO ZERO ON ITS RE-EDITING.
0039	REF 5	LAST 725	6064 10 067 1	CCS	NEWJOB	SEE IF A JOB OF HIGHER PRIORITY IS
0040	REF 1		6065 1 5126 0	TCF	CHANG2	PRESENT, AND IF SO, CHANGE JOBS.
0041	REF 8	LAST 997	6066 24 164 1	INCR	LOC	ADVANCE THE LOCATION COUNTER.
R0042						
0043	REF 9	LAST 998	6067 50 164 1	NEWOPS INDEX	LOC	ENTRY TO BEGIN BY PICKING OP CODE PAIR.
0044			6070 3 0000 1	CA	0	MAY BE AN OPCODE PAIR OR A STORE CODE.
0045	REF 316	LAST 993	6071 10 000 0	CCS	A	TEST SIGN AND GET DABS(A).
0046	REF 1		6072 1 6361 1	TCF	DOSTORE	PROCESS STORE CODE.
0047			6073 00177 0	LOW7	OCT 177	
0048	REF 10	LAST 998	6074 54 023 1	TS	EDOP	OP CODE PAIR. LEAVE THE OTHER IN EDOP
0049	REF 6	LAST 466	6075 7 6073 1	MASK	LOW7	WHERE CCS EDOP WILL HONOR IT NEXT.
0050	REF 13	LAST 473	6076 54 020 1	OPJUMP TS	CYR	LOWWD ENTERS HERE IF A RIGHT-HAND OP
0051	REF 14	LAST 998	6077 10 020 1	CCS	CYR	CODE IS TO BE PROCESSED. TEST PREFIXES.
0052	REF 1		6100 1 6246 0	TCF	OPJUMP2	TEST SECOND PREFIX BIT.
0053	REF 1		6101 1 6742 1	TCF	EXIT	+0 OP CODE IS EXIT.

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P0054 PROCESS ADDRESSES WHICH MAY BE DIRECT, INDEXED, OR REFERENCE THE PUSHDOWN LIST.

0056	REF	52	LAST	975	6102	7 4753 0	ADDRESS	MASK	BIT1	SEE IF ADDRESS IS INDEXED. CYR CONTAINED
0057	REF	317	LAST	998	6103	10 000 0		CCS	A	400XX, SO BIT 1 IS NOW AS IT WAS IN CYR.
0058	REF	1			6104	1 6145 0		TCF	INDEX	FORM INDEXED ADDRESS.
0059	REF	10	LAST	998	6105	50 164 1	DIRADRES	INDEX	LCC	LOOK AHEAD TO NEXT WORD TO SEE IF
0060					6106	4 0001 1	OCT40001	CS	1	ADDRESS IS GIVEN.
0061	REF	318	LAST	999	6107	10 000 0		CCS	A	
0062	RFF	1			6110	1 6214 1		TCF	PUSHUP	IF NOT.
0063					6111	77773 1	NEG4	DEC	-4	
0064	RFF	11	LAST	999	6112	24 164 1		INCR	LOC	IF SO, TO SHOW WE PICKED UP A WORD.
0065	REF	5	LAST	997	6113	54 116 0		TS	ADDR WD	

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P0066 FINAL DIGESTION OF DIRECT ADDRESSES OF OP CODES WITH 01 PREFIX IS DONE HERE. IN EACH CASE, THE
 R0068 REQUIRED 12-BIT SUB-ADDRESS IS LEFT IN ADDRWD, WITH ANY REQUIRED E OR F BANK SWITCHING DONE. ADDRESSES LESS
 R0070 THAN 45D ARE TAKEN TO BE RELATIVE TO THE WORK AREA. THE OP CODE IS NOW IN BITS 1-5 OF CYR WITH BIT 14 = 1.

0072	REF	1		6114	6 6250 0	AD	-ENDVAC	SEE IF ADDRESS RELATIVE TO WORK AREA.
0073	REF	319	LAST 999	6115	10 000 0	CCS	A	
0074	REF	1		6116	6 7742 1	AD	-ENDERAS	IF NOT, SEE IF IN GENERAL ERASABLE.
0075	REF	1		6117	1 6124 1	TCF	IERASTST	
0076	REF	34	LAST 959	6120	3 0120 1	NETZERO	CA	FIXLOC
0077	REF	6	LAST 999	6121	26 116 0	ADS	ADDRWD	IF SO, LEAVE THE MODIFIED ADDRESS IN ADDRWD AND DISPATCH.
0078	REF	15	LAST 998	6122	50 020 0	ITR15	INDEX	CYR
0079	REF	1		6123	7 6272 1	7	INDJUMP	-1
								THIS INDEX MAKES THE NEXT INSTRUCTION TCF INDJUMP + OP, EDITING CYR.
0080				6124	0 0006 1	IERASTST	EXTEND	
0081	REF	1		6125	6 6135 0		8ZMF	GEADDR
								GO PROCESS GENERAL-ERASABLE ADDRESS.
0082	REF	14	LAST 995	6126	7 5012 0	MASK	LOW10	FIXED BANK ADDRESS. RESTORE AND ADD 815.
0083	REF	15	LAST 1000	6127	6 5012 1	AD	LOW10	SWITCH BANKS AND LEAVE SUBADDRESS IN
0084	REF	7	LAST 1000	6130	56 116 1	XCH	ADDRWD	ADDRWD FOR OPERAND RETRIEVAL. (THIS
0085	REF	6	LAST 997	6131	6 0115 1	AD	INTBIT15	METHOD PRECLUDES USE OF THE LAST
0086	REF	11	LAST 995	6132	54 004 1	TS	FBANK	LOCATION IN EACH FBANK.)
0087	REF	16	LAST 1000	6133	50 020 0	ITR12	INDEX	CYR
0088	REF	2	LAST 1000	6134	7 6272 1	7	INDJUMP	-1
0089	REF	10	LAST 991	6135	7 4357 0	GEADDR	MASK	LOW8
0090	REF	3	LAST 473	6136	6 5007 0	AD	OCT1400	
0091	REF	8	LAST 1000	6137	56 116 1	XCH	ADDRWD	
0092	REF	45	LAST 991	6140	54 003 0	TS	EBANK	
0093	REF	17	LAST 1000	6141	50 020 0	ITR10	INDEX	CYR
0094	REF	3	LAST 1000	6142	7 6272 1	7	INDJUMP	-1

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P0095 THE FOLLOWING ROUTINE PROCESSES INTERPRETIVE INDEXED ADDRESSES. AN INTERPRETER INDEX REGISTER MAY
 R0097 CONTAIN THE ADDRESS OF ANY ERASABLE REGISTER (0-42 BEING RELATIVE TO THE VAC AREA) OR ANY INTERPRETIVE PROGRAM
 R0099 BANK, OR ANY INTEGER IN THAT RANGE.

0100	REF	1		6143	3 7732 0	DODLOAD*	CAF	DLOAD*	STODL* COMES HERE TO PROCESS LOAD ADR.
0101	REF	18	LAST 1000	6144	54 020 1		TS	CYR	(STOVL* ENTERS HERE).
0102	REF	35	LAST 1000	6145	3 0120 1	INDEX	CA	EIXLOC	SET UP INDEX LOCATION.
0103	REF	1		6146	54 130 1		TS	INDEXLOC	
0104	REF	12	LAST 999	6147	24 164 1		INCR	LOC	(ADDRESS ALWAYS GIVEN).
0105	REF	13	LAST 1001	6150	50 164 1		INDEX	LOC	
0106				6151	4 0000 0		CS	0	
0107	REF	320	LAST 1000	6152	10 000 0		CCS	A	INDEX 2 IF ADDRESS STORED COMPLEMENTED.
0108	REF	2	LAST 1001	6153	24 130 0		INCR	INDEXLOC	
0109				6154	16 155 1		NOOP		
0110	REF	9	LAST 1000	6155	54 116 0		TS	ADDRWD	14 BIT ADDRESS TO ADDRWD.
0111	REF	1		6156	7 7741 0		MASK	HIGH4	IF ADDRESS GREATER THAN 2K, ADD INTBIT15
0112				6157	0 0006 1		EXTEND		
0113	REF	1		6160	1 6163 1		BZE	INDEX2	
0114	REF	7	LAST 1000	6161	3 0115 1		CA	INTBIT15	
0115	REF	10	LAST 1001	6162	26 116 0		ADS	ADDRWD	
0116	REF	3	LAST 1001	6163	50 130 0	INDEX2	INDEX	INDEXLOC	
0117	REF	22	LAST 959	6164	4 0046 1		CS	X1	
0118	REF	11	LAST 1001	6165	26 116 0		ADS	ADDRWD	DO AUGMENT, IGNORING AND CORRECTING OVF.
0119	REF	8	LAST 959	6166	7 7743 1		MASK	HIGH9	SEE IF ADDRESS IS IN WORK AREA.
0120				6167	0 0006 1		EXTEND		
0121	REF	1		6170	1 6203 1		BZF	INDWCRK	
0122	REF	2	LAST 1001	6171	7 7741 0		MASK	HIGH4	SEE IF IN FIXED BANK.
0123				6172	0 0006 1		EXTEND		
0124	REF	1		6173	1 6205 1		BZF	INDERASE	
0125	REF	12	LAST 1001	6174	3 0116 1		CA	ADDRWD	IN FIXED - SWITCH BANKS AND CREATE
0126	REF	12	LAST 1000	6175	54 004 1		TS	FBANK	SUB-ADDRESS.
0127	REF	16	LAST 1000	6176	7 5012 0		MASK	LOW10	
0128	REF	1		6177	6 4741 1		AD	2K	
0129	REF	13	LAST 1001	6200	54 116 0		TS	ADDRWD	
0130	REF	19	LAST 1001	6201	50 020 0	ITR11	INDEX	CYR	
0131	REF	4	LAST 1000	6202	3 6272 0		3	INDJUMP -1	
0132	REF	36	LAST 1001	6203	3 0120 1	INDWORK	CA	FIXLOC	MAKE ADDRWD RELATIVE TO WORK AREA.
0133	REF	1		6204	1 6211 1		TCF	ITR13 -1	
0134	REE	4	LAST 1000	6205	3 5007 0	INDERASE	CA	OCT1400	
0135	REE	14	LAST 1001	6206	56 116 1		XCH	ADDRWD	
0136	REF	46	LAST 1000	6207	54 003 0		TS	EBANK	
0137	REF	11	LAST 1000	6210	7 4357 0		MASK	LOW8	
0138	REE	15	LAST 1001	6211	26 116 0	-1	ADS	ADDRWD	

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0139	REF	20	LAST	1001	6212	50	020	0	ITR13	INDEX	CYR
0140	REF	5	LAST	1001	6213	3	6272	0		3	INDJUMP -1

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P0141 PUSH-UP ROUTINES. WHEN NO OPERAND ADDRESS IS GIVEN, THE APPROPRIATE OPERAND IS TAKEN FROM THE PUSH-DOWN
 R0143 LIST. IN MOST CASES THE MODE OF THE RESULT (VECTOR OR SCALAR) OF THE LAST ARITHMETIC OPERATION PERFORMED
 R0145 IS THE SAME AS THE TYPE OF OPERAND DESIRED (ALL ADD/SUBTRACT ETC.). EXCEPTIONS TO THIS GENERAL RULE ARE LISTED
 R0147 BELOW (NOTE THAT IN EVERY CASE THE MODE REGISTER IS LEFT INTACT):

R0148 1. VXSC AND V/SC WANT THE OPPOSITE TYPE OF OPERAND, E.G., IF THE LAST OPERATION YIELDED A VECTOR
 R0150 RESULT, VXSC WANTS A SCALAR.

R0151 2. THE LOAD CODES SHOULD LOAD THE ACCUMULATOR INDEPENDENT OF THE RESULT OF THE LAST OPERATION. THIS
 R0153 INCLUDES VLOAD, DLOAD, TLOAD, PDDL, AND PDVL (NO PUSHUP WITH SLOAD).

R0154 3. SOME ARITHMETIC OPERATIONS REQUIRE A STANDARD TYPE OF OPERAND REGARDLESS OF THE PREVIOUS OPERATION.
 R0156 THIS INCLUDES SIGN WANTING DP AND TAD REQUIRING TP.

0157	REF	2	LAST	755	6214	3	4360	0	PUSHUP	CAF	OCT23	IF THE LOW 5 BITS OF CYR ARE LESS THAN
0158	REF	21	LAST	1002	6215	7	0020	1		MASK	CYR	20, THIS DP REQUIRES SPECIAL ATTENTION.
0159	REF	1			6216	6	6221	0		AD	-OCT10	(NO -0).
0160	REF	321	LAST	1001	6217	10	000	0		CCS	A	
0161	REF	1			6220	1	6232	0		TCF	REGUP	FOR ALL CODES GREATER THAN OCT 7.

0162					6221	77767	1	-OCT10	OCT	-10		
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0163	REF	1			6222	6	6111	0		AD	NFG4	WE NOW HAVE 7 - DP CODE(MOD4). SEE IF
0164	REF	322	LAST	1003	6223	10	000	0		CCS	A	THE DP CODE (MOD4) IS THREE (REVERSE).
0165	REF	323	LAST	1003	6224	50	000	1		INDEX	A	NO - THE MODE IS DEFINITE. PICK UP THE
0166	REF	1			6225	4	6243	0		CS	NO.WDS	
0167	REF	2	LAST	1003	6226	1	6234	0		TCF	REGUP +2	

0168	REF	14	LAST	998	6227	50	163	0		INDEX	MODE	FOR VXSC AND V/SC WE WANT THE REQUIRED
0169	REF	4	LAST	959	6230	4	6241	1		CS	REVCNT	PUSHLOC DECREMENT WITHOUT CHANGING THE
0170	REF	3	LAST	1003	6231	1	6234	0		TCF	REGUP +2	MODE AT THIS TIME.

0171	REF	15	LAST	1003	6232	50	163	0	REGUP	INDEX	MODE	MOST ALL DP CODES PUSHUP HERE.
0172	REF	2	LAST	1003	6233	4	6243	0		CS	NO.WDS	
0173	REF	10	LAST	887	6234	26	166	1	+2	ADS	PUSHLOC	
0174	REF	16	LAST	1001	6235	54	116	0		TS	ADDRWD	
0175	REF	22	LAST	1003	6236	50	020	0	ITR14	INDEX	CYR	
0176	REF	6	LAST	1002	6237	7	6272	1		7	INDJUMP -1	(THE INDEX MAKES THIS A TCF.)

0177					6240	00002	0			OCT	2	REVERSE PUSHUP DECREMENT. VECTOR TAKES 2
0178					6241	00006	1	REVCNT		OCT	6	WORDS, SCALAR TAKES 6.
0179					6242	00006	1			OCT	6	
0180					6243	00002	0	NO.WDS		OCT	2	CONVENTIONAL DECREMENT IS 6 WORDS VECTOR
0181					6244	00003	1	OCTAL3		OCT	3	2 IN DP, AND 3 IN TP.
0182					6245	00006	1			OCT	6	

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P0183 TEST THE SECCND PREFIX BIT TO SEE IF THIS IS A MISCELLANEOUS OR A UNARY/SHORT SHIFT OPERATION.

0185	REF	23	LAST	1003	6246	10 020 1	OPJUMP2	CCS	CYR	TEST SECOND PREFIX BIT.
0186	REF	1			6247	1 6262 0		TCF	OPJUMP3	TEST THIRD BIT TO SEE IF UNARY OR SHIFT.

0187					6250	77722 0	-ENDVAC	DEC	-45	
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R0188 THE FOLLOWING ROUTINE PROCESSES ADDRESSES OF SUFFIX CLASS 10. THEY ARE BASICALLY WORK AREA ADDRESSES
 R0190 IN THE RANGE 0 - 52, ERASABLE ECADR CONSTANTS FROM 100 - 3777, AND ECADRS ABOVE THAT. ALL 15 BITS ARE AVAILABLE
 R0192 IN CONTRAST TO SUFFIX 1, IN WHICH ONLY THE LOW ORDER 14 ARE AVAILABLE.

0193	REF	14	LAST	1001	6251	24 164 1	15BITADR	INCR	LOC	(ENTRY HERE FROM STCALL).
0194	REF	15	LAST	1004	6252	50 164 1		INDEX	LOC	PICK UP ADDRESS WORD.
0195					6253	3 0000 1		CA	0	
0196	REF	6	LAST	114	6254	54 117 1		TS	POLISH	WE MAY NEED A SUBADDRESS LATER.

0197	REF	1			6255	3 5013 0		CAF	LOW7+2K	THESE INSTRUCTIONS ARE IN BANK 1.
0198	REF	13	LAST	1001	6256	54 004 1		TS	EBANK	
0199	REF	24	LAST	1004	6257	7 0020 1		MASK	CYR	
0200	REF	324	LAST	1003	6260	50 000 1	ITR7	INDEX	A	
0201	REF	1			6261	1 6333 0		TCF	MISCJUMP	

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P0202

COMPLETE THE DISPATCHING OF UNARY AND SHORT SHIFT OPERATIONS.

0203	REF	14	LAST 1004	6262	54 004 1	OPJUMP3	TS	FBANK	CALL IN BANK 0 (BITS 11-15 OF A ARE 0.)
R0204			ITRACE (6) REFERS TO "OPJUMP3".						
0205	REF	25	LAST 1004	6263	10 020 1		CCS	CYR	TEST THIRD PREFIX BIT.
0206	REF	325	LAST 1004	6264	50 000 1		INDEX	A	THE DECREMENTED UNARY CODE IS IN BITS
0207	REF	1		6265	1 2000 1		TCF	UNAJUMP	1-4 OF A (ZERO, EXIT, HAS BEEN DETECTED)
0208	REF	16	LAST 1003	6266	10 163 1		CCS	MODE	ITS A SHORT SHIFT CODE. SEE IF PRESENT
0209	REF	1		6267	1 2017 1		TCF	SHORTT	SCALAR OR VECTOR.
0210	REF	2	LAST 1005	6270	1 2017 1		TCF	SHORTT	
0211	REF	1		6271	1 2121 0		TCF	SHORTV	CALLS THE APPROPRIATE ROUTINE.
0212	REF	1		4350		FBANKMSK	EQUALS	BANKMASK	
0213	REF	34	LAST 614	6272	00122 0	LVBUF	ADRES	VBUF	

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P0214 THE FOLLOWING IS THE JUMP TABLE FOR OP CODES WHICH MAY HAVE INDEXABLE ADDRESSES OR MAY PUSH UP.

0216	REF	1	6273	1 6504	1	INOJUMP	TCF	VLJAD	00 - LOAD MPAC WITH A VECTOR.
0217	REF	1	6274	1 7070	0		TCF	TAD	01 - TRIPLE PRECISION ADD TO MPAC.
0218	REF	1	6275	1 7654	0		TCF	SIGN	02 - COMPLEMENT MPAC (V OR SC) IF X NEG.
0219	REF	1	6276	1 7400	0		TCF	VXSC	03 - VECTOR TIMES SCALAR.
0220	REF	1	6277	1 6702	0		TCF	CGOTO	04 - COMPUTED GO TO.
0221	REF	2	LAST 370	6300	1 6467	0	TCF	TLJAD	05 - LOAD MPAC WITH TRIPLE PRECISION.
0222	REF	1		6301	1 6051	1	TCF	OLOAD	06 - LOAD MPAC WITH A DP SCALAR.
0223	REF	1		6302	1 7623	0	TCF	V/SC	07 - VECTOR DIVIDED BY SCALAR.
0224	REF	1		6303	1 6500	0	TCF	SLOAD	10 - LOAD MPAC IN SINGLE PRECISION.
0225	REF	1		6304	1 6617	0	TCF	SSP	11 - SET SINGLE PRECISION INTO X.
0226	REF	1		6305	1 6522	0	TCF	POOL	12 - PUSH DOWN MPAC AND RE-LOAD IN OP.
0227	REF	1		6306	1 7333	1	TCF	MXV	13 - MATRIX POST-MULTIPLIED BY VECTOR.
0228	REF	1		6307	1 6556	0	TCF	PDVL	14 - PUSH DOWN AND VECTOR LOAD.
0229	REF	1		6310	1 6625	1	TCF	CCALL	15 - COMPUTED CALL.
0230	REF	1		6311	1 7336	1	TCF	VXM	16 - MATRIX PRE-MULTIPLIED BY VECTOR.
0231	REF	1		6312	1 7615	0	TCF	TSLC	17 - NORMALIZE MPAC (SCALAR ONLY).
0232	REF	1		6313	1 7573	0	TCF	OMPR	20 - DP MULTIPLY AND ROUND.
0233	REF	1		6314	1 7576	0	TCF	DDV	21 - OP DIVIDE BY.
0234	REF	1		6315	1 7602	0	TCF	BDOV	22 - DP DIVIDE INTO.
0235	REF	1		6316	1 7620	0	TCF	GSHIFT	23 - GENERAL SHIFT INSTRUCTION.
0236	REF	1		6317	1 6750	1	TCF	VAO	24 - VECTOR ADD.
0237	REF	1		6320	1 6746	0	TCF	VSU	25 - VECTOR SUBTRACT.
0238	REF	1		6321	1 7035	1	TCF	BVSU	26 - VECTOR SUBTRACT FROM.
0239	REF	1		6322	1 7330	1	TCF	DOT	27 - VECTOR DOT PRODUCT.
0240	REF	1		6323	1 7457	1	TCF	VXV	30 - VECTOR CROSS PRODUCT.
0241	REF	1		6324	1 7424	0	TCF	VPROJ	31 - VECTOR PROJECTION.
0242	REF	1		6325	1 7004	0	TCF	DSU	32 - DP SUBTRACT.
0243	REF	1		6326	1 7061	0	TCF	BOSU	33 - DP SUBTRACT FROM.
0244	REF	1		6327	1 6774	1	TCF	DAD	34 - DP ADD.
0245				6330	1 6330	0	TCF		35 - AVAILABLE
0246	REF	1		6331	1 7571	1	TCF	DMP1	36 - DP MULTIPLY.
0247	REF	1		6332	1 7612	1	TCF	SETPD	37 - SET PUSH DOWN POINTER (DIRECT ONLY)

R0248 CODES 10 AND 14 MUST NOT PUSH UP. CODE 04 MAY BE USED FOR VECTOR DECLARE BEFORE PUSHUP IF DESIRED.

L INTERPRETER

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P0250 THE FOLLOWING JUMP TABLE APPLIES TO INDEX, BRANCH, AND MISCELLANEOUS INSTRUCTIONS.

0252	REF	1	6333	1	2341	1	MISCJUMP	TCF	AXT	00 - ADDRESS TO INDEX TRUE.
0253	REF	1	6334	1	2346	0		TCF	AXC	01 - ADDRESS TO INDEX COMPLEMENTED.
0254	REF	1	6335	1	2351	0		TCF	LXA	02 - LOAD INDEX FROM ERASABLE.
0255	REF	1	6336	1	2355	1		TCF	LXC	03 - LOAD INDEX FROM COMPLEMENT OF ERAS.
0256	REF	1	6337	1	2361	0		TCF	SXA	04 - STORE INDEX IN ERASABLE.
0257	RFF	1	6340	1	2367	0		TCF	XC4X	05 - EXCHANGE INDEX WITH FRASABLE.
0258	REF	1	6341	1	2403	0		TCF	INCR	06 - INCREMENT INDEX REGISTER.
0259	REF	1	6342	1	2412	0		TCF	TIX	07 - TRANSFER ON INDEX.
0260	REF	1	6343	1	2375	0		TCF	XAD	10 - INDEX REGISTER ADD FROM ERASABLE.
0261	REF	1	6344	1	2406	0		TCF	XSU	11 - INDEX SUBTRACT FROM ERASABLE.
0262	REF	1	6345	1	2464	1		TCF	BZE/GOTO	12 - BRANCH ZERO AND GOTO.
0263	RFF	1	6346	1	2471	0		TCF	BPL/BMN	13 - BRANCH PLUS AND BRANCH MINUS.
0264	REF	1	6347	1	2444	0		TCF	RTB/BHIZ	14 - RETURN TO BASIC AND BRANCH HI ZERO.
0265	REF	1	6350	1	2504	0		TCF	CALL/ITA	15 - CALL AND STORE QPRET.
0266	REF	1	6351	1	2513	0		TCF	SW/	16 - SWITCH INSTRUCTIONS AND AVAILABLE.
0267	REF	1	6352	1	2454	1		TCF	BOV(B)	17 - BRANCH ON OVERFLOW TO BASIC OR INT.

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P0268 THE FOLLOWING JUMP TABLE APPLIES TO UNARY INSTRUCTIONS.

	REF		2 LAST	997 TO 1008:	205	205*	COUNT*	\$\$/INTER	
0269	REF	1		00,2000			BANK	0	00 - EXIT - DETECTED EARLIER.
0270									01 - SQUARE ROOT.
0271	REF	1		00,2000	1 3207 0	UNAJUMP	TCF	SQRT	02 - SIN.
0272	REF	1		00,2001	1 3530 0		TCF	SINE	03 - COS.
0273	REF	1		00,2002	1 3517 0		TCF	COSINE	04 - ARC SIN.
0274	REF	1		00,2003	1 3610 1		TCF	ARCSIN	05 - ARC COS.
0275	REF	1		00,2004	1 3612 0		TCF	ARCCOS	06 - DP SQUARE.
0276	REF	1		00,2005	1 3174 1		TCF	DSQ	07 - ROUND TO DP.
0277	REF	1		00,2006	1 2116 1		TCF	ROUND	
0278	REF	1		00,2007	1 7667 0		TCF	COMP	10 - COMPLEMENT VECTOR OR SCALAR.
0279	REF	1		00,2010	1 3232 0		TCF	VDEF	11 - VECTOR DEFINE.
0280	REF	2	LAST 612	00,2011	1 3023 1		TCF	UNIT	12 - UNIT VECTOR.
0281	REF	1		00,2012	1 3176 0		TCF	ABVALABS	13 - LENGTH OF VECTOR OR MAG OF SCALAR.
0282	REF	1		00,2013	1 3245 0		TCF	VSQ	14 - SQUARE OF LENGTH OF VECTOR.
0283	REF	1		00,2014	1 6353 0		TCF	STADR	15 - PUSH UP ON STORE CODE.
0284	REF	1		00,2015	1 3274 1		TCF	RVQ	16 - RETURN VIA QPRET.
0285	REF	1		00,2016	1 3247 1		TCF	PUSH	17 - PUSH MPAC DOWN.

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P0286 SECTION 2 LOAD AND STORE PACKAGE.

R0287 A SET OF EIGHT STORE CODES IS PROVIDED AS THE PRIMARY METHOD OF STORING THE MULTI-PURPOSE
 R0289 ACCUMULATOR (MPAC). IE IN THE DANZIG SECTION LOC REFERS TO AN ALGEBRAICALLY POSITIVE WORD, IT IS TAKEN AS A
 R0291 STORE CODE WITH A CORRESPONDING ERASABLE ADDRESS. MOST OF THESE CODES ARE TWO ADDRESS, SPECIFYING THAT THE WORD
 R0293 FOLLOWING THE STORE CODE IS TO BE USED AS AN ADDRESS FROM WHICH TO RE-LOAD MPAC. FOUR OPTIONS ARE AVAILABLE:

R0295	1. STORE	STORE MPAC. THE E ADDRESS MAY BE INDEXED.
R0297	2. STODL	STORE MPAC AND RE-LOAD IT IN DP WITH THE NEXT ADDRESS (THE LOAD MAY BE INDEXED).
R0299	3. STOVL	STORE MPAC AND RE-LOAD A VECTOR (AS ABOVE).
R0301	4. STCALL	STORE AND DO A CALL (BOTH ADDRESSES MUST BE DIRECT HERE).

R0303 STODL AND STOVL WILL TAKE FROM THE PUSH-DOWN LIST IF NO LOAD ADDRESS IS GIVEN.

0305		6353		BLOCK 3	
0306	REF 3	LAST 1008 TO 1009:	15 220*	COUNT* \$\$/INTER	
0307	REF 4	LAST 998	6353 3 0165 0	CA BANKSET	THE STADR CODE (PUSHUP UP ON STORE
0308	REF 15	LAST 1005	6354 54 004 1	TS FRANK	ADDRESS) ENTERS HERE.
0309	REF 16	LAST 1004	6355 24 164 1	INCR LOC	
0310	REF 17	LAST 1009	6356 50 164 1	INDEX LOC	THE STORECODE WAS STORED COMPLEMENTED TO
0311			6357 4 0000 0	CS 0	MAKE IT LOOK LIKE AN OPCODE PAIR.
0312	REF 6	LAST 989	6360 6 7746 0	AD NEGONE	(YUL CANT REMOVE 1 BECAUSE OF EARLY CCS)
0313	REF 17	LAST 1003	6361 54 116 0	DOSTORE TS ADDRWD	
0314	REF 7	LAST 474	6362 7 4356 1	MASK LOW11	ENTRY FROM DISPATCHER. SAVE THE ERASABLE
0315	REF 18	LAST 1009	6363 56 116 1	XCH ADDRWD	ADDRESS AND JUMP ON THE STORE CODE NO.
0316	REF 1		6364 7 7721 0	MASK B12T14	
0317			6365 0 0006 1	EXTEND	
0318	REF 37	LAST 821	6366 7 4747 0	MP BITS	EACH TRANSFER VECTOR ENTRY IS TWO WORDS.
0319	REF 326	LAST 1005	6367 50 000 1	ITRO INDEX A	
0320	REF 1		6370 1 6371 0	TCF STORJUMP	

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P0321 STORE CODE JUMP TABLE. CALLS THE APPROPRIATE STORING ROUTINE AND EXITS TO DANZIG OR TO ADDRESS WITH
 R0323 A SUPPLIED OPERATION CODE.

R03231 STORE STORE,1 AND STDR,2 RETURN TO DANZIG, THUS RESETTNG THE EBANK TO ITS STATE AT INTPRET.

0324	REF	1		6371	0 6421 0	STORJUMP TC	STORE	STDRE.
0325	REF	2	LAST 945	6372	1 6060 0	TCF	DANZIG	PICK UP NEW OP CODE(S).
0326	REF	1		6373	0 6413 1	TC	STORE,1	
0327	REF	3	LAST 1010	6374	1 6060 0	TCF	DANZIG	
0328	REF	1		6375	0 6416 1	TC	STDR,2	
0329	REF	4	LAST 1010	6376	1 6060 0	TCF	DANZIG	
0330	REF	2	LAST 1010	6377	0 6421 0	TC	STDR	STODL.
0331	REF	1		6400	1 6457 0	TCF	DODLOAD	
0332	REF	3	LAST 1010	6401	0 6421 0	TC	STORE	STODL WITH INDEXED LOAD ADDRESS.
0333	REF	1		6402	1 6143 0	TCF	DDLOAD*	
0334	REF	4	LAST 1010	6403	0 6421 0	TC	STDR	STOVL.
0335	REF	1		6404	1 6462 0	TCF	DOVLOAD	
0336	REF	5	LAST 1010	6405	0 6421 0	TC	STORE	STOVL WITH INDEXED LOAD ADDRESS.
0337	REF	1		6406	1 6465 1	TCF	DOVLOAD*	
0338	REF	6	LAST 1010	6407	0 6421 0	TC	STORE	STOTC.
0339	REF	2	LAST 294	6410	3 4766 1	CAF	CALLCODE	
0340	REF	26	LAST 1005	6411	54 020 1	TS	CYR	
0341	REF	1		6412	1 6251 0	TCF	15BITADR	GET A 15 BIT ADDRESS.

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P0342 STORE CODE ADDRESS PROCESSOR.

0343	REF	37	LAST	1001	6413	50 120 1	STORE,1	INDEX	FIXLOC
0344	REF	23	LAST	1001	6414	4 0046 1		CS	X1
0345	REF	1			6415	1 6420 0		TCF	PRESTORE
0346	REF	38	LAST	1011	6416	50 120 1	STORE,2	INDEX	FIXLOC
0347	REF	17	LAST	981	6417	4 0047 0		CS	X2
0348	REF	19	LAST	1009	6420	26 116 0	PRESTORE	ADS	ADDRWD
0349	REF	20	LAST	1011	6421	4 0116 0	STORE	CS	ADDRWD
0350	REF	1			6422	6 4772 1		AD	DEC45
0351	REF	327	LAST	1009	6423	10 000 0		CCS	A
0352	REF	39	LAST	1011	6424	3 0120 1		CA	FIXLOC
0353	REF	1			6425	1 6432 0		TCF	AHEAD5
0354	REF	5	LAST	1001	6426	3 5007 0		CA	OCT1400
0355	REF	21	LAST	1011	6427	56 116 1		XCH	ADDRWD
0356	REF	47	LAST	1001	6430	54 003 0		TS	EBANK
0357	REF	12	LAST	1001	6431	7 4357 0		MASK	LOW8
0358	REF	22	LAST	1011	6432	26 116 0	AHEAD5	ADS	ADDRWD

RESULTANT ADDRESS IS IN ERASABLE.

DOES THE ADDRESS POINT TO THE WORK AREA?
YES.

NO. SET EBANK & MAKE UP SUBADDRESS.

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P0359 STORING ROUTINES. STORE DP, TP, OR VECTOR AS INDICATED BY MODE.

0360 6433 0 0006 1 STARTSTO EXTEND MPAC,+1 MUST BE STORED IN ANY EVENT.
R0361 ITRACE (5) REFERS TO "STARTSTO".
0362 REF 350 LAST 998 6434 3 0155 0 DCA MPAC
0363 REF 23 LAST 1011 6435 50 116 1 INDEX ADDRWD.
0364 6436 52 001 1 DXCH 0

0365 REF 17 LAST 1005 6437 10 163 1 CCS MODE
0366 REF 1 6440 1 6453 1 TCF TSTORE
0367 REF 247 LAST 996 6441 0 0002 0 TC 0

0368 6442 0 0006 1 VSTORE EXTEND
0369 REF 351 LAST 1012 6443 3 0160 0 DCA MPAC +3
0370 REF 24 LAST 1012 6444 50 116 1 INDEX ADDRWD
0371 6445 52 003 0 DXCH 2

0372 6446 0 0006 1 EXTEND
0373 REF 352 LAST 1012 6447 3 0162 1 DCA MPAC +5
0374 REF 25 LAST 1012 6450 50 116 1 INDEX ADDRWD
0375 6451 52 005 0 DXCH 4
0376 REF 248 LAST 1012 6452 0 0002 0 TC 0

0377 REF 353 LAST 1012 6453 3 0156 0 TSTORE CA MPAC +2
0378 REF 26 LAST 1012 6454 50 116 1 INDEX ADDRWD
0379 6455 54 002 1 TS 2
0380 REF 249 LAST 1012 6456 0 0002 0 TC 0

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P0381 ROUTINES TO BEGIN PROCESSING OF THE SECOND ADDRESS ASSOCIATED WITH ALL STORE-TYPE CODES EXCEPT STORE
R0383 ITSELF.

0384	REF	1		6457	3 7731 0	DODLOAD	CAF	DLOADCOD	
0385	REF	27	LAST 1010	6460	54 020 1		TS	CYR	
0386	REF	1		6461	1 6105 1		TCF	DIRADRES	GO GET A DIRECT ADDRESS.
0387	REF	1		6462	3 4735 1	DOVLOAD	CAF	VLOADCOD	
0388	REF	28	LAST 1013	6463	54 020 1		TS	CYR	
0389	REF	2	LAST 1013	6464	1 6105 1		TCF	DIRADRES	
0390	REF	1		6465	3 6106 0	DOVLOAD*	CAF	VLOAD*	
0391	REF	2	LAST 1010	6466	1 6144 1		TCF	DODLOAD* +1	PROLOGUE TO INDEX ROUTINE.

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P0392 THE FOLLOWING LOAD INSTRUCTIONS ARE PROVIDED FOR LOADING THE MULTI-PURPOSE ACCUMULATOR MPAC.

0394	REE	27	LAST	1012	6467	50	116	1	TLOAD	INDEX	ADDRWD	
0395					6470	3	0002	0		CA	2	
0396	REF	354	LAST	1012	6471	54	156	1		TS	MPAC	+2
0397					6472	0	0006	1		EXTEND		
0398	REE	28	LAST	1014	6473	5	0116	1		INDEX	ADDRWD	
0399					6474	3	0001	0		DCA	0	
0400	REE	355	LAST	1014	6475	52	155	1		DXCH	MPAC	
0401	REF	105	LAST	923	6476	3	4753	1	TMODE	CAE	ONE	
0402	REF	1			6477	1	6057	1		TCE	NEWMODE	
												DECLARE TRIPLE PRECISION MODE.
0403					6500	22	007	0	SLOAD	ZL		
0404	REE	29	LAST	1014	6501	50	116	1		INDEX	ADDRWD	
0405					6502	3	0000	1		CA	0	
0406	REF	1			6503	1	6054	1		TCE	SLJAD2	
												LOAD A SINGLE PRECISION NUMBER INTO MPAC, SETTING MPAC+1,2 TO ZERO. THE CONTENTS OF THE REMAINING MPAC REGISTERS ARE IRRELEVANT.
0407					6504	0	0006	1	VLOAD	EXTEND		
0408	REF	30	LAST	1014	6505	5	0116	1		INDEX	ADDRWD	
0409					6506	3	0001	0		DCA	0	
0410	REF	356	LAST	1014	6507	52	155	1		DXCH	MPAC	
												LOAD A DOUBLE PRECISION VECTOR INTO MPAC,+1, MPAC+3,4, AND MPAC+5,6. THE CONTENTS OF MPAC +2 ARE IRRELEVANT.
0411					6510	0	0006	1	ENDVLOAD	EXTEND		
0412	REE	31	LAST	1014	6511	5	0116	1		INDEX	ADDRWD	
0413					6512	3	0003	1		DCA	2	
0414	REF	357	LAST	1014	6513	52	160	1		DXCH	MPAC	+3
												PDLV COMES HERE TO FINISH UP FOR DP, TP.
0415					6514	0	0006	1	+4	EXTEND		
0416	REF	32	LAST	1014	6515	5	0116	1		INDEX	ADDRWD	
0417					6516	3	0005	1		DCA	4	
0418	REE	358	LAST	1014	6517	52	162	0		DXCH	MPAC	+5
												TPDLV FINISHES HERE.
0419	REF	106	LAST	1014	6520	4	4753	0	VMODE	CS	ONE	
0420	REF	2	LAST	1014	6521	1	6057	1		TCE	NEWMODE	
												DECLARE VECTOR MODE.

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P0421 THE FOLLOWING INSTRUCTIONS ARE PROVIDED FOR STORING OPERANDS IN THE PUSHDOWN LIST:

R0423	1. PUSH	PUSHDOWN AND NO LOAD.
R0424	2. PDDL	PUSHDOWN AND DOUBLE PRECISION LOAD.
R0425	3. PDVL	PUSHDOWN AND VECTOR LOAD.

0426				6522	0 0006 1	PODL	EXTENO		
0427	REF	33	LAST	1014	6523	5 0116 1	INDEX	A00RWD	LOAD MPAC,+1, PUSHING THE FORMER
0428					6524	3 0001 0	DCA	0	CONTENTS DOWN.
0429	REF	359	LAST	1014	6525	52 155 1	OXCH	MPAC	
0430	REF	11	LAST	1003	6526	50 166 0	INOEX	PUSHLOC	
0431					6527	52 001 1	DXCH	0	
0432	REF	18	LAST	1012	6530	50 163 0	INOEX	MODE	ADVANCE THE PUSHDOWN POINTER APPROPRIATELY.
0433	REF	3	LAST	1003	6531	3 6243 1	CAF	NO.WDS	
0434	REF	12	LAST	1015	6532	26 166 1	AOS	PUSHLOC	
0435	REF	19	LAST	1015	6533	10 163 1	CCS	MODE	
0436	REF	1			6534	1 6551 1	TCF	ENDPUSH	
0437	REF	1			6535	1 6547 0	TCE	ENDDPUSH	
0438	REF	20	LAST	1015	6536	54 163 1	TS	MODE	NOW DP.
0439	REF	360	LAST	1015	6537	54 156 1	ENDVPUSH	MPAC +2	
0440	REF	361	LAST	1015	6540	52 160 1	DXCH	MPAC +3	PUSH DOWN THE REST OF THE VECTOR HERE.
0441	REF	13	LAST	1015	6541	50 166 0	INDEX	PUSHLOC	
0442					6542	51 775 0	DXCH	0 -4	
0443	REF	362	LAST	1015	6543	52 162 0	OXCH	MPAC +5	
0444	REF	14	LAST	1015	6544	50 166 0	INDEX	PUSHLOC	
0445					6545	51 777 1	DXCH	0 -2	
0446	REF	5	LAST	1010	6546	1 6060 0	TCE	DANZ IG	
0447	REF	363	LAST	1015	6547	54 156 1	ENDDPUSH	TS	SET MPAC +2 TO ZERO AND EXIT ON DP.
0448	REF	6	LAST	1015	6550	1 6060 0	TCE	DANZ IG	
0449	REF	21	LAST	1015	6551	54 163 1	ENDTPUSH	TS	ON TRIPLE, SET MPAC +2 TO ZERO, PUSHING
0450	REF	364	LAST	1015	6552	56 156 0	XCH	MPAC +2	DOWN THE OLD CONTENTS
0451	REF	15	LAST	1015	6553	50 166 0	+2	INDEX	
0452					6554	53 777 0	TS	0 -1	
0453	REF	7	LAST	1015	6555	1 6060 0	TCE	DANZ IG	

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P0454 PDVL - PUSHDOWN AND VECTOR LOAD.

0455				6556	0 0006	1	PDVL	EXTEND		RELOAD MPAC AND PUSH DOWN ITS CONTENTS.
0456	REF	34	LAST	1015	6557	5 0116		INDEX	ADDRWD	
0457					6560	3 0001	0	DCA	0	
0458	REF	365	LAST	1015	6561	52 155	1	DXCH	MPAC	
0459	REF	16	LAST	1015	6562	50 166	0	INDEX	PUSHLOC	
0460					6563	52 001	1	DXCH	0	
0461	REF	22	LAST	1015	6564	50 163	0	INDEX	MODE	ADVANCE THE PUSHDOWN POINTER.
0462	REF	4	LAST	1015	6565	3 6243	1	CAF	NO.WDS	
0463	REF	17	LAST	1016	6566	26 166	1	ADS	PUSHLOC	
0464	REF	23	LAST	1016	6567	10 163	1	CCS	MODE	TEST PAST MODE.
0465	REF	1			6570	1 6607	1	TCF	TPDVVL	
0466	REF	1			6571	1 6510	1	TCF	ENDVLOAD	JUST LOAD LAST FOUR REGISTERS ON DP.
0467					6572	0 0006	1	VPDVL	EXTEND	PUSHDOWN AND RE-LOAD LAST TWO COMPONENTS
0468	REF	35	LAST	1016	6573	5 0116	1	INDEX	ADDRWD	
0469					6574	3 0003	1	DCA	2	
0470	REF	366	LAST	1016	6575	52 160	1	DXCH	MPAC +3	
0471	REF	18	LAST	1016	6576	50 166	0	INDEX	PUSHLOC	
0472					6577	51'775	0	DXCH	0 -4	
0473					6600	0 0006	1	EXTEND		
0474	REF	36	LAST	1016	6601	5 0116	1	INDEX	ADDRWD	
0475					6602	3 0005	1	DCA	4	
0476	REF	367	LAST	1016	6603	52 162	0	DXCH	MPAC +5	
0477	REF	19	LAST	1016	6604	50 166	0	INDEX	PUSHLOC	
0478					6605	51'777	1	DXCH	0 -2	
0479	REF	8	LAST	1015	6606	1 6060	0	TCF	DANZIG	
0480					6607	0 0006	1	TPDVL	EXTEND	ON TP, WE MUST LOAD THE Y COMPONENT
0481	REF	37	LAST	1016	6610	5 0116	1	INDEX	ADDRWD	BEFORE STORING MPAC +2 INCASE THIS IS A
0482					6611	3 0003	1	DCA	2	PUSHUP.
0483	REF	368	LAST	1016	6612	52 160	1	DXCH	MPAC +3	
0484	REF	369	LAST	1016	6613	3 0156	0	CA	MPAC +2	
0485	REF	20	LAST	1016	6614	50 166	0	INDEX	PUSHLOC	IN DP.
0486					6615	53'777	0	TS	0 -1	
0487	REF	2	LAST	1016	6616	1 6514	0	TCF	ENDVLOAD +4	

R0488 SSP (STORE SINGLE PRECISION) IS EXECUTED HERE.

0489	REF	18	LAST	1009	6617	24 164	1	SSP	INCR	LOC	PICK UP THE WORD FOLLOWING THE GIVEN
0490	REF	19	LAST	1016	6620	50 164	1	INDEX	LOC		ADDRESS AND STORE IT AT X.
0491					6621	3 0000	1	CA	0		
0492	REF	38	LAST	1016	6622	50 116	1	STORE1	INDEX	ADDRWD	SOME INDEX AND MISCELLANEOUS OPS END
0493					6623	54 000	0	TS	0		HERE.

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0494 REF 9 LAST 1016 6624 1 6060 0

TCF DANZIG

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P0495 SEQUENCE CHANGING AND SUBROUTINE CALLING OPTIONS.

R0496 THE FOLLOWING OPERATIONS ARE AVAILABLE FOR SEQUENCING CHANGING, BRANCHING, AND CALLING SUBROUTINES:

R0498	1.	GOTO	GO TO.
R0499	2.	CALL	CALL SUBROUTINE SETTING QPRET.
R0500	3.	CGOTO	COMPUTED GO TO.
R0501	4.	CCALL	COMPUTED CALL.
R0502	7.	BPL	BRANCH IF MPAC POSITIVE OR ZERO.
R0503	8.	BZE	BRANCH IF MPAC ZERO.
R0504	9.	BMN	BRANCH IF MPAC NEGATIVE NON-ZERO.

0505	REF	20	LAST	1016	6625	24 164 1	CCALL	INCR	LOC	MAINTAIN LOC FOR QPRET COMPUTATION.
0506	REF	21	LAST	1018	6626	50 164 1		INDEX	LOC	
0507					6627	3 0000 1		CAF	0	GET BASE ADDRESS OF CADR LIST.
0508	REF	39	LAST	1016	6630	50 116 1		INDEX	ADDRWD	
0509					6631	6 0000 1		AD	0	ADD INCREMENT.
0510	REF	16	LAST	1009	6632	54 004 1		TS	EBANK	SELECT DESIRED CADR.
0511	REF	17	LAST	1001	6633	7 5012 0		MASK	LOW10	
0512	REF	328	LAST	1011	6634	50 000 1		INDEX	A	
0513					6635	3 2000 0		CAF	10000	
0514	REF	7	LAST	1004	6636	54 117 1		TS	POLISH	
0515	REF	5	LAST	1009	6637	3 0165 0	CALL	CA	BANKSET	FOR ANY OF THE CALL OPTIONS, MAKE UP THE
0516	REF	2	LAST	1005	6640	7 4350 1		MASK	BANKMASK	ADDRESS OF THE NEXT OP-CODE PAIR/STORE
0517	REF	3	LAST	1018	6641	6 4350 0		AD	BANKMASK	CODE AND LEAVE IT IN QPRET. NOTE THAT
0518	REF	22	LAST	1018	6642	6 0164 1		AD	LOC	BANKMASK = -(2000 - 1).
0519	REF	40	LAST	1011	6643	50 120 1		INDEX	FIXLOC	
0520	REF	10	LAST	936	6644	54 052 1		TS	QPRET	
0521	REF	8	LAST	1018	6645	3 0117 0	GOTO	CA	POLISH	BASIC BRANCHING SEQUENCE.
0522	REF	3	LAST	1001	6646	7 7741 0	+1	MASK	HIGH4	
0523					6647	0 0006 1		EXTEND		
0524	REF	1			6650	1 6661 1		BZF	GOTOERS	SEE IF ADDRESS POINTS TO FIXFD OR ERAS.
0525	REF	6	LAST	1018	6651	3 0165 0	+4	CA	BANKSET	SET EBANK PART OF BBANK. NEXT, SET UP
0526	REF	25	LAST	998	6652	54 006 0		TS	BBANK	EBANK. THE COMBINATION IS PICKED UP &
0527	REF	9	LAST	1018	6653	3 0117 0		CA	POLISH	PUT INTO BANKSET AT INTPRET +2.
0528	REF	17	LAST	1018	6654	54 004 1		TS	FBANK	
0529	REF	18	LAST	1018	6655	7 5012 0		MASK	LOW10	
0530	REF	2	LAST	1001	6656	6 4741 1		AD	2K	
0531	REF	23	LAST	1018	6657	54 164 0		TS	LOC	
0532	REF	216	LAST	997	6660	1 6041 0		TCF	INTPRET +3	
0533					E3,1400			EBANK=	1400	SO YUL DOESN'T CUSS THE "CA 1400" BELOW.
0534	REF	10	LAST	1018	6661	3 0117 0	GOTOERS	CA	POLISH	THE GIVEN ADDRESS IS IN ERASABLE - SEE
0535	REF	2	LAST	1000	6662	6 6250 0		AD	-FNDVAC	IF RELATIVE TO THE WORK AREA.
0536	REF	329	LAST	1018	6663	10 000 0		CCS	A	
0537	REF	11	LAST	1018	6664	3 0117 0		CA	POLISH	GENERAL ERASABLE.
0538	REF	1			6665	1 6674 0		TCF	GOTOGE	

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0539	REF 41	LAST 1018	6666	3 0120 1		CA	FIXLOC	WORK AREA.
0540	REF 12	LAST 1018	6667	6 0117 0		AD	POLISH	
0541	REF 330	LAST 1018	6670	50 000 1		INDEX	A	USE THE GIVEN ADDRESS AS THE ADDRESS OF
0542			6671	3 0000 1		CA	0	THE BRANCH ADDRESS.
0543	REF 13	LAST 1019	6672	54 117 1		TS	POLISH	
0544	REF 1		6673	1 6646 1		TCF	GOTO +1	ALLOWS ARBITRARY INDIRECTNESS LEVELS.
0545	REF 48	LAST 1011	6674	54 003 0	GOTOGF	TS	EBANK	
0546	REF 13	LAST 1011	6675	7 4357 0		MASK	LOW8	
0547	REF 331	LAST 1019	6676	50 000 1		INDEX	A	USE THE GIVEN ADDRESS AS THE ADDRESS OF
0548			6677	3 1400 1		CA	1400	THE BRANCH ADDRESS.
0549	REF 14	LAST 1019	6700	54 117 1		TS	POLISH	
0550	REF 2	LAST 1019	6701	1 6646 1		TCF	GOTO +1	
0551	REF 24	LAST 1018	6702	50 164 1	CGOTO	INDEX	LOC	COMPUTED GO TO. PICK UP ADDRESS OF CADR
0552			6703	3 0001 0		CA	1	LIST.
0553	REF 40	LAST 1018	6704	50 116 1		INDEX	ADDRWD	ADD MODIFIER.
0554			6705	6 0000 1		AD	0	
0555	REF 18	LAST 1018	6706	54 004 1		TS	FBANK	SELECT GOTO ADDRESS.
0556	REF 19	LAST 1018	6707	7 5012 0		MASK	LJW10	
0557	REF 332	LAST 1019	6710	50 000 1		INDEX	A	
0558			6711	3 2000 0		CA	10000	
0559	REF 15	LAST 1019	6712	54 117 1		TS	POLISH	
0560	REF 3	LAST 1019	6713	1 6646 1		TCF	GOTO +1	WITH ADDRESS IN A.
0561	REF 7	LAST 1018	6714	3 0165 0	SWBRANCH	CA	BANKSET	SWITCH INSTRUCTIONS WHICH ELECT TO
0562	REF 19	LAST 1019	6715	54 004 1		TS	FBANK	BRANCH COME HERE TO DO SO.
0563	REF 25	LAST 1019	6716	50 164 1		INDEX	LOC	
0564			6717	3 0001 0		CA	1	
0565	REF 16	LAST 1019	6720	54 117 1		TS	POLISH	
0566	REF 4	LAST 1019	6721	1 6646 1		TCF	GOTO +1	

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P0567 TRIPLE PRECISION BRANCHING ROUTINE. IF CALLING TC IS AT L, RETURN IS AS FOLLOWS:

R0569 L+1 IF MPAC IS GREATER THAN ZERO.
 R0570 L+2 IF MPAC IS EQUAL TO +0 OR -0.
 R0571 L+3 IF MPAC IS LESS THAN ZERO.

0572	REF 370	LAST 1016	6722	10 154 0	BRANCH	CCS	MPAC
0573	REF 250	LAST 1012	6723	0 0002 0		TC	0
0574			6724	1 6726 0		TCF	+2
0575	REF 1		6725	1 6740 0		TCF	NEG

ON ZERO.

0576	REF 371	LAST 1020	6726	10 155 1		CCS	MPAC +1
0577	REF 251	LAST 1020	6727	0 0002 0		TC	0
0578			6730	1 6732 0		TCF	+2
0579	REF 2	LAST 1020	6731	1 6740 0		TCF	NEG

0580	REF 372	LAST 1020	6732	10 156 1		CCS	MPAC +2
0581	REF 252	LAST 1020	6733	0 0002 0		TC	0
0582			6734	1 6736 1		TCF	+2
0583	REF 3	LAST 1020	6735	1 6740 0		TCF	NEG

0584	REF 253	LAST 1020	6736	50 002 0	Q+1	INDEX	0
0585			6737	0 0001 0		TC	1

0586	REF 254	LAST 1020	6740	50 002 0	NEG	INDEX	0
0587			6741	0 0002 0		TC	2

IF FIRST NON-ZERO REGISTER WAS NEGATIVE.

0588	REF 4	LAST 1020	6740		Q+2	=	NEG
------	-------	-----------	------	--	-----	---	-----

R0589 ITRACE {3} REFERS TO "EXIT".

0590	REF 8	LAST 1019	6742	3 0165 0	EXIT	CA	BANKSET
0591	REF 26	LAST 1018	6743	54 006 0		TS	BBANK
0592	REF 26	LAST 1019	6744	50 164 1		INDEX	LOC
0593			6745	0 0001 0		TC	1

RESTORE USER'S BANK SETTING, AND LEAVE INTERPRETIVE MODE.

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P0594 SECTION 3 - ADD/SUBTRACT PACKAGE.

R0595 THE FOLLOWING OPERATIONS ARE PROVIDED FOR ADDING TO AND SUBTRACTING FROM THE MULTI-PURPOSE ACCUMULATOR
 R0597 MPAC:

R0598 1. DAD DOUBLE PRECISION ADD.
 R0599 2. DSU DOUBLE PRECISION SUBTRACT.
 R0600 3. BDSU DOUBLE PRECISION SUBTRACT FROM.
 R0601 4. TAD TRIPLE PRECISION ADD.
 R0602 5. VAD VECTOR ADD.
 R0603 6. VSU VECTOR SUBTRACT.
 R0604 7. BVSU VECTOR SUBTRACT FROM.

R0605 THE INTERPRETIVE OVERFLOW INDICATOR OVFLW IS SET NON-ZERO IF OVERFLOW OCCURS IN ANY OF THE ABOVE.

0607	REF	39	LAST	997	6746	3	4735	1	VSU	CAF	BIT15	CHANGES 0 TO DCS.
0608					6747	1	6751	0		TCF	+2	
0609	REF	9	LAST	831	6750	3	4355	0	VAD	CAF	PRI030	CHANGES 0 TO DCA.
0610	REF	41	LAST	1019	6751	26	116	0		ADS	ADDRWD	
0611					6752	0	0006	1		EXTEND		
0612	REF	42	LAST	1021	6753	5	0116	1		INDEX	ADDRWD	
0613	REF	2	LAST	394	6754	00	003	1		READ	HISCALAR	DCA 2 OR DCS 2
0614	REF	373	LAST	1020	6755	20	160	1		DAS	MPAC +3	
0615					6756	0	0006	1		EXTEND		CHECK OVERFLOW.
0616					6757	1	6761	0		BZF	+2	
0617	REF	1			6760	0	7013	1		TC	OVERFLWY	
0618					6761	0	0006	1		EXTEND		
0619	REF	43	LAST	1021	6762	5	0116	1		INDEX	ADDRWD	
0620	REF	2	LAST	227	6763	00	005	1		READ	CHAN5	DCA 4 OR DCS 4
0621	REF	374	LAST	1021	6764	20	162	0		DAS	MPAC +5	
0622					6765	0	0006	1		EXTEND		
0623					6766	1	6770	0		BZF	+2	
0624	REF	1			6767	0	7010	1		TC	OVERFLWZ	
0625					6770	0	0006	1		EXTEND		
0626	REF	44	LAST	1021	6771	5	0116	1		INDEX	ADDRWD	
0627	REF	15	LAST	750	6772	00	001	0		READ	LCHAN	DCA 0 OR DCS 0
0628	REF	1			6773	1	6777	1		TCF	ENDVXV	
0629					6774	0	0006	1	DAD	EXTEND		
0630	REF	45	LAST	1021	6775	5	0116	1		INDEX	ADDRWD	
0631					6776	3	0001	0		DCA	0	
0632	REF	375	LAST	1021	6777	20	155	1	ENDVXV	DAS	MPAC	VXV FINISHES HERE.
0633					7000	0	0006	1		EXTEND		
0634	REF	10	LAST	1017	7001	1	6060	0		BZF	DANZIG	

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0635	REF	1		7002	0	7016	1	SETOVF	TC	OVERFLOW
0636	REF	11	LAST 1021	7003	1	6060	0		TCF	DANZIG

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0637				7004	0 0006 1	DSU	EXTEND		
0638	REF	46	LAST 1021	7005	5 0116 1		INDEX	ADDRWD	
0639				7006	4 0001 1		DCS	0	
0640	REF	2	LAST 1021	7007	1 6777 1		TCF	ENDVXV	
0641	REF	170	LAST 995	7010	54 001 1	OVERFLWZ	TS	L	ENTRY FOR THIRD COMPONENT.
0642	REF	19	LAST 950	7011	3 4756 1		CAF	FIVE	
0643				7012	1 7015 0		TCF	+3	
0644	REF	171	LAST 1023	7013	54 001 1	OVERFLWY	TS	L	ENTRY FOR SECOND COMPONENT.
0645	REF	30	LAST 975	7014	3 6244 0		CAF	THREE	
0646	REF	172	LAST 1023	7015	56 001 0		XCH	L	
0647	REF	333	LAST 1019	7016	50 000 1	OVERFLOW	INDEX	A	ENTRY FOR 1ST COMP OR DP (L=0).
0648	REF	2	LAST 922	7017	4 4734 1		CS	LIMITS	PICK UP POSMAX OR NEGMAX.
0649	REF	65	LAST 890	7020	54 130 1		TS	BUF	
0650				7021	0 0006 1		EXTEND		
0651	REF	334	LAST 1023	7022	24 000 1		AUG	A	FORCE OVERFLOW.
0652	REF	173	LAST 1023	7023	50 001 0		INDEX	L	
0653	REF	376	LAST 1021	7024	26 155 1		ADS	MPAC +1	
0654				7025	54 007 1		TS	7	
0655	REF	181	LAST 997	7026	3 4755 1		CAF	ZERO	
0656	REF	66	LAST 1023	7027	6 0130 0		AD	BUF	
0657	REF	174	LAST 1023	7030	50 001 0		INDEX	L	
0658	REF	377	LAST 1023	7031	26 154 0		ADS	MPAC	
0659				7032	54 007 1		TS	7	
0660	RFF	255	LAST 1020	7033	0 0002 0		TC	Q	NO OVERFLOW EXIT.
0661	REF	1		7034	1 7151 1		TCF	SETOVF2	SET OVFLND AND EXIT.
0662				7035	0 0006 1	BVSU	EXTEND		
0663	REF	47	LAST 1023	7036	5 0116 1		INDEX	ADDRWD	
0664				7037	3 0003 1		DCA	2	
0665	REF	378	LAST 1023	7040	52 160 1		DXCH	MPAC +3	
0666				7041	0 0006 1		EXTEND		
0667				7042	4 0001 1		DCOM		
0668	REF	379	LAST 1023	7043	20 160 1		DAS	MPAC +3	
0669				7044	0 0006 1		EXTEND		
0670				7045	1 7047 1		BZF	+2	
0671	REF	2	LAST 1021	7046	0 7013 1		TC	OVERFLWY	
0672				7047	0 0006 1		EXTEND		
0673	REF	48	LAST 1023	7050	5 0116 1		INDEX	ADDRWD	
0674				7051	3 0005 1		DCA	4	
0675	REF	380	LAST 1023	7052	52 162 0		DXCH	MPAC +5	
0676				7053	0 0006 1		EXTEND		
0677				7054	4 0001 1		DCOM		
0678	REF	381	LAST 1023	7055	20 162 0		DAS	MPAC +5	
0679				7056	0 0006 1		EXTEND		
0680				7057	1 7061 0		BZF	+2	
0681	REF	2	LAST 1021	7060	0 7010 1		TC	OVERFLWZ	

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0682				7061	0 0006	1	BDSU	EXTEND	
0683	REF	49	LAST	7062	5 0116	1		INDEX	ADDRWD
0684				7063	3 0001	0		DCA	0
0685	REF	382	LAST	7064	52 155	1		DXCH	MPAC
0686				7065	0 0006	1		EXTEND	
0687				7066	4 0001	1		DCOM	
0688	REF	3	LAST	7067	1 6777	1		TCF	ENDVXV

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P0689

TRIPLE PRECISION ADD ROUTINE.

0690				7070	0 0006 1	TAD	EXTEND		
0691	REF	50	LAST 1024	7071	5 0116 1		INDEX	ADDRWD	
0692				7072	3 0002 0		DCA	1	ADD MINOR PARTS FIRST.
0693	REF	383	LAST 1024	7073	20 156 1		DAS	MPAC +1	
0694	REF	51	LAST 1025	7074	50 116 1		INDEX	ADDRWD	
0695				7075	6 0000 1		AD	0	
0696	REF	384	LAST 1025	7076	6 0154 1		AD	MPAC	
0697	REF	385	LAST 1025	7077	54 154 0		TS	MPAC	
0698	REF	12	LAST 1022	7100	1 6060 0		TCF	DANZ IG	
0699	REF	1		7101	1 7002 0		TCF	SETOVF	SET OVFind IF SUCH OCCURS.

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P0700 ARITHMETIC SUBROUTINES REQUIRED IN FIXED-FIXED.

R0701 1. DMP SUB DOUBLE PRECISION MULTIPLY. MULTIPLY THE CONTENTS OF MPAC,+1 BY THE DP WORD WHOSE ADDRESS
 R0703 IS IN ADDRWD AND LEAVE A TRIPLE PRECISION RESULT IN MPAC.
 R0705 2. ROUND SUB ROUND THE TRIPLE PRECISION CONTENTS OF MPAC TO DOUBLE PRECISION.
 R0707 3. DOT SUB TAKE THE DOT PRODUCT OF THE VECTOR IN MPAC AND THE VECTOR WHOSE ADDRESS IS IN ADDRWD
 R0709 AND LEAVE THE TRIPLE PRECISION RESULT IN MPAC.
 R0710 4. POLY USING THE CONTENTS OF MPAC AS A DP ARGUMENT, EVALUATE THE POLYNOMIAL WHOSE DEGREE AND
 R0712 COEFFICIENTS IMMEDIATELY FOLLOW THE TC POLY INSTRUCTION (SEE ROUTINE FOR DETAILS.)

0714	REF 256	LAST 1023	7102	50 002 0	DMP	INDEX	Q	BASIC SUBROUTINE FOR USE BY PINBALL, ETC
0715			7103	3 0000 1		CAF	0	ADRES OF ARGUMENT FOLLOWS TC DMP .
0716	REF 257	LAST 1026	7104	24 002 0		INCR	Q	
0717	REF 52	LAST 1025	7105	54 116 0	-1	TS	ADDRWD	(PROLOGUE FOR SETTING ADDRWD.)
0718	REF 53	LAST 1026	7106	50 116 1	DMP SUB	INDEX	ADDRWD	GET MINOR PART OF OPERAND AT C(ADDRWD).
0719			7107	3 0001 0		CA	1	
0720	REF 386	LAST 1025	7110	54 156 1		TS	MPAC +2	THIS WORKS FOR SQUARING MPAC AS WELL.
0721	REF 182	LAST 1023	7111	3 4755 1		CAF	ZERO	SET MPAC +1 TO ZERO SO WE CAN ACCUMULATE
0722	REF 387	LAST 1026	7112	56 155 0		XCH	MPAC +1	THE PARTIAL PRODUCTS WITH DAS
0723	REF 9	LAST 994	7113	54 135 1		TS	MPTMP	INSTRUCTIONS.
0724			7114	0 0006 1		EXTEND		
0725	REF 388	LAST 1026	7115	7 0156 1		MP	MPAC +2	MINOR OF MPAC X MINOR OF C(ADDRWD).
0726	REF 389	LAST 1026	7116	56 156 0		XCH	MPAC +2	DISCARD MINOR PART OF ABOVE RESULT AND
0727			7117	0 0006 1		EXTEND		FORM MAJOR OF MPAC X MINOR OF C(ADDRWD).
0728	REF 390	LAST 1026	7120	7 0154 0		MP	MPAC	
0729	REF 391	LAST 1026	7121	20 156 1		DAS	MPAC +1	GUARANTEED NO OVERFLOW.
0730	REF 54	LAST 1026	7122	50 116 1		INDEX	ADDRWD	GET MAJOR PART OF ARGUMENT AT C(ADDRWD).
0731			7123	3 0000 1		CA	0	
0732	REF 10	LAST 1026	7124	56 135 0		XCH	MPTMP	SAVE AND BRING OUT MINOR OF MPAC.
0733			7125	0 0006 1	DMP SUB2	EXTEND		
0734	REF 11	LAST 1026	7126	7 0135 1		MP	MPTFMP	MAJOR OF C(ADDRWD) X MINOR OF MPAC.
0735	REF 392	LAST 1026	7127	20 156 1		DAS	MPAC +1	ACCUMULATE, SETTING A TO NET OVERFLOW.
0736	REF 393	LAST 1026	7130	56 154 1		XCH	MPAC	SETTING MPAC TO 0 OR +-1.
0737			7131	0 0006 1		EXTEND		
0738	REF 12	LAST 1026	7132	7 0135 1		MP	MPTMP	MAJOR OF MPAC X MAJOR OF C(ADDRWD).
0739	REF 394	LAST 1026	7133	20 155 1		DAS	MPAC	GUARANTEED NO OVERFLOW.
0740	REF 258	LAST 1026	7134	0 0002 0		TC	Q	49 MCT = .573 MS. INCLUDING RETURN.

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P0741 RCUND MPAC TO DOUBLE PRECISION, SETTING OVFind ON THE RARE EVENT OF OVERFLOW.

0743	REF 183	LAST 1026	7135	3 4755 1	ROUND SUB	CAF	ZERO	SET MPAC +2 = 0 FOR SCALARS AND CHANGE
0744	REF 24	LAST 1016	7136	54 163 1	+1	TS	MODE	MODE TO DP.
0745	REF 395	LAST 1026	7137	56 156 0	VRound	XCH	MPAC +2	BUT WE NEEDNT TAKE THE TIME FOR VECTORS.
0746			7140	6 0000 1		DOUBLE		
0747	REF 175	LAST 1023	7141	54 001 1		TS	L	
0748	REF 259	LAST 1026	7142	0 0002 0		TC	Q	
0749	REF 396	LAST 1027	7143	6 0155 0		AD	MPAC +1	ADD ROUNDING BIT IF MPAC +2 WAS GREATER
0750	REF 397	LAST 1027	7144	54 155 1		TS	MPAC +1	THAN .5 IN MAGNITUDE.
0751	REF 260	LAST 1027	7145	0 0002 0		TC	Q	
0752	REF 398	LAST 1027	7146	6 0154 1		AD	MPAC	PROPAGATE INTERFLOW.
0753	REF 399	LAST 1027	7147	54 154 0		TS	MPAC	
0754	REF 261	LAST 1027	7150	0 0002 0		TC	Q	
0755	REF 2	LAST 816	7151	54 121 1	SETOVF2	TS	OVFind	(RARE).
0756	REF 262	LAST 1027	7152	0 0002 0		TC	Q	

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07057 THE DOT PRODUCT SUBROUTINE USUALLY FORMS THE DOT PRODUCT OF THE VECTOR IN MPAC WITH A STANDARD SIX
 07059 REGISTER VECTOR WHOSE ADDRESS IS IN ADDRWD. IN THIS CASE C(DOTINC) ARE SET TO 2. VXM, HOWEVER, SETS C(DOTINC) TO
 07061 6 SO THAT DOTSUB DOTS MPAC WITH A COLUMN VECTOR OF THE MATRIX IN QUESTION IN THIS CASE.

0763 REF 64 LAST 991 7153 3 4752 0 PREDOT CAF TWO PROLOGUE TO SET DOTINC TO 2.
 0764 REF 4 LAST 113 7154 54 136 1 TS DOTINC

0765 7155 0 0006 1 DOTSUB EXTEND
 0766 RFF 5 LAST 113 7156 22 137 1 QXCH DOTRET SAVE RETURN.
 0767 REF 1 7157 0 7106 1 TC DMPSUB DOT X COMPONENTS.
 0768 REF 400 LAST 1027 7160 52 160 1 DXCH MPAC +3 POSITION Y COMPONENT OF MPAC FOR
 0769 REF 401 LAST 1028 7161 52 155 1 DXCH MPAC MULTIPLICATION WHILE SAVING RESULT IN
 0770 REF 67 LAST 1023 7162 52 131 0 DXCH BUF THREE WORD BUFFER, BUF.
 0771 REF 402 LAST 1028 7163 3 0156 0 CA MPAC +2
 0772 REF 68 LAST 1028 7164 54 132 0 TS BUF +2

0773 REF 5 LAST 1028 7165 3 0136 0 CA DOTINC ADVANCE ADDRWD TO Y COMPONENT OF
 0774 REF 55 LAST 1026 7166 26 116 0 ADS ADDRWD OTHER ARGUMENT.
 0775 REF 2 LAST 1028 7167 0 7106 1 TC DMPSUB
 0776 RFF 403 LAST 1028 7170 52 156 1 DXCH MPAC +1 ACCUMULATE PARTIAL PRODUCTS.
 0777 RFF 69 LAST 1028 7171 20 132 0 DAS BUF +1
 0778 REF 404 LAST 1028 7172 6 0154 1 AD MPAC
 0779 REF 70 LAST 1028 7173 6 0130 0 AD BUF
 0780 REF 71 LAST 1028 7174 54 130 1 TS BUF
 0781 7175 1 7177 0 TCF +2
 0782 REF 3 LAST 1027 7176 54 121 1 TS QV FIND IF OVERFLOW OCCURS.

0783 REF 405 LAST 1028 7177 52 162 0 DXCH MPAC +5 MULTIPLY Z COMPONENTS.
 0784 REF 406 LAST 1028 7200 52 155 1 DXCH MPAC
 0785 REF 6 LAST 1028 7201 3 0136 0 CA DOTINC
 0786 REF 56 LAST 1028 7202 26 116 0 ADS ADDRWD
 0787 REF 3 LAST 1028 7203 0 7106 1 TC DMPSUB
 0788 REF 72 LAST 1028 7204 52 132 0 END DOT DXCH BUF +1 LEAVE FINAL ACCUMULATION IN MPAC.
 0789 REF 407 LAST 1028 7205 20 156 1 DAS MPAC +1
 0790 REF 408 LAST 1028 7206 6 0154 1 AD MPAC
 0791 RFF 73 LAST 1028 7207 6 0130 0 AD BUF
 0792 REF 409 LAST 1028 7210 54 154 0 TS MPAC
 0793 REF 6 LAST 1028 7211 0 0137 1 TC DOTRET

0794 RFF 2 LAST 1022 7212 0 7016 1 TC DVERFLOW ON OVERFLOW HERE.
 0795 RFF 7 LAST 1028 7213 0 0137 1 TC DOTRET

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P0796 DOUBLE PRECISION POLYNOMIAL EVALUATOR

R0797 THIS ROUTINE EVALUATES $A_N X^N + A_{N-1} X^{N-1} + \dots + A_1 X + A_0$ LEAVING THE DP RESULT IN MPAC ON EXIT.
 R0798
 R0800

R0801 THE ROUTINE HAS TWO ENTRIES

R0802 1. ENTRY THRU POWRSERS. THE COEFFICIENTS MAY BE EITHER IN FIXED OR ERASABLE, THE CALL IS BY
 R0804 TC POWRSERS, AND THE RETURN IS TO LOC(TC POWRSERS)+1. THE ENTERING DATA MUST BE AS FOLLOWS

A0806	A	SP	LOC-3	ADDRESS FOR REFERENCING COEF TABLE
A0807	L	SP	N-1	N IS THE DEGREE OF THE POWER SERIES
A0808	MPAC	DP	X	ARGUMENT

A0809	LOC-2N	DP	A(0)
A0810		...	
A0811	LOC	DP	A(N)

R0812 2. ENTRY THRU POLY. THE CALL TO POLY AND THE ENTERING DATA MUST BE AS FOLLOWS

A0814	MPAC	DP	X	ARGUMENT
A0815	LOC	TC	POLY	
A0816	LOC+1	SP	N-1	
A0817	LOC+2	DP	A(0)	
A0818		...		
A0819	LOC+2N+2	DP	A(N)	RETURN IS TO LOC+2N+4

0820			7214	0 0006 1	POWRSERS	EXTEND	
0821	REF	1	7215	22 141 0		QXCH	POLYRET
0822	REF	17	7216	54 117 1		TS	POLISH
0823	REF	1	7217	22 140 1		LXCH	POLYCNT
0824	REF	1	7220	1 7231 1		TCF	POLYCOM

RETURN ADDRESS
POWER SERIES ADDRESS
N-1 TO COUNTER
SKIP SET UP BY POLY

0825	REF	263	7221	50 0002 0	POLY	INDEX	0
0826			7222	3 0000 1		CAF	0
0827	REF	2	7223	54 140 0		TS	POLYCNT
0828			7224	6 0000 1		DOUBLE	
0829	REF	264	7225	6 0002 0		AD	0
0830	REF	18	7226	54 117 1		TS	POLISH
0831	REF	20	7227	6 4756 1		AD	FIVE
0832	REF	2	7230	54 141 1		TS	POLYRET

N-1 TO COUNTER
L(A(N))-3 TO POLISH
STORE RETURN ADDRESS

0833	REF	1	7231	3 6272 0	POLYCOM	CAF	LVBUE
0834	REF	57	7232	54 116 0		TS	ADDRWD

INCOMING X WILL BE MOVED TO VBUE, SO
SET ADDRWD SO DMPSUB WILL MPY BY VBUE.

0835			7233	0 0006 1		EXTEND	
0836	REF	19	7234	5 0117 0		INDEX	POLISH
0837			7235	3 0004 0		DCA	3

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0838	REF 410	LAST 1028	7236	52 155 1		DXCH	MPAC	LOAD A(N) INTO MPAC,
0839	REF 35	LAST 1005	7237	52 123 0		DXCH	VBUF	SAVING X IN VBUF
0840	REF 1		7240	1 7244 0		TCF	POLY2	
0841	REF 3	LAST 1029	7241	54 140 0	POLYLOOP	TS	POLYCNT	SAVE DECREMENTED LOOP COUNTER
0842	REF 65	LAST 1028	7242	4 4752 1		CS	TWJ	
0843	REF 20	LAST 1029	7243	26 117 1		ADS	POLISH	REGRESS COEFFICIENT POINTER
0844	REF 4	LAST 1028	7244	0 7106 1	POLY2	TC	DMPSUB	MULTIPLY BY X
0845			7245	0 0006 1		EXTEND		
0846	REF 21	LAST 1030	7246	5 0117 0		INDEX	POLISH	
0847			7247	3 0002 0		DCA	1	ADD IN NEXT COEFFICIENT
0848	REF 411	LAST 1030	7250	20 155 1		DAS	MPAC	USERS RESPONSIBILITY TO ASSURE NO OVFLOW
0849	REF 4	LAST 1030	7251	10 140 0		CCS	POLYCNT	
0850	REF 1		7252	1 7241 0		TCF	POLYLOOP	
0851	REF 3	LAST 1029	7253	0 0141 0		TC	POLYRET	RETURN CALLER

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P0852 MISCELLANEOUS MULTI-PRECISION ROUTINES REQUIRED IN FIXED-FIXED BUT NOT USED BY THE INTERPRETER.

085398	REF 184	LAST 1027	7254	3 4755 1	DPAGREE	CAF	ZERO	DOUBLE PRECISION ENTRY -
085399	REF 412	LAST 1030	7255	54 156 1		TS	MPAC +2	ZERO LOW-ORDER WORD
0854	REF 265	LAST 1029	7256	22 002 0	TPAGREE	LXCH	Q	FORCE SIGN AGREEMENT AMONG THE TRIPLE
0855	REF 4	LAST 888	7257	0 6722 0		TC	BRANCH	PRECISION CONTENTS OF MPAC. RETURNING
0856	REF 1		7260	1 7264 1		TCF	ARG+	WITH SIGNUM OF THE INPUT IN A.
0857	RFF 1		7261	1 7304 0		TCF	ARGZERO	
0858	REF 21	LAST 919	7262	4 4733 0		CS	POSMAX	IF NEGATIVE.
0859			7263	1 7265 0		TCF	+2	
0860	REF 22	LAST 1031	7264	3 4733 1	ARG+	CAF	POSMAX	
0861	REF 266	LAST 1031	7265	54 002 1		TS	Q	
0862			7266	0 0006 1			EXTEND	
0863	REF 335	LAST 1023	7267	24 000 1		AUG	A	FORMS +-1.0.
0864	REF 413	LAST 1031	7270	6 0156 0		AD	MPAC +2	
0865	REF 414	LAST 1031	7271	54 156 1		TS	MPAC +2	
0866	REF 185	LAST 1031	7272	3 4755 1		CAF	ZERO	
0867	REF 267	LAST 1031	7273	6 0002 0		AD	Q	
0868	REF 415	LAST 1031	7274	6 0155 0		AD	MPAC +1	
0869	REF 416	LAST 1031	7275	54 155 1		TS	MPAC +1	
0870	REF 186	LAST 1031	7276	3 4755 1		CAF	ZERO	
0871	REF 268	LAST 1031	7277	6 0002 0		AD	Q	Q STILL HAS POSMAX OR NEGMAX IN IT.
0872	REF 417	LAST 1031	7300	6 0154 1		AD	MPAC	
0873	REF 418	LAST 1031	7301	54 154 0	ARGZERO2	TS	MPAC	ALWAYS SKIPPING UNLESS ARGZERO.
0874	REF 419	LAST 1031	7302	54 155 1		TS	MPAC +1	
0875	REF 176	LAST 1027	7303	0 0001 0		TC	L	RETURN VIA L.
0876	REF 420	LAST 1031	7304	54 156 1	ARGZERO	TS	MPAC +2	SET ALL THREE MPAC REGISTERS TO ZERO.
0877	REF 1		7305	1 7301 0		TCF	ARGZERO2	

R0878 SHORTMP MULTIPLIES THE TP CONTENTS OF MPAC BY THE SINGLE PRECISION NUMBER ARRIVING IN A.

0880	REF 13	LAST 1026	7306	54 135 1	SHORTMP	TS	MPTEMP	
0881			7307	0 0006 1		EXTEND		
0882	REF 421	LAST 1031	7310	7 0156 1		MP	MPAC +2	
0883	REF 422	LAST 1031	7311	54 156 1		TS	MPAC +2	
0884	REF 187	LAST 1031	7312	3 4755 1	SHORTMP2	CAF	ZERO	SO SUBSEQUENT DAS WILL WORK.
0885	REF 423	LAST 1031	7313	56 155 0		XCH	MPAC +1	
0886	REF 1		7314	1 7125 1		TCF	DMPSUB2	

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P0887 DMPNSUB MULTIPLIES THE DP FRACTION ARRIVING IN MPAC BY THE SP
 R0888 INTEGER ARRIVING IN A. THE DP PRODUCT DEPARTS BOTH IN MPAC AND IN
 R0889 A AND L. NOTE THAT DMPNSUB NORMALLY INCREASES THE MAGNITUDE OF THE
 R0890 CCNTENTS OF MPAC. THE CUSTOMER MUST INSURE THAT B(A) X B(MPAC,MPAC+1)
 R0891 AND B(A) X B(MPAC) ARE LESS THAN 1 IN MAGNITUDE, WHERE B, AS IS OBVIOUS,
 R0892 INDICATES THE ARRIVING CONTENTS.

0893	REF	1		7315	54 135 1	DMPNSUB	TS	DMPNTEMP	
0894				7316	0 0006 1		EXTEND		
0895	REF	424	LAST 1031	7317	7 0155 1		MP	MPAC +1	
0896	REF	425	LAST 1032	7320	52 155 1		DXCH	MPAC	LOW PRODUCT TO MPAC, HIGH FACTOR TO A
0897				7321	0 0006 1		EXTEND		
0898	REF	2	LAST 1032	7322	7 0135 1		MP	DMPNTEMP	
0899	REF	177	LAST 1031	7323	3 0001 0		CA	L	
0900	REF	426	LAST 1032	7324	26 154 0		ADS	MPAC	COMPLETING THE PRODUCT IN MPAC
0901				7325	0 0006 1		EXTEND		
0902	REF	427	LAST 1032	7326	3 0155 0		DCA	MPAC	BRINGING THE PRODUCT INTO A AND L
0903	REF	269	LAST 1031	7327	0 0002 0		TC	Q	

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P0904 MISCELLANFCUS VECTOR OPERATIONS. INCLUDED HERE ARE THE FOLLOWING:

R0905	1.	DOT	DP VECTOR DOT PRODUCT.
R0906	2.	VXV	DP VECTOR CROSS PRODUCT.
R0907	3.	VXSC	DP VECTOR TIMES SCALAR.
R0908	4.	V/SC	DP VECTOR DIVIDED BY SCALAR.
R0909	5.	VPROJ	DP VECTOR PROJECTION. ((MPAC.X)MPAC).
R0910	6.	VXM	DP VECTOR POST-MULTIPLIED BY MATRIX.
R0911	7.	MXV	DP VECTOR PRE-MULTIPLIED BY MATRIX.

0912	REF	1		7330	0	7153	1	DOT	TC	PREDOT	DO THE DOT PRODUCT AND EXIT, CHANGING
0913	REF	188	LAST 1031	7331	3	4755	1	D MODE	CAF	ZERO	THE MODE TO DP SCALAR.
0914	REF	3	LAST 1014	7332	1	6057	1		TCF	NEWMODE	

0915	REF	66	LAST 1030	7333	3	4752	0	MXV	CAF	TWO	SET UP MATINC AND DOTINC FOR ROW
0916	REF	6	LAST 114	7334	54	140	0		TS	MATINC	VECTORS.
0917	REF	1		7335	1	7341	1		TCF	VXM/MXV	GO TO COMMON PORTION.

0918	REF	7	LAST 805	7336	4	4363	1	VXM	CS	TEN	SET MATINC AND DOTINC TO REFER TO MATRIX
0919	REF	7	LAST 1033	7337	54	140	0		TS	MATINC	AS THREE COLUMN VECTORS.
0920	REF	20	LAST 889	7340	3	6241	0		CAF	SIX	

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P0921 COMMON PORTION OF MXV AND VXM.

0922	REF	7	LAST 1028	7341	54 136 1	VXM/MXV	TS	DOTINC	
0923			ITRACE (2)	REFERS TO	"VXM/MXV".				
0924	REF	2	LAST 612	7342	0 7531 1		TC	MPACVBUF	SAVE VECTOR IN MPAC FOR FURTHER USE.
0925	REF	1		7343	0 7155 1		TC	DOTSUB	GO DOT TO GET X COMPONENT OF ANSWER.
0926				7344	0 0006 1		EXTEND		
0927	REF	36	LAST 1030	7345	3 0123 1		DCA	VBUF	MOVE MPAC VECTOR BACK INTO MPAC, SAVING
0928	REF	428	LAST 1032	7346	52 155 1		DXCH	MPAC	NEW X COMPONENT IN BUF2.
0929	REF	14	LAST 994	7347	52 134 0		DXCH	BUF2	
0930				7350	0 0006 1		EXTEND		
0931	REF	37	LAST 1034	7351	3 0125 1		DCA	VBUF +2	
0932	REF	429	LAST 1034	7352	52 160 1		DXCH	MPAC +3	
0933				7353	0 0006 1		EXTEND		
0934	REF	38	LAST 1034	7354	3 0127 0		DCA	VBUF +4	
0935	REF	430	LAST 1034	7355	52 162 0		DXCH	MPAC +5	
0936	REF	8	LAST 1033	7356	3 0140 1		CA	MATINC	INITIALIZE ADDRWD FOR NEXT DOT PRODUCT.
0937	REF	58	LAST 1029	7357	26 116 0		ADS	ADDRWD	FORMS BASE ADDRESS OF NEXT COLUMN(ROW).
0938	REF	2	LAST 1034	7360	0 7155 1		TC	DOTSUB	
0939	REF	39	LAST 1034	7361	52 123 0		DXCH	VBUF	MOVE GIVEN VECTOR BACK TO MPAC, SAVING Y
0940	REF	431	LAST 1034	7362	52 155 1		DXCH	MPAC	COMPONENT OF ANSWER IN VBUF +2.
0941	REF	40	LAST 1034	7363	52 125 0		DXCH	VBUF +2	
0942	REF	432	LAST 1034	7364	52 160 1		DXCH	MPAC +3	
0943	REF	41	LAST 1034	7365	52 127 1		DXCH	VBUF +4	
0944	REF	433	LAST 1034	7366	52 162 0		DXCH	MPAC +5	
0945	REF	9	LAST 1034	7367	3 0140 1		CA	MATINC	FORM ADDRESS OF LAST COLUMN OR ROW.
0946	REF	59	LAST 1034	7370	26 116 0		ADS	ADDRWD	
0947	REF	3	LAST 1034	7371	0 7155 1		TC	DOTSUB	
0948	REF	15	LAST 1034	7372	52 134 0		DXCH	BUF2	ANSWER NOW COMPLETE. PUT COMPONENTS INTO
0949	REF	434	LAST 1034	7373	52 155 1		DXCH	MPAC	PROPER MPAC REGISTERS.
0950	REF	435	LAST 1034	7374	52 162 0		DXCH	MPAC +5	
0951	REF	42	LAST 1034	7375	52 125 0		DXCH	VBUF +2	
0952	REF	436	LAST 1034	7376	52 160 1		DXCH	MPAC +3	
0953	REF	13	LAST 1025	7377	1 6060 0		TCF	DANZ IG	EXIT.

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P0954 VXSC - VECTOR TIMES SCALAR.

0955	REF	25	LAST 1027	7400	10 163 1	VXSC	CCS	MODE	TEST PRESENT MODE.
0956	REF	1		7401	1 7427 0		TCF	OVXSC	SEPARATE ROUTINE WHEN SCALAR IS IN MPAC.
0957	REF	2	LAST 1035	7402	1 7427 0		TCF	OVXSC	
0958	REF	5	LAST 1030	7403	0 7106 1	VVXSC	TC	DMPSUB	COMPUTE X COMPONENT
0959	REF	1		7404	0 7137 0		TC	VROUND	AND ROUND IT.
0960	REF	437	LAST 1034	7405	52 160 1		DXCH	MPAC +3	PUT Y COMPONENT INTO MPAC SAVING MPAC IN
0961	REF	438	LAST 1035	7406	52 155 1		DXCH	MPAC	MPAC +3.
0962	REF	439	LAST 1035	7407	52 160 1		DXCH	MPAC +3	
0963	REF	6	LAST 1035	7410	0 7106 1		TC	DMPSUB	DO SAME FOR Y AND Z COMPONENTS.
0964	REF	2	LAST 1035	7411	0 7137 0		TC	VROUND	
0965	REF	440	LAST 1035	7412	52 162 0		DXCH	MPAC +5	
0966	REF	441	LAST 1035	7413	52 155 1		DXCH	MPAC	
0967	REF	442	LAST 1035	7414	52 162 0		DXCH	MPAC +5	
0968	REF	7	LAST 1035	7415	0 7106 1		TC	DMPSUB	
0969	REF	3	LAST 1035	7416	0 7137 0		TC	VROUND	
0970	REF	443	LAST 1035	7417	52 155 1	VROTATEX	DXCH	MPAC	EXIT USED TO RESTORE MPAC AFTER THIS
0971	REF	444	LAST 1035	7420	52 162 0		DXCH	MPAC +5	TYPE OF ROTATION. CALLED BY VECTOR SHIFT
0972	REF	445	LAST 1035	7421	52 160 1		DXCH	MPAC +3	RIGHT, V/SC, ETC.
0973	REF	446	LAST 1035	7422	52 155 1		DXCH	MPAC	
0974	REF	14	LAST 1034	7423	1 6060 0		TCF	DANZIG	

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P0975 DP VECTOR PROJECTION ROUTINE.

0976	REF	2	LAST 1033	7424	0 7153 1	VPROJ	TC	PREDOT	(MPAC.X)MPAC IS COMPUTED AND LEFT IN
0977	REF	22	LAST 919	7425	4 4751 1		CS	FOUR	MPAC. DO DOT AND FALL INTO DVXSC.
0978	REF	60	LAST 1034	7426	26 116 0		ADS	ADDRWD	

R0979 VXSC WHEN SCALAR ARRIVES IN MPAC AND VECTOR IS AT X.

0980				7427	0 0006 1	DVXSC	EXTEND		SAVE SCALAR IN MPAC +3 AND GET X
0981	REF	447	LAST 1035	7430	3 0155 0		DCA	MPAC	COMPONENT OF ANSWER.
0982	REF	448	LAST 1036	7431	52 160 1		DXCH	MPAC +3	
0983	REF	8	LAST 1035	7432	0 7106 1		TC	DMPSUB	
0984	REF	4	LAST 1035	7433	0 7137 0		TC	VRDUND	
0985	REF	67	LAST 1033	7434	3 4752 0		CAF	TWO	ADVANCE ADDRWD TO Y COMPONENT OF X.
0986	REF	61	LAST 1036	7435	26 116 0		ADS	ADDPWD	
0987				7436	0 0006 1		EXTEND		
0988	REF	449	LAST 1036	7437	3 0160 0		DCA	MPAC +3	PUT SCALAR BACK INTO MPAC AND SAVE
0989	REF	450	LAST 1036	7440	52 155 1		DXCH	MPAC	X RESULT IN MPAC +5.
0990	REF	451	LAST 1036	7441	52 162 0		DXCH	MPAC +5	
0991	REF	9	LAST 1036	7442	0 7106 1		TC	DMPSUB	
0992	REF	5	LAST 1036	7443	0 7137 0		TC	VRDUND	
0993	REF	68	LAST 1036	7444	3 4752 0		CAF	TWO	
0994	REF	62	LAST 1036	7445	26 116 0		ADS	ADDRWD	TO Z COMPONENT.
0995	REF	452	LAST 1036	7446	52 160 1		DXCH	MPAC +3	BRING SCALAR BACK, PUTTING Y RESULT IN
0996	REF	453	LAST 1036	7447	52 155 1		DXCH	MPAC	THE PROPER PLACE.
0997	REF	454	LAST 1036	7450	52 160 1		DXCH	MPAC +3	
0998	REF	10	LAST 1036	7451	0 7106 1		TC	DMPSUB	
0999	REF	6	LAST 1036	7452	0 7137 0		TC	VRDUND	
1000	REF	455	LAST 1036	7453	52 155 1		DXCH	MPAC	PUT Z COMPONENT IN PROPER PLACE, ALSO
1001	REF	456	LAST 1036	7454	52 162 0		DXCH	MPAC +5	POSITIONING X.
1002	REF	457	LAST 1036	7455	52 155 1		DXCH	MPAC	
1003	REF	1		7456	1 6520 1		TCF	VMODE	MODE HAS CHANGED TO VECTOR.

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P1004 THE VECTOR CROSS PRODUCT ROUTINE CALCULATES (X M -X M ,X M -X M ,X M -X M) WHERE M IS THE VECTOR IN
 R1006 3 2 2 3 1 3 3 1 2 1 1 2
 R1008 MPAC AND X THE VECTOR AT THE GIVEN ADDRESS.

1009				7457	0 0006 1	VXV	EXTEND		
1010	REF 458	LAST 1036		7460	3 0162 1		DCA	MPAC +5	FORM UP M3X1, LEAVING M1 IN VBUF.
1011	REF 459	LAST 1037		7461	52 155 1		DXCH	MPAC	
1012	REF 43	LAST 1034		7462	52 123 0		DXCH	VBUF	
1013	REF 11	LAST 1036		7463	0 7106 1		TC	DMPSUB	BY X1.
1014				7464	0 0006 1		EXTEND		
1015	REF 460	LAST 1037		7465	4 0160 1		DCS	MPAC +3	CALCULATE -X1M2, SAVING X1M3 IN VBUF +2.
1016	REF 461	LAST 1037		7466	52 155 1		DXCH	MPAC	
1017	REF 44	LAST 1037		7467	52 125 0		DXCH	VBUF +2	
1018	REF 12	LAST 1037		7470	0 7106 1		TC	DMPSUB	
1019	REF 69	LAST 1036		7471	3 4752 0		CAF	TWO	ADVANCE ADDRWD TO X2.
1020	REF 63	LAST 1036		7472	26 116 0		ADS	ADDRWD	
1021				7473	0 0006 1		EXTEND		
1022	REF 462	LAST 1037		7474	4 0162 0		DCS	MPAC +5	PREPARE TO GET -X2M3, SAVING -X1M2 IN
1023	REF 463	LAST 1037		7475	52 155 1		DXCH	MPAC	MPAC +5.
1024	REF 464	LAST 1037		7476	52 162 0		DXCH	MPAC +5	
1025	REF 13	LAST 1037		7477	0 7106 1		TC	DMPSUB	
1026				7500	0 0006 1		EXTEND		
1027	REF 45	LAST 1037		7501	3 0123 1		DCA	VBUF	GET X2M1, SAVING -X2M3 IN VBUF +4.
1028	REF 465	LAST 1037		7502	52 155 1		DXCH	MPAC	
1029	REF 46	LAST 1037		7503	52 127 1		DXCH	VBUF +4	
1030	REF 14	LAST 1037		7504	0 7106 1		TC	DMPSUB	
1031	REF 70	LAST 1037		7505	3 4752 0		CAF	TWO	ADVANCE ADDRWD TO X3.
1032	REF 64	LAST 1037		7506	26 116 0		ADS	ADDRWD	
1033				7507	0 0006 1		EXTEND		
1034	REF 47	LAST 1037		7510	4 0123 0		DCS	VBUF	GET -X3M1, ADDING X2M1 TO MPAC +5 TO
1035	REF 466	LAST 1037		7511	52 155 1		DXCH	MPAC	COMPLETE THE Z COMPONENT OF THE ANSWER.
1036	REF 467	LAST 1037		7512	20 162 0		DAS	MPAC +5	
1037				7513	0 0006 1		EXTEND		
1038				7514	1 7516 0		BZF	+2	
1039	REF 3	LAST 1023		7515	0 7010 1		TC	OVERFLWZ	
1040	REF 15	LAST 1037		7516	0 7106 1		TC	DMPSUB	
1041	REF 48	LAST 1037		7517	52 125 0		DXCH	VBUF +2	MOVE X1M3 TO MPAC +3 SETTING UP FOR X3M2
1042	REF 468	LAST 1037		7520	52 160 1		DXCH	MPAC +3	AND ADD -X3M1 TO MPAC +3 TO COMPLETE THE
1043	REF 469	LAST 1037		7521	52 155 1		DXCH	MPAC	Y COMPONENT OF THE RESULT.
1044	REF 470	LAST 1037		7522	20 160 1		DAS	MPAC +3	
1045				7523	0 0006 1		EXTEND		
1046				7524	1 7526 0		BZF	+2	

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1047 REF 3 LAST 1023 7525 0 7013 1 TC OVERFLWY

1048 RFF 16 LAST 1037 7526 0 7106 1 TC DMPSUB

1049 REF 49 LAST 1037 7527 52 127 1 DXCH VBUF +4

1050 RFF 4 LAST 1024 7530 1 6777 1 TCF ENDVXV

GO ADD -X2M3 TO X3M2 TO COMPLETE THE X
COMPONENT (TAIL END OF DAD).

R1051 THE MPACVBUF SUBROUTINE SAVES THE VECTOR IN MPAC IN VBUF WITHOUT Clobbering MPAC.

1053 7531 0 0006 1 MPACVBUF EXTEND

CALLED BY MXV, VXM, AND UNIT.

1054 REF 471 LAST 1037 7532 3 0155 0 DCA MPAC

1055 REF 50 LAST 1038 7533 52 123 0 DXCH VBUF

1056 7534 0 0006 1 EXTEND

1057 REF 472 LAST 1038 7535 3 0160 0 DCA MPAC +3

1058 REF 51 LAST 1038 7536 52 125 0 DXCH VBUF +2

1059 7537 0 0006 1 EXTEND

1060 REF 473 LAST 1038 7540 3 0162 1 DCA MPAC +5

1061 REF 52 LAST 1038 7541 52 127 1 DXCH VBUF +4

1062 REF 270 LAST 1032 7542 0 0002 0 TC Q

RETURN TO CALLER.

R1063 DOUBLE PRECISION SIGN AGRFE ROUTINE. ARRIVE WITH INPUT IN A+L. OUTPUT IS IN A + L.

1065 REF 336 LAST 1031 7543 10 000 0 ALSIGNAG CCS A

TEST UPPER PART.

1066 REF 1 7544 1 7550 1 TCF UPPOS

IT IS POSITIVE

1067 REF 271 LAST 1038 7545 0 0002 0 TC Q

ZFRO

1068 REF 1 7546 1 7560 1 TCF JPNFG

NEGATIVE

1069 REF 272 LAST 1038 7547 0 0002 0 TC Q

ZERO

1070 REF 178 LAST 1032 7550 56 001 0 UPPOS XCH L

SAVE DECREMENTED UPPER PART.

1071 REF 10 LAST 921 7551 6 4736 1 AD HALF

1072 REF 11 LAST 1038 7552 6 4736 1 AD HALF

1073 REF 337 LAST 1038 7553 54 000 0 TS A

SKIPS ON OVERFLOW

1074 7554 1 7556 1 TCF +2

1075 REF 179 LAST 1038 7555 24 001 0 INCR L

RESTORE UPPER TO ROIGNAL VALUE

1076 REF 180 LAST 1038 7556 56 001 0 XCH L

SWAP A + L BACK.

1077 RFF 273 LAST 1038 7557 0 0002 0 TC Q

1078 REF 181 LAST 1038 7560 56 001 0 UPNEG XCH L

SAVE COMPLMENTED + DECREMENTED UPPER PT

1079 REF 5 LAST 921 7561 6 4735 1 AD NEGMAX

1080 REF 7 LAST 1009 7562 6 7746 0 AD NEGONE

1081 REF 338 LAST 1038 7563 54 000 0 TS A

1082 7564 1 7566 1 TCF +2

DONT INCREMENT IF NO OVERFLOW.

1083 REF 182 LAST 1038 7565 24 001 0 INCR L

1084 REF 183 LAST 1038 7566 56 001 0 XCH L

1085 7567 4 0000 0 COM

MAKE NEGATIVE AGAIN.

1086 RFF 274 LAST 1038 7570 0 0002 0 TC Q

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P1087 INTERPRETIVE INSTRUCTIONS WHOSE EXECUTION CONSISTS OF PRINCIPALLY CALLING SUBROUTINES.

1089	REF	17	LAST 1038	7571	0	7106	1	DMP1	TC	DMPSUB	DMP INSTRUCTION.
1090	REF	15	LAST 1035	7572	1	6060	0		TCF	DANZIG	
1091	REF	18	LAST 1039	7573	0	7106	1	DMPR	TC	DMPSUB	
1092	REF	1		7574	0	7136	1		TC	ROUND SUB +1	(C(A) = +0).
1093	REF	16	LAST 1039	7575	1	6060	0		TCF	DANZIG	
1094				7576	0	0006	1	DDV	EXTEND		
1095	REF	65	LAST 1037	7577	5	0116	1		INDEX	ADDRWD	MOVE DIVIDEND INTO BUF.
1096				7600	3	0001	0		DCA	0	
1097	REF	2	LAST 1006	7601	1	7606	1		TCF	BDDV +4	
1098				7602	0	0006	1	BDDV	EXTEND		MOVE DIVISOR INTO MPAC SAVING MPAC, THE
1099	REF	66	LAST 1039	7603	5	0116	1		INDEX	ADDRWD	DIVIDEND, IN BUF.
1100				7604	3	0001	0		DCA	0	
1101	REF	474	LAST 1038	7605	52	155	1		DXCH	MPAC	
1102	REF	74	LAST 1028	7606	52	131	0	+4	DXCH	BUF	
1103	REF	189	LAST 1033	7607	3	4755	1		CAF	ZERO	DIVIDE ROUTINES IN BANK 0.
1104	REF	20	LAST 1019	7610	54	004	1		TS	FBANK	
1105	REF	2	LAST 824	7611	1	2353	1		TCF	DDV/BDDV	
1106	REF	67	LAST 1039	7612	3	0116	1	SETPD	CA	ADDRWD	MUST SET TO WORK AREA, OR EBANK TROUBLE.
1107	REF	21	LAST 1016	7613	54	166	1		TS	PUSHLOC	
1108	REF	1		7614	1	6062	1		TCF	NOIBNKSW	NO FBANK SWITCH REQUIRED.
1109	REF	190	LAST 1039	7615	3	4755	1	TSLC	CAF	ZERO	SHIFTING ROUTINES LOCATED IN BANK 00.
1110	REF	21	LAST 1039	7616	54	004	1		TS	FBANK	
1111	REF	1		7617	1	2172	0		TCF	TSLC2	
1112	REF	7	LAST 998	7620	3	6073	0	GSHIFT	CAF	LOW7	USED AS MASK AT GENSHIFT. THIS PROCESSES
1113	REF	22	LAST 1039	7621	54	004	1		TS	FBANK	ANY SHIFT INSTRUCTION (EXCEPT TSLC) WITH
1114	REF	1		7622	1	2214	0		TCF	GENSHIFT	AN ADDRESS (ROUTINES IN BANK 0).

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P1115 THE FOLLOWING IS THE PROLOGUE TO V/SC. IF THE PRESENT MODE IS VECTOR, IT SAVES THE SCALAR AT X IN BUF
 R1117 AND CALLS THE V/SC ROUTINE IN BANK 0. IF THE PRESENT MODE IS SCALAR, IT MOVES THE VECTOR AT X INTO MPAC, SAVING
 R1119 THE SCALAR IN MPAC IN BUF BEFORE CALLING THE V/SC ROUTINE IN BANK 0.

1120	REF	26	LAST	1035	7623	10 163 1	V/SC	CCS	MODE	
1121	REF	1			7624	1 7635 1		TCF	DV/SC	MOVE VECTOR INTO MPAC.
1122	REF	2	LAST	1040	7625	1 7635 1		TCF	DV/SC	
1123					7626	0 0006 1	VV/SC	EXTEND		
1124	REF	68	LAST	1039	7627	5 0116 1		INDEX	ADDRWD	
1125					7630	3 0001 0		DCA	0	
1126	REF	75	LAST	1039	7631	52 131 0	V/SC1	DXCH	BUF	IN BOTH CASES, VECTOR IS NOW IN MPAC AND
1127	REF	191	LAST	1039	7632	3 4755 1		CAF	ZERO	SCALAR IN BUF.
1128	REF	23	LAST	1039	7633	54 004 1		TS	FBANK	
1129	REF	1			7634	1 2654 0		TCF	V/SC2	
1130					7635	0 0006 1	DV/SC	EXTEND		
1131	REF	69	LAST	1040	7636	5 0116 1		INDEX	ADDRWD	
1132					7637	3 0003 1		DCA	2	
1133	REF	475	LAST	1039	7640	52 160 1		DXCH	MPAC +3	
1134					7641	0 0006 1		EXTEND		
1135	REF	70	LAST	1040	7642	5 0116 1		INDEX	ADDRWD	
1136					7643	3 0005 1		DCA	4	
1137	REF	476	LAST	1040	7644	52 162 0		DXCH	MPAC +5	
1138	REF	107	LAST	1014	7645	4 4753 0		CS	ONE	CHANGE MODE TO VECTOR.
1139	REF	27	LAST	1040	7646	54 163 1		TS	MODE	
1140					7647	0 0006 1		EXTEND		
1141	REF	71	LAST	1040	7650	5 0116 1		INDEX	ADDRWD	
1142					7651	3 0001 0		DCA	0	
1143	REF	477	LAST	1040	7652	52 155 1		DXCH	MPAC	
1144	REF	1			7653	1 7631 0		TCF	V/SC1	FINISH PROLOGUE AT COMMON SECTION.

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P1145 SIGN AND COMPLEMENT INSTRUCTIONS.

1146	REF 72	LAST 1040	7654 50 116 1	SIGN	INDEX	ADDRWD	CALL COMP INSTRUCTION IF WORD AT X IS NEGATIVE NON-ZERO.
1147			7655 10 000 0		CCS	0	
1148	REF 17	LAST 1039	7656 1 6060 0		TCF	DANZ IG	
1149			7657 1 7661 0		TCF	+2	
1150	REF 2	LAST 1008	7660 1 7667 0		TCF	COMP	DO THE COMPLEMENT.
1151	REF 73	LAST 1041	7661 50 116 1	CCSL	INDEX	ADDRWD	
1152			7662 10 001 1		CCS	1	
1153	REF 18	LAST 1041	7663 1 6060 0		TCF	DANZ IG	
1154	REF 19	LAST 1041	7664 1 6060 0		TCF	DANZ IG	
1155	REF 3	LAST 1041	7665 1 7667 0		TCF	COMP	COMPLEMENT DP MPAC IN EVERY CASE.
1156	REF 20	LAST 1041	7666 1 6060 0		TCF	DANZ IG	
1157			7667 0 0006 1	COMP	EXTEND		
1158	REF 478	LAST 1040	7670 4 0155 1		DCS	MPAC	
1159	REF 479	LAST 1041	7671 52 155 1		DXCH	MPAC	
1160	REF 28	LAST 1040	7672 10 163 1		CCS	MODE	EITHER COMPLEMENT MPAC +3 OR THE REST OF THE VECTOR ACCUMULATOR.
1161	REF 1		7673 1 7704 1		TCF	DCOMP	
1162	REF 2	LAST 1041	7674 1 7704 1		TCF	DCOMP	
1163			7675 0 0006 1		EXTEND		VECTOR COMPLEMENT.
1164	REF 480	LAST 1041	7676 4 0160 1		DCS	MPAC +3	
1165	REF 481	LAST 1041	7677 52 160 1		DXCH	MPAC +3	
1166			7700 0 0006 1		EXTEND		
1167	REF 482	LAST 1041	7701 4 0162 0		DCS	MPAC +5	
1168	REF 483	LAST 1041	7702 52 162 0		DXCH	MPAC +5	
1169	REF 21	LAST 1041	7703 1 6060 0		TCF	DANZ IG	
1170	REF 484	LAST 1041	7704 4 0156 1	DCOMP	CS	MPAC +2	
1171	REF 485	LAST 1041	7705 54 156 1		TS	MPAC +2	
1172	REF 22	LAST 1041	7706 1 6060 0		TCF	DANZ IG	

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P1173 THE FOLLOWING SHORT SHIFT CODES REQUIRE NO ADDRESS WORD:

R1174	1.	SR1 TO SR4	SCALAR SHIFT RIGHT.
R1175	2.	SR1R TO SR4R	SCALAR SHIFT RIGHT AND ROUND.
R1176	3.	SL1 TO SL4	SCALAR SHIFT LEFT.
R1177	4.	SL1R TO SL4R	SCALAR SHIFT LEFT AND ROUND.
R1178	5.	VSR1 TO VSR8	VECTOR SHIFT RIGHT (ALWAYS ROUNDS).
R1179	6.	VSL1 TO VSL8	VECTOR SHIFT LEFT (NEVER ROUNDS).

R1180 THE FOLLOWING CODES REQUIRE AN ADDRESS WHICH MAY BE INDEXED:*

R1181	1.	SR	SCALAR SHIFT RIGHT.
R1182	2.	SRR	SCALAR SHIFT RIGHT AND ROUND.
R1183	3.	SL	SCALAR SHIFT LEFT.
R1184	4.	SLR	SCALAR SHIFT LEFT AND ROUND.
R1185	5.	VSR	VECTOR SHIFT RIGHT.
R1186	6.	VSL	VECTOR SHIFT LEFT.

R1187 * IF THE ADDRESS IS INDEXED, AND THE INDEX MODIFICATION RESULTS IN A NEGATIVE SHIFT COUNT, A SHIFT OF THE
 R1189 ABSOLUTE VALUE OF THE COUNT IS DONE IN THE OPPOSITE DIRECTION.

1190				00,2017			BANK	00	
1191	REF	1					COUNT*	\$/INTER	
1192	REF	21	LAST 1033	00,2017	3 6241 0	SHORT	CAF	SIX	SCALAR SHORT SHIFTS COME HERE. THE SHIFT
1193	REF	29	LAST 1013	00,2020	7 0020 1		MASK	CYR	COUNT-1 IS NOW IN BITS 2-3 OF CYR. THE
1194	REF	11	LAST 922	00,2021	54 021 0		TS	SR	ROUNDING BIT IS IN BIT1 AT THIS POINT.
1195	REF	30	LAST 1042	00,2022	10 020 1		CCS	CYR	SEE IF RIGHT OR LEFT SHIFT DESIRED.
1196	REF	1		00,2023	1 2101 1		TCF	TSSL	SHIFT LEFT.
1197				00,2024	00024 1	SRDDV	DFC	20	MPTEMP SETTING FOR SR BEFORE DDV.
1198	REF	12	LAST 1042	00,2025	50 021 1	TSSR	INDEX	SR	GET SHIFTING BIT.
1199	REF	65	LAST 910	00,2026	3 4736 1		CAF	BIT14	
1200	REF	14	LAST 1031	00,2027	54 135 1		TS	MPTEMP	
1201	REF	31	LAST 1042	00,2030	10 020 1		CCS	CYR	SEE IF A ROUND IS DESIRED.
1202	REF	1		00,2031	0 2050 0	RIGHTR	TC	MPACSRND	YES - SHIFT RIGHT AND ROUND.
1203	REF	4	LAST 1033	00,2032	1 6057 1		TCF	NEWMODE	SET MODE TO DP (C(A) = 0).
1204	REF	15	LAST 1042	00,2033	3 0135 0	MPACSHR	CA	MPTEMP	DO A TRIPLE PRECISION SHIFT RIGHT.
1205				00,2034	0 0006 1		EXTEND		
1206	REF	486	LAST 1041	00,2035	7 0156 1		MP	MPAC +2	
1207	REF	487	LAST 1042	00,2036	54 156 1	+3	TS	MPAC +2	(EXIT FROM SORT AND ABVAL).
1208	REF	16	LAST 1042	00,2037	3 0135 0		CA	MPTEMP	
1209				00,2040	0 0006 1		EXTEND		
1210	REF	488	LAST 1042	00,2041	7 0154 0		MP	MPAC	SHIFT MAJOR PART INTO A,L AND PLACE IN

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1211 REF 489 LAST 1042 00,2042 52 155 1
 1212 REF 17 LAST 1042 00,2043 3 0135 0
 1213 00,2044 0 0006 1
 1214 REF 184 LAST 1038 00,2045 7 0001 1
 1215 REF 490 LAST 1043 00,2046 20 156 1
 1216 REF 23 LAST 1041 00,2047 1 6060 0

DXCH MPAC
 CA MPTEMP
 EXTEND
 MP L
 DAS MPAC +1
 TCF DANZ IG

MPAC,+1.

ORIGINAL C(MPAC +1).
 GUARANTEED NO OVERFLOW.

R1217 MPAC SHIFT RIGHT AND ROUND SUBROUTINES.

1218 REF 491 LAST 1043 00,2050 3 0156 0
 1219 00,2051 0 0006 1
 1220 REF 18 LAST 1043 00,2052 7 0135 1
 1221 REF 492 LAST 1043 00,2053 56 155 0
 1222 00,2054 0 0006 1
 1223 REF 19 LAST 1043 00,2055 7 0135 1
 1224 REF 493 LAST 1043 00,2056 56 155 0
 1225 REF 185 LAST 1043 00,2057 6 0001 0

MPACSRND CA MPAC +2
 EXTEND
 MP MPTEMP
 XCH MPAC +1
 EXTEND
 MP MPTEMP
 XCH MPAC +1
 AD L

WE HAVE TO DO ALL THREE MULTIPLIES SINCE
 MPAC +1 AND MPAC +2 MIGHT HAVE SIGN
 DISAGREEMENT WITH A SHIFT RIGHT OF 1.

TRIAL MINOR PART.

1226 00,2060 6 0000 1
 1227 REF 494 LAST 1043 00,2061 54 156 1
 1228 00,2062 1 2064 0
 1229 REF 495 LAST 1043 00,2063 26 155 1

VSHR2 DOUBLE
 TS MPAC +2
 TCF +2
 ADS MPAC +1

(FINISH VECTOR COMPONENT SHIFT RIGHT AND ROUND.

GUARANTEED NO OVERFLOW.

1230 REF 192 LAST 1040 00,2064 3 4755 1
 1231 REF 496 LAST 1043 00,2065 54 156 1
 1232 REF 497 LAST 1043 00,2066 56 154 1
 1233 00,2067 0 0006 1
 1234 REF 20 LAST 1043 00,2070 7 0135 1
 1235 REF 498 LAST 1043 00,2071 20 155 1
 1236 REF 275 LAST 1038 00,2072 0 0002 0

CAF ZERO
 TS MPAC +2
 XCH MPAC
 EXTEND
 MP MPTEMP
 DAS MPAC
 TC Q

SETTING TO ZERO SO FOLLOWING DAS WORKS.

AGAIN NO OVERFLOW.

1237 REF 21 LAST 1043 00,2073 3 0135 0
 1238 00,2074 0 0006 1
 1239 REF 499 LAST 1043 00,2075 7 0155 1
 1240 REF 500 LAST 1043 00,2076 54 155 1
 1241 REF 186 LAST 1043 00,2077 56 001 0
 1242 REF 1 00,2100 1 2060 1

VSHRRND CA MPTEMP
 EXTEND
 MP MPAC +1
 TS MPAC +1
 XCH L
 TCF VSHR2

ENTRY TO SHIFT RIGHT AND ROUND MPAC WHEN MPAC CONTAINS A VECTOR COMPONENT.

GO ADD ONE IF NECESSARY AND FINISH.

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P1243 ROUTINE FOR SHORT SCALAR SHIFT LEFT (AND MAYBE ROUND).

1244	REF	13	LAST	1042	00,2101	3 0021 1	TSSL	CA	SR	GET SHIFT COUNT FOR SR.
1245	REF	22	LAST	1043	00,2102	54 135 1	+1	TS	MPTEMP	
1246					00,2103	0 0006 1	+2	EXTEND		ENTRY HERE FROM SL FOR SCALARS.
1247	REF	501	LAST	1043	00,2104	3 0156 0		DCA	MPAC +1	SHIFTING LEFT ONE PLACE AT A TIME IS
1248	REF	502	LAST	1044	00,2105	20 156 1		DAS	MPAC +1	FASTER THAN DOING THE WHOLE SHIFT WITH
1249	REF	503	LAST	1044	00,2106	6 0154 1		AD	MPAC	MULTIPLIES ASSUMING THAT FREQUENCY OF
1250	REF	504	LAST	1044	00,2107	6 0154 1		AD	MPAC	SHIFT COUNTS GOES DOWN RAPIDLY AS A
1251	REF	505	LAST	1044	00,2110	54 154 0		TS	MPAC	FUNCTION OF THEIR MAGNITUDE.
1252					00,2111	1 2113 1		TCF	+2	
1253	RFF	4	LAST	1028	00,2112	54 121 1		TS	DVFIND	OVERFLOW. (LEAVES OVERFLOW-CORRECTED
A1254										RESULT ANYWAY).
1255	REF	23	LAST	1044	00,2113	10 135 1		CCS	MPTEMP	LOOP ON DECREMENTED SHIFT COUNT.
1256	REF	2	LAST	1042	00,2114	1 2102 1		TCF	TSSL +1	
1257	RFF	32	LAST	1042	00,2115	10 020 1		CCS	CYR	SEE IF ROUND WANTED.
1258	REF	2	LAST	1039	00,2116	0 7135 1	ROUND	TC	ROUND SUB	YES - ROUND AND EXIT.
1259	REF	24	LAST	1043	00,2117	1 6060 0		TCF	DANZIG	SL LEAVES A ZERO IN CYR FOR NO ROUND.
1260	REF	25	LAST	1044	00,2120	1 6060 0		TCF	DANZIG	NO - EXIT IMMEDIATELY

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P1261 VECTOR SHIFTING ROUTINES.

1262	REF	2	LAST	247	00,2121	3 4757 0	SHORTV	CAF	LOW3	SAVE 3 BIT SHIFT COUNT - 1 WITHOUT
1263	REF	33	LAST	1044	00,2122	7 0020 1		MASK	CYR	EDITING CYR.
1264	REF	24	LAST	1044	00,2123	54 135 1		TS	MPTEMP	
1265	REF	34	LAST	1045	00,2124	10 020 1		CCS	CYR	SEE IF LEFT OR RIGHT SHIFT.
1266	REF	1			00,2125	1 2145 1		TCF	VSSL	VECTOR SHIFT LEFT.
1267					00,2126	00176 1	OCT176	OCT	176	USED IN PROCESSED SHIFTS WITH - COUNT.
1268	REF	25	LAST	1045	00,2127	50 135 0	VSSR	INDEX	MPTEMP	(ENTRY FROM SR). PICK UP SHIFTING BIT.
1269	REF	66	LAST	1042	00,2130	3 4736 1		CAF	BIT14	MPTEMP CONTAINS THE SHIFT COUNT - 1.
1270	REF	26	LAST	1045	00,2131	54 135 1		TS	MPTEMP	
1271	REF	1			00,2132	0 2073 1		TC	VSHRRND	SHIFT X COMPONENT.
1272	REF	506	LAST	1044	00,2133	52 155 1		DXCH	MPAC	SWAP X AND Y COMPONENTS.
1273	REF	507	LAST	1045	00,2134	52 160 1		DXCH	MPAC +3	
1274	REF	508	LAST	1045	00,2135	52 155 1		DXCH	MPAC	
1275	REF	2	LAST	1045	00,2136	0 2073 1		TC	VSHRRND	SHIFT Y COMPONENT.
1276	REF	509	LAST	1045	00,2137	52 155 1		DXCH	MPAC	SWAP Y AND Z COMPONENTS.
1277	REF	510	LAST	1045	00,2140	52 162 0		DXCH	MPAC +5	
1278	REF	511	LAST	1045	00,2141	52 155 1		DXCH	MPAC	
1279	REF	3	LAST	1045	00,2142	0 2073 1		TC	VSHRRND	SHIFT Z COMPONENT.
1280	REF	1			00,2143	1 7417 0		TCF	VROTATEX	RESTORE COMPONENTS TO PROPER PLACES.

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P1281 VECTOR SHIFT LEFT - DONE ONE PLACE AT A TIME.

1282	REF 27	LAST 1045	00,2144	54 135 1	-1	TS	MPTFMP	SHIFTING LOOP.
1283			00,2145	0 0006 1	VSSL	EXTEND		
1284	REF 512	LAST 1045	00,2146	3 0155 0		DCA	MPAC	
1285	REF 513	LAST 1046	00,2147	20 155 1		DAS	MPAC	
1286			00,2150	0 0006 1		EXTEND		
1287			00,2151	1 2153 0		BZF	+2	
1288	REF 3	LAST 1028	00,2152	0 7016 1		TC	OVERFLOW	
1289			00,2153	0 0006 1		EXTEND		
1290	REF 514	LAST 1046	00,2154	3 0160 0		DCA	MPAC +3	
1291	REF 515	LAST 1046	00,2155	20 160 1		DAS	MPAC +3	
1292			00,2156	0 0006 1		EXTEND		
1293			00,2157	1 2161 1		BZF	+2	
1294	REF 4	LAST 1038	00,2160	0 7013 1		TC	OVERFLWY	
1295			00,2161	0 0006 1		EXTEND		
1296	REF 516	LAST 1046	00,2162	3 0162 1		DCA	MPAC +5	
1297	REF 517	LAST 1046	00,2163	20 162 0		DAS	MPAC +5	
1298			00,2164	0 0006 1		EXTEND		
1299			00,2165	1 2167 1		BZF	+2	
1300	REF 4	LAST 1037	00,2166	0 7010 1		TC	OVERFLWZ	
1301	REF 28	LAST 1046	00,2167	10 135 1		CCS	MPTFMP	LOOP ON DECREMENTED SHIFT COUNTER.
1302	REF 2	LAST 1045	00,2170	1 2144 0		TCF	VSSL -1	
1303	REF 26	LAST 1044	00,2171	1 6060 0		TCF	DANZIG	EXIT.

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P1304 TSLC - TRIPLE SHIFT LEFT AND COUNT. SHIFTS MPAC LEFT UNTIL GREATER THAN .5 IN MAGNITUDE, LEAVING
R1306 THE COMPLEMENT OF THE NUMBER OF SHIFTS REQUIRED IN X.

1307	REF	29	LAST	1046	00,2172	54 135 1	TSLC2	TS	MPTEMP	START BY ZEROING SHIFT COUNT (IN A NOW).
1308	REF	5	LAST	1031	00,2173	0 6722 0		TC	BRANCH	EXIT WITH NO SHIFTING IF ARGUMENT ZERO.
1309					00,2174	1 2176 1		TCF	+2	
1310	REF	1			00,2175	1 2212 0		TCF	ENDTSLC	STORES ZERO SHIFT COUNT IN THIS CASE.
1311	REF	12	LAST	853	00,2176	0 7256 1		TC	TPAGREE	MAY CAUSE UPSHIFT OF ONE EXTRA PLACE.
1312	REF	518	LAST	1046	00,2177	3 0154 1		CA	MPAC	BEGIN NORMALIZATION LOOP.
1313	REF	1			00,2200	1 2207 1		TCF	TSLCTEST	
1314	REF	30	LAST	1047	00,2201	24 135 0	TSLCLOOP	INCR	MPTEMP	INCREMENT SHIFT COUNTER.
1315					00,2202	0 0006 1		EXTEND		
1316	REF	519	LAST	1047	00,2203	3 0156 0		DCA	MPAC +1	
1317	REF	520	LAST	1047	00,2204	20 156 1		DAS	MPAC +1	
1318	REF	521	LAST	1047	00,2205	6 0154 1		AD	MPAC	
1319	REF	522	LAST	1047	00,2206	26 154 0		ADS	MPAC	
1320					00,2207	6 0000 1	TSLCTEST	DOUBLE		SEE IF (ANOTHER) SHIFT IS REQUIRED.
1321					00,2210	54 000 0		OVSF		
1322	REF	1			00,2211	1 2201 1		TCF	TSLCLOOP	YES - INCREMENT COUNT AND SHIFT AGAIN.
1323	REF	31	LAST	1047	00,2212	4 0135 1	ENDTSLC	CS	MPTEMP	
1324	REF	1			00,2213	1 6622 0		TCF	STORE1	STORE SHIFT COUNT AND RETURN TO DANZIG.

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P1325 THE FOLLOWING ROUTINES PROCESSES THE GENERAL SHIFT INSTRUCTIONS SR, SRR, SL, AND SLR.
 R1327 THE GIVEN ADDRESS IS DECODED AS FOLLOWS:

R1328 BITS 1-7 SHIFT COUNT (SUBADDRESS) LESS THAN 125 DECIMAL.
 R1329 BIT 8 PSEUDO SIGN BIT (DETECTS CHANGE IN SIGN IN INDEXED SHIFTS).
 R1331 BIT 9 0 FOR LEFT SHIFT, AND 1 FOR RIGHT SHIFT.
 R1332 BIT 10 1 FOR TERMINAL ROUND ON SCALAR SHIFTS, 0 OTHERWISE.
 R1333 BITS 11-13 0.
 R1334 BIT 14 1.
 R1335 BIT 15 0.

R1336 THE ABOVE ENCODING IS DONE BY THE YUL SYSTEM.

1337	REF	74	LAST	1041	00,2214	7 0116 0	GENSHIFT	MASK	ADDRWD	GET SHIFT COUNT, TESTING FOR ZERO.
1338	REF	339	LAST	1038	00,2215	10 000 0		CCS	A	(ARRIVES WITH C(A) = LOW7).
1339	REF	1			00,2216	1 2224 0		TCF	GENSHFT2	IF NON-ZERO, PROCEED WITH DECREMENTED CT
1340	REF	43	LAST	910	00,2217	3 4742 1		CAF	BIT10	ZERO SHIFT COUNT. NO SHIFTS NEEDED BUT
1341	REF	75	LAST	1048	00,2220	7 0116 0		MASK	ADDRWD	WE MIGHT HAVE TO ROUND MPAC ON SLR AND
1342	REF	340	LAST	1048	00,2221	10 000 0		CCS	A	SRR (SCALAR ONLY).
1343	REF	3	LAST	1044	00,2222	0 7135 1		TC	ROUND SUB	
1344	REF	27	LAST	1046	00,2223	1 6060 0		TCF	DANZIG	
1345	REF	32	LAST	1047	00,2224	54 135 1	GENSHFT2	TS	MPTMP	DECREMENTED SHIFT COUNT TO MPTMP.
1346	REF	35	LAST	995	00,2225	3 4744 1		CAF	BIT8	TEST MEANING OF LOW SEVEN BIT COUNT IN
1347					00,2226	0 0006 1		EXTEND		MPTMP NOW.
1348	REF	76	LAST	1048	00,2227	7 0116 0		MP	ADDRWD	
1349	REF	1			00,2230	7 6244 1		MASK	LOW2	JUMPS ON SHIFT DIRECTION (BIT8) AND
1350	REF	341	LAST	1048	00,2231	50 000 1		INDEX	A	
1351					00,2232	1 2233 0		TCF	+1	ORIGINAL SHIFT DIRECTION (BIT 9).
1352	REF	1			00,2233	1 2332 0		TCF	RIGHT-	NEGATIVE SHIFT COUNT FOR SL OR SLR.
1353	REF	1			00,2234	1 2342 1		TCF	LEFT	SL OR SLR.
1354	REF	1			00,2235	1 2336 1		TCF	LEFT-	NEGATIVE SHIFT COUNT WITH SR OR SRR.

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P1355 GENERAL SHIFT RIGHT.

1356	REF	29	LAST	1041	00,2236	10 163 1	RIGHT	CCS	MODE	SEE IF VECTOR OR SCALAR.
1357	REF	1			00,2237	1 2277 0		TCF	GENSCR	
1358	REF	2	LAST	1049	00,2240	1 2277 0		TCF	GENSCR	
1359	RFF	33	LAST	1048	00,2241	3 0135 0		CA	MPTEMP	SEE IF SHIFT COUNT LESS THAN 14D.
1360	REF	1			00,2242	6 3733 0	VRIGHT2	AD	NEG12	
1361					00,2243	0 0006 1		EXTEND		
1362	REF	1			00,2244	6 2127 1		BZMF	VSSR	IF SO, BRANCH AND SHIFT IMMEDIATELY.
1363	REF	8	LAST	1038	00,2245	6 7746 0		AD	NEGONE	IF NOT, REDUCE MPTEMP BY A TOTAL OF 14,
1364	REF	34	LAST	1049	00,2246	54 135 1		TS	MPTEMP	AND DO A SHIFT RIGHT AND ROUND BY 14.
1365	REF	193	LAST	1043	00,2247	3 4755 1		CAF	ZERO	THE ROUND AT THIS STAGE MAY INTRODUCE A
1366	REF	187	LAST	1043	00,2250	54 001 1		TS	L	ONE BIT ERROR IN A SHIFT RIGHT 15D.
1367	REF	523	LAST	1047	00,2251	56 154 1		XCH	MPAC	
1368	REF	524	LAST	1049	00,2252	56 155 0		XCH	MPAC +1	
1369	REF	1			00,2253	0 2272 1		TC	SETROUND	X COMPONENT NOW SHIFTED, SO MAKE UP THE
1370	RFF	525	LAST	1049	00,2254	20 155 1		DAS	MPAC	ROUNDING QUANTITY (0 IN A AND 0 OR +-1
A1371										IN L).
1372	REF	526	LAST	1049	00,2255	56 157 1		XCH	MPAC +3	REPEAT THE ABOVE PROCESS FOR Y AND Z.
1373	REF	527	LAST	1049	00,2256	56 160 0		XCH	MPAC +4	
1374	REF	2	LAST	1049	00,2257	0 2272 1		TC	SETROUND	
1375	REF	528	LAST	1049	00,2260	20 160 1		DAS	MPAC +3	NO OVERFLOW ON THESE ADDS.
1376	REF	529	LAST	1049	00,2261	56 161 1		XCH	MPAC +5	
1377	REF	530	LAST	1049	00,2262	56 162 1		XCH	MPAC +6	
1378	REF	3	LAST	1049	00,2263	0 2272 1		TC	SETROUND	
1379	REF	531	LAST	1049	00,2264	20 162 0		DAS	MPAC +5	
1380	REF	35	LAST	1049	00,2265	10 135 1		CCS	MPTEMP	SEE IF DONE, DOING FINAL DECREMENT.
1381	REF	36	LAST	1049	00,2266	54 135 1		TS	MPTEMP	
1382	REF	1			00,2267	1 2242 0		TCF	VRIGHT2	
1383					00,2270	04604 1	BIASLO	DEC	.2974 B-1	SQRT CONSTANT
1384	REF	28	LAST	1048	00,2271	1 6060 0		TCF	DANZIG	
1385					00,2272	6 0000 1	SETROUND	DOUBLE		MAKES UP ROUNDING QUANTITY FROM ARRIVING
1386	REF	532	LAST	1049	00,2273	54 156 1		TS	MPAC +2	C(A). L IS ZERO INITIALLY.
1387	REF	194	LAST	1049	00,2274	3 4755 1		CAF	ZERO	
1388	REF	188	LAST	1049	00,2275	56 001 0		XCH	L	
1389	REF	276	LAST	1043	00,2276	0 0002 0		TC	Q	RETURN AND DO THE DAS, RESETTNG L TO 0.

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P1390 PROCESS SR AND SRR FOR SCALARS.

1391	REF	37	LAST 1049	00,2277	3 0135 0	GENSCR	CA	MPTEMP	SEE IF THE ORIGINAL SHIFT COUNT WAS LESS
1392	REF	2	LAST 1049	00,2300	6 3733 0	+1	AD	NFG12	THAN 140.
1393				00,2301	0 0006 1			EXTEND	
1394	REF	1		00,2302	6 2322 0		BZMF	DOSSHFT	DO THE SHIFT IMMEDIATELY IF SO.
1395	REF	9	LAST 1049	00,2303	6 7746 0	+4	AD	NFGONE	IF NOT, DECREMENT SHIFT COUNT BY 140 AND
1396	REF	38	LAST 1050	00,2304	54 135 1		TS	MPTEMP	SHIFT MPAC RIGHT 14 PLACES.
1397	REF	195	LAST 1049	00,2305	3 4755 1		CAF	ZERO	
1398	REF	533	LAST 1049	00,2306	56 154 1		XCH	MPAC	
1399	REF	534	LAST 1050	00,2307	56 155 0		XCH	MPAC +1	
1400	REF	535	LAST 1050	00,2310	54 156 1		TS	MPAC +2	
1401	REF	39	LAST 1050	00,2311	10 135 1		CCS	MPTEMP	SEE IF FINISHED, DO FINAL DECREMENT.
1402	REF	40	LAST 1050	00,2312	54 135 1		TS	MPTEMP	
1403	REF	3	LAST 1049	00,2313	0 2300 0		TC	GENSCR +1	
1404				00,2314	22650 1	SLOPEHI	DEC	.5884	SQRT CONSTANT.
1405	REF	44	LAST 1048	00,2315	3 4742 1		CAF	BIT10	FINISHED WITH SHIFT. SEE IF ROUND
1406	REF	77	LAST 1048	00,2316	7 0116 0		MASK	ADDRWD	WANTED.
1407	REF	342	LAST 1048	00,2317	10 000 0		CCS	A	
1408	REF	4	LAST 1048	00,2320	0 7135 1		TC	ROUND SUB	
1409	REF	29	LAST 1049	00,2321	1 6060 0		TCF	DANZIG	DO SO AND/OR EXIT.
1410	REF	41	LAST 1050	00,2322	50 135 0	DOSSHFT	INDEX	MPTEMP	PICK UP SHIFTING BIT.
1411	REF	67	LAST 1045	00,2323	3 4736 1		CAF	BIT14	
1412	REF	42	LAST 1050	00,2324	54 135 1		TS	MPTEMP	
1413	REF	45	LAST 1050	00,2325	3 4742 1		CAF	BIT10	SEE IF TERMINAL ROUND DESIRED.
1414	REF	78	LAST 1050	00,2326	7 0116 0		MASK	ADDRWD	
1415	REF	343	LAST 1050	00,2327	10 000 0		CCS	A	
1416	REF	1		00,2330	1 2031 0		TCF	RIGHTR	YES.
1417	REF	1		00,2331	1 2033 1		TCF	MPACSHR	JUST SHIFT RIGHT.

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P1418 PROCESS THE RIGHT- (SL(R) WITH A NEGATIVE COUNT), LEFT-, AND LEFT OPTIONS.

1420	REF	43	LAST 1050	00,2332	4 0135 1	RIGHT-	CS	MPTEMP	GET ABSOLUTE VALUE - 1 OF SHIFT COUNT
1421	REF	1		00,2333	6 2126 0		AD	0CT176	UNDERSTANDING THAT BIT8 (PSEUDO-SIGN)
1422	REF	44	LAST 1051	00,2334	54 135 1		TS	MPTEMP	WAS 1 INITIALLY.
1423	REF	1		00,2335	1 2236 0		TCF	RIGHT	DO NORMAL SHIFT RIGHT.
1424	RFF	2	LAST 1051	00,2336	4 2126 1	LEFT-	CS	0CT176	SAME PROLOGUE TO LEFT FOR INDEXED RIGHT
1425	REF	45	LAST 1051	00,2337	6 0135 0		AD	MPTEMP	SHIFTS WHOSE NET SHIFT COUNT IS NEGATIVE
1426				00,2340	4 0000 0		COM		
1427	REF	46	LAST 1051	00,2341	54 135 1		TS	MPTFMP	
1428	REF	30	LAST 1049	00,2342	10 163 1	LEFT	CCS	MODE	SINCE LEFT SHIFTING IS SOME ONE PLACE AT
1429	REF	1		00,2343	1 2346 0		TCF	GENSCL	A TIME, NO COMPARISON WITH 14 NEED BE
1430	REF	2	LAST 1051	00,2344	1 2346 0		TCF	GENSCL	DONE. FOR SCALARS, SEE IF TERMINAL ROUND
1431	RFF	3	LAST 1046	00,2345	1 2145 1		TCF	VSSL	DESIRED. FOR VECTORS, SHIFT IMMEDIATELY.
1432	REF	79	LAST 1050	00,2346	4 0116 0	GENSCL	CS	ADDRWD	PUT ROUNDING BIT (BIT 10 OF ADDRWD) INTO
1433				00,2347	0 0006 1		EXTEND		BIT 15 OF CYR WHERE THE ROUNDING BIT OF
1434	REF	44	LAST 899	00,2350	7 4746 1		MP	BIT6	A SHORT SHIFT LEFT WOULD BE
1435	REF	35	LAST 1045	00,2351	54 020 1		TS	CYR	
1436	REF	3	LAST 1044	00,2352	1 2103 0		TCF	TSSL +2	DO THE SHIFT.

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P1437 SCALAR DIVISION INSTRUCTIONS, DDV AND BDDV, ARE EXECUTED HERE. AT THIS POINT, THE DIVIDEND IS IN MPAC
R1439 AND THE DIVISOR IN BUF.

1440	REF 108	LAST 1040	00,2353	4 4753 0	DDV/BDDV	CS	ONE	INITIALIZATION.
1441	REF 1		00,2354	54 136 1		TS	DVSIGN	+1 FOR POSITIVE QUOTIENT - -0 FOR NEG.
1442	REF 1		00,2355	54 137 0		TS	DVNORMCT	DIVIDEND NORMALIZATION COUNT.
1443	REF 1		00,2356	54 140 0		TS	MAXDVSW	NEAR-ONE DIVIDE FLAG.
1444	REF 76	LAST 1040	00,2357	10 130 1		CCS	BUF	FORCE BUF POSITIVE WITH THE MAJOR PART
1445	REF 1		00,2360	1 2516 0		TCF	BUFPOS	NON-ZERO.
1446			00,2361	1 2363 1		TCF	+2	
1447	REF 1		00,2362	1 2531 0		TCF	BUFNEG	
1448	REF 536	LAST 1050	00,2363	54 156 1	BUFZERO	TS	MPAC +2	ZERO THIS.
1449	REF 13	LAST 1047	00,2364	0 7256 1		TC	TPAGREE	FORCE SIGN AGREEMENT BEFORE OVERFLOW
1450	REF 537	LAST 1052	00,2365	10 154 0		CCS	MPAC	TEST TO SEE IF MPAC NON-ZERO. (TOO BIG)
1451	REF 1		00,2366	1 2414 0		TCF	OVF+	MAJOR PART OF DIVIDEND IS POSITIVE NON-0
1452			00,2367	1 2371 1		TCF	+2	
1453	REF 2	LAST 1052	00,2370	1 2413 1		TCF	OVF+ -1	MAJOR PART OF DIVIDEND IS NEG. NON-ZERO
1454	REF 77	LAST 1052	00,2371	56 131 1		XCH	BUF +1	SHIFT DIVIDEND AND DIVISOR LEFT 14.
1455	REF 78	LAST 1052	00,2372	56 130 0		XCH	BUF	
1456	REF 538	LAST 1052	00,2373	56 155 0		XCH	MPAC +1	
1457	REF 539	LAST 1052	00,2374	56 154 1		XCH	MPAC	
1458	REF 79	LAST 1052	00,2375	10 130 1		CCS	BUF	TRY AGAIN ON FORMER MINOR PART.
1459	REF 1		00,2376	1 2422 0		TCF	BUF+	
1460			00,2377	1 2401 1		TCF	+2	OVERFLOW ON ZERO DIVISOR.
1461	REF 1		00,2400	1 2416 1		TCF	BUF-	
1462	REF 540	LAST 1052	00,2401	4 0154 0		CS	MPAC	SIGN OF MPAC DETERMINES SIGN OF RESULT.
1463			00,2402	0 0006 1	SGNDVOVF	EXTEND		
1464			00,2403	6 2405 1		BZMF	+2	
1465	REF 2	LAST 1052	00,2404	24 136 0		INCR	DVSIGN	NEGMAX IN MPAC PERHAPS.
1466	REF 23	LAST 1031	00,2405	3 4733 1	DVOVF	CAF	POSMAX	ON DIVISION OVERFLOW OF ANY SORT, SET
1467	REF 541	LAST 1052	00,2406	54 154 0		TS	MPAC	SET OP MPAC TO +-POSMAX.
1468	REF 1		00,2407	0 2630 0		TC	FINALDV +3	
1469	REF 109	LAST 1052	00,2410	3 4753 1		CAF	ONE	SET OVERFLOW INDICATOR AND EXIT.
1470	REF 5	LAST 1044	00,2411	54 121 1		TS	OVFIND	
1471	REF 30	LAST 1050	00,2412	0 6060 1		TC	DANZIG	
1472	REF 3	LAST 1052	00,2413	24 136 0	-1	INCR	DVSIGN	
1473	REF 80	LAST 1052	00,2414	4 0131 0	OVF+	CS	BUF +1	LOAD LOWER ORDER PART OF DIVISOR.
1474	REF 1		00,2415	1 2402 1		TCF	SGNDVOVF	GET SIGN OF RESULT.
1475			00,2416	0 0006 1	BUF-	EXTEND		IF BUF IS NEGATIVE, COMPLEMENT IT AND
1476	REF 81	LAST 1052	00,2417	4 0131 0		DCS	BUF	MAINTAIN DVSIGN FOR FINAL QUOTIENT SIGN.
1477	REF 82	LAST 1052	00,2420	52 131 0		DXCH	BUF	
1478	REF 4	LAST 1052	00,2421	24 136 0		INCR	DVSIGN	NOW -0.

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1479	REF 542	LAST 1052	00,2422	10 154 0	BUF+	CCS	MPAC	FORCE MPAC POSITIVE, CHECKING FOR ZERO
1480	REF 1		00,2423	1 2437 1		TCF	MPAC+	DIVIDEND IN THE PROCESS.
1481			00,2424	1 2426 1		TCF	+2	
1482	REF 1		00,2425	1 2433 0		TCF	MPAC-	
1483	REF 543	LAST 1053	00,2426	10 155 1		CCS	MPAC +1	
1484	REF 2	LAST 1053	00,2427	1 2437 1		TCF	MPAC+	
1485	REF 31	LAST 1052	00,2430	1 6060 0		TCF	DANZIG	EXIT IMMEDIATELY ON ZERO DIVIDEND.
1486	REF 2	LAST 1053	00,2431	1 2433 0		TCF	MPAC-	
1487	REF 32	LAST 1053	00,2432	1 6060 0		TCF	DANZIG	
1488			00,2433	0 0006 1	MPAC-	EXTEND		FORCE MPAC POSITIVE AS BUF IN BUF-.
1489	REF 544	LAST 1053	00,2434	4 0155 1		DCS	MPAC	
1490	REF 545	LAST 1053	00,2435	52 155 1		DXCH	MPAC	
1491	REF 5	LAST 1052	00,2436	24 136 0		INCR	DVSIGN	NOW +1 OR -0.

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1492	REF 546	LAST 1053	00,2437	4 0154	0	MPAC+	CS	MPAC	CHECK FOR DIVISION OVERFLOW. IF THE MAJOR PART OF THE DIVIDEND IS LESS THAN THE MAJOR PART OF THE DIVISOR BY AT LEAST TWO, WE CAN PROCEED IMMEDIATELY WITHOUT NORMALIZATION PRODUCING A DVMAX. USED IN SQRTSUB.			
1493	REF 10	LAST 1050	00,2440	6 7746	0	AD	VEGONE					
1494	REF 83	LAST 1052	00,2441	6 0130	0	AD	BUF					
1495	REF 344	LAST 1050	00,2442	10 000	0	CCS	A					
1496	REF 1		00,2443	1 2505	1	TCF	DVNORM					
1497			00,2444	60001	0	-1/2+2	OCT	60001				
1498			00,2445	1 2446	1		TCF	+1	IF THE ABOVE DOES NOT HOLD, FORCE SIGN AGREEMENT IN NUMERATOR AND DENOMINATOR TO FACILITATE OVERFLOW AND NEAR-ONE CHECKING.			
1499	REF 12	LAST 1038	00,2446	3 4736	1	CAF	HALF					
1500			00,2447	6 0000	1	DOUBLE						
1501	REF 547	LAST 1054	00,2450	6 0155	0	AD	MPAC +1					
1502	REF 548	LAST 1054	00,2451	54 155	1	TS	MPAC +1					
1503	REF 196	LAST 1050	00,2452	3 4755	1	CAF	ZERO					
1504	REF 24	LAST 1052	00,2453	6 4733	1	AD	PCSMAX					
1505	REF 549	LAST 1054	00,2454	26 154	0	ADS	MPAC					
1506	REF 13	LAST 1054	00,2455	3 4736	1		CAF	HALF	SAME FOR BUF.			
1507			00,2456	6 0000	1	DOUBLE						
1508	REF 84	LAST 1054	00,2457	6 0131	1	AD	BUF +1					
1509	REF 85	LAST 1054	00,2460	54 131	0	TS	BUF +1					
1510	REF 197	LAST 1054	00,2461	3 4755	1	CAF	ZERO					
1511	REF 25	LAST 1054	00,2462	6 4733	1	AD	POSMAX					
1512	REF 86	LAST 1054	00,2463	26 130	1	ADS	BUF					
1513	REF 550	LAST 1054	00,2464	4 0154	0		CS	MPAC	CHECK MAGNITUDE OF SIGN-CORRECTED OPERANDS.			
1514	REF 87	LAST 1054	00,2465	6 0130	0	AD	BUF					
1515	REF 345	LAST 1054	00,2466	10 000	0	CCS	A					
1516	REF 2	LAST 1054	00,2467	1 2505	1	TCF	DVNORM	DIVIDE OK - WILL NOT BECOME MAXDV CASE.				
1517	REF 16	LAST 1034	00,2470	00133	0	LBUF2	ADRES					
1518	REF 1		00,2471	1 2405	0		TCF	DVOVF	DIVISOR NOT LESS THAN DIVIDEND - OVF.			
1519	REF 2	LAST 1052	00,2472	54 140	0		TS	MAXDVSW	IF THE MAJOR PARTS OF THE DIVIDEND AND DIVISOR ARE EQUAL, A SPECIAL APPROXIMATION IS USED (PROVIDED THE DIVISION IS POSSIBLE, OF COURSE).			
1520	REF 551	LAST 1054	00,2473	4 0155	1	CS	MPAC +1					
1521	REF 88	LAST 1054	00,2474	6 0131	1	AD	BUF +1					
1522			00,2475	0 0006	1	EXTEND						
1523	REF 2	LAST 1054	00,2476	6 2405	1	BZMF	DVOVF					
1524	REF 3	LAST 1054	00,2477	1 2505	1	TCF	DVNORM	IF NO OVERFLOW.				

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1525				00,2500	0 0006 1	BUFNORM	EXTEND		ADD -1 TO AUGMENT SHIFT COUNT AND SHIFT
1526	REF	2	LAST	1052	00,2501	24 137 1	AUG	DVNORMCT	LEFT ONE PLACE.
1527				00,2502	0 0006 1		EXTEND		
1528	REF	89	LAST	1054	00,2503	3 0131 1	DCA	BUF	
1529	REF	90	LAST	1055	00,2504	20 131 0	DAS	BUF	
1530	REF	91	LAST	1055	00,2505	3 0130 0	DVNORM	CA	BUF
1531				00,2506	6 0000 1		DOUBLE		SEE IF DIVISOR NORMALIZED YET.
1532				00,2507	54 000 0		OVSF		
1533	REF	1		00,2510	1 2500 1		TCF	BUFNORM	NO - SHIFT LEFT ONE AND TRY AGAIN.
1534	REF	552	LAST	1054	00,2511	52 155 1	DXCH	MPAC	CALL DIVIDEND NORMALIZATION SEQUENCE
1535	REF	3	LAST	1055	00,2512	50 137 1	INDEX	DVNORMCT	PRIOR TO DOING THE DIVIDE.
1536	REF	1		00,2513	0 2565 0		TC	MAXTEST	
1537	REF	553	LAST	1055	00,2514	54 156 1	TS	MPAC +2	RETURNS WITH DIVISION DONE AND C(A) = 0.
1538	REF	33	LAST	1053	00,2515	1 6060 0	TCF	DANZIG	
1539	REF	346	LAST	1054	00,2516	10 000 0	BUFPDS	CCS	A
1540	REF	2	LAST	1052	00,2517	1 2422 0	TCF	BUF+	TO BUF+ IF BUF IS GREATER THAN +1.
1541	REF	92	LAST	1055	00,2520	4 0131 0	CS	BUF +1	IF BUF IS +1, FORCING SIGN AGREEMENT
1542				00,2521	0 0006 1		EXTEND		MAY CAUSE BUF TO BECOME ZERO.
1543	REF	3	LAST	1055	00,2522	6 2422 1	BZMF	BUF+	BRANCH IF SIGNS AGREE.
1544	REF	14	LAST	1054	00,2523	3 4736 1	CA	HALF	SIGNS DISAGREE. FORCE AGREEMENT.
1545				00,2524	6 0000 1	+6	DOUBLE		
1546	REF	93	LAST	1055	00,2525	26 131 0	ADS	BUF +1	
1547	REF	198	LAST	1054	00,2526	3 4755 1	CA	ZERO	
1548	REF	94	LAST	1055	00,2527	54 130 1	TS	BUF	
1549	REF	1		00,2530	1 2363 1		TCF	BUFZFRO	
1550	REF	347	LAST	1055	00,2531	10 000 0	BUFNORM	CCS	A
1551	REF	2	LAST	1052	00,2532	1 2416 1	TCF	BUF-	TO BUF- IF BUF IS LESS THAN -1.
1552	REF	95	LAST	1055	00,2533	3 0131 1	CA	BUF +1	IF BUF IS -1, FORCING SIGN AGREEMENT
1553				00,2534	0 0006 1		EXTEND		MAY CAUSE BUF TO BECOME ZERO.
1554	REF	3	LAST	1055	00,2535	6 2416 0	BZMF	BUF-	BRANCH IF SIGNS AGREE.
1555	REF	15	LAST	1055	00,2536	4 4736 0	CS	HALF	SIGNS DISAGREE. FORCE AGREEMENT.
1556	REF	2	LAST	1052	00,2537	1 2524 1	TCF	BUFPDS +6	

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P1557 THE FOLLOWING ARE PROLOGUES TO SHIFT THE DIVIDEND ARRIVING IN A AND L BEFORE THE DIVIDE.

1559	REF 14	LAST 1044	00,2540	22 021 1	-21D	LXCH	SR	SPECIAL PROLOGUE FOR UNIT WHEN THE
1560			00,2541	0 0006 1		EXTEND		LENGTH OF THE ARGUMENT WAS NOT LESS THAN
1561	REF 16	LAST 1055	00,2542	7 4736 0		MP	HALF	.5. IN THIS CASE, EACH COMPONENT MUST BE
1562	REF 189	LAST 1049	00,2543	56 001 0		XCH	L	SHIFTED RIGHT ONE TO PRODUCE A HALF-UNIT
1563	REF 15	LAST 1056	00,2544	6 0021 1		AD	SR	VECTOR.
1564	REF 190	LAST 1056	00,2545	56 001 0		XCH	L	
1565	REF 1		00,2546	1 2571 1		TCF	GENDDV +1	WITH DP DIVIDEND IN A,L.
1566			00,2547	20 001 1		DDOUBL		PROLOGUE WHICH NORMALIZES THE DIVIDEND
1567			00,2550	20 001 1		DDOUBL		WHEN IT IS KNOWN THAT NO DIVISION
1568			00,2551	20 001 1		DDOUBL		OVERFLOW WILL OCCUR.
1569			00,2552	20 001 1		DDOUBL		
1570			00,2553	20 001 1		DDOUBL		
1571			00,2554	20 001 1		DDOUBL		
1572			00,2555	20 001 1		DDOUBL		
1573			00,2556	20 001 1		DDOUBL		
1574			00,2557	20 001 1		DDOUBL		
1575			00,2560	20 001 1		DDOUBL		
1576			00,2561	20 001 1		DDOUBL		
1577			00,2562	20 001 1		DDOUBL		
1578			00,2563	20 001 1		DDOUBL		
1579	REF 554	LAST 1055	00,2564	52 155 1		DXCH	MPAC	
1580	REF 3	LAST 1054	00,2565	10 140 0	MAXTEST	CCS	MAXCVSW	0 IF MAJORS MIGHT BE =, -1 OTHERWISE.
1581			00,2566	06552 0	BIASHI	DEC	.4192 B-1	SQRT CONSTANTS
1582	REF 1		00,2567	1 2642 1		TCF	MAXDV	CHECK TO SEE IF THEY ARE NOW EQUAL.

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R1583 THE FOLLOWING IS A GENERAL PURPOSE DOUBLE PRECISION DIVISION ROUTINE. IT DIVIDES MPAC BY BUF AND LEAVES
R1585 THE RESULT IN MPAC. THE FOLLOWING CONDITIONS MUST BE SATISFIED:

R1586 1. THE DIVISOR (BUF) MUST BE POSITIVE AND NOT LESS THAN .5.

R1587 2. THE DIVIDEND (MPAC) MUST BE POSITIVE WITH THE MAJOR PART OF MPAC STRICTLY LESS THAN THAT OF BUF
R1589 (A SPECIAL APPROXIMATION, MAXDV, IS USED WHEN THE MAJOR PARTS ARE EQUAL).

R1591 UNDERSTANDING THAT $A/B = Q + S(R/B)$ WHERE $S = 2(-14)$ AND Q AND R ARE QUOTIENT AND REMAINDER, RESPEC-
R1593 TIVELY, THE FOLLOWING APPROXIMATION IS OBTAINED BY MULTIPLYING ABOVE AND BELOW BY $C - SD$ AND NEGLECTING TERMS OF
R1595 ORDER S -SQUARED (POSSIBLY INTRODUCING ERROR INTO THE LOW TWO BITS OF THE RESULT). SIGN AGREEMENT IS UNNECESSARY.

R1597
$$\frac{A + SB}{C + SD} = Q + S\left(\frac{R - QD}{C}\right)$$
 WHERE Q AND R ARE QUOTIENT AND REMAINDER OF $\frac{A + S3}{C}$ RESPECTIVELY.
R1599
R1601

1603	REF 555	LAST 1056	00,2570	52 155 1	GENDDV	DXCH	MPAC	WE NEED A AND B ONLY FOR FIRST DV.
1604			00,2571	0 0006 1	+1	EXTEND		(SPECIAL UNIT PROLOGUE ENTERS HERE).
1605	REF 96	LAST 1055	00,2572	10 130 1		DV	BUF	A NOW CONTAINS Q AND L, R.
1606	REF 556	LAST 1057	00,2573	52 155 1		DXCH	MPAC	
1607	REF 557	LAST 1057	00,2574	4 0154 0		CS	MPAC	FORM DIVIDEND FOR MINOR PART OF RESULT.
1608			00,2575	0 0006 1		EXTEND		
1609	REF 97	LAST 1057	00,2576	7 0131 0		MP	BUF +1	
1610	REF 558	LAST 1057	00,2577	6 0155 0		AD	MPAC +1	OVERFLOW AT THIS POINT IS POSITIVE SINCE
1611			00,2600	54 000 0		OVSF		R IS POSITIVE IN EVERY CASE.
1612			00,2601	1 2606 1		TCF	+5	
1613			00,2602	0 0006 1		EXTEND		OVERFLOW CAN BE REMOVED BY SUBTRACTING C
1614	REF 98	LAST 1057	00,2603	60 130 0		SU	BUF	(BUF) ONCE SINCE R IS ALWAYS LESS THAN C
1615	REF 559	LAST 1057	00,2604	24 154 1		INCR	MPAC	IN THIS CASE. INCR COMPENSATES SUBTRACT.
1616	REF 1		00,2605	1 2610 0		TCF	+DDW	(SINCE C(A) IS STILL POSITIVE).
1617			00,2606	0 0006 1	+5	EXTEND		C(A) CAN BE MADE LESS THAN C IN MAGNI-
1618	REF 1		00,2607	6 2620 1		BZMF	-UP	TUDE BY DIMINISHING IT BY C (SINCE C IS
A1619								NOT LESS THAN .5) UNLESS C(A) = 0.

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1620				00,2610	0 0006 1	+DOWN	EXTEND	
1621	REF 99	LAST 1057		00,2611	60 130 0		SU	BUF
1622				00,2612	0 0006 1		EXTEND	
1623				00,2613	1 2616 0		BZF	+3
1624				00,2614	0 0006 1		EXTEND	
1625	REF 1			00,2615	6 2624 0		BZMF	ENDMAXDV

IF POSITIVE, REDUCE ONLY IF NECESSARY
SINCE THE COMPENSATING INCR MIGHT CAUSE
OVERFLOW.
DONT SUBTRACT UNLESS RESULT IS POSITIVE
OR ZERO.

1626	REF 560	LAST 1057		00,2616	24 154 1	+3	INCR	MPAC
1627	REF 2	LAST 1052		00,2617	1 2625 0		TCF	FINALDV

KEEP SUBTRACT HERE AND COMPENSATE.

1628				00,2620	0 0006 1	-UP	EXTEND	
1629	RFF 3	LAST 1058		00,2621	1 2630 1		BZF	FINALDV +3

IF ZERO, SET MINOR PART OF RESULT TO
ZERO.

1630				00,2622	0 0006 1		EXTEND	
1631	RFF 561	LAST 1058		00,2623	26 154 0		DIM	MPAC
1632	REF 100	LAST 1058		00,2624	6 0130 0	FNDMAXDV	AD	BUF

IF NEGATIVE, ADD C TO A, SUBTRACTING ONE
TO COMPENSATE. DIM IS OK HERE SINCE THE
MAJOR PART NEVER GOES NEGATIVE.

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1633			00,2625	22 007 0	FINALDV	ZL		DO DV TO OBTAIN MINOR PART OF RESULT.
1634			00,2626	0 0006 1		EXTEND		
1635	REF 101	LAST 1058	00,2627	10 130 1		DV	BUF	
1636	REF 562	LAST 1058	00,2630	54 155 1	+3	TS	MPAC +1	
1637	REF 6	LAST 1053	00,2631	10 136 1		CCS	DV SIGN	LEAVE RESULT POSITIVE UNLESS C(DV SIGN)=
1638	REF 277	LAST 1049	00,2632	0 0002 0		TC	Q	-0.
1639	REF 278	LAST 1059	00,2633	0 0002 0		TC	Q	
1640	REF 279	LAST 1059	00,2634	0 0002 0		TC	Q	
1641			00,2635	0 0006 1		EXTEND		
1642	REF 563	LAST 1059	00,2636	4 0155 1		DCS	MPAC	
1643	REF 564	LAST 1059	00,2637	52 155 1		DXCH	MPAC	
1644	REF 199	LAST 1055	00,2640	3 4755 1		CAF	ZERO	SO WE ALWAYS RETURN WITH C(A) = 0.
1645	REF 280	LAST 1059	00,2641	0 0002 0		TC	Q	

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P1646 IF THE MAJOR PARTS OF THE DIVISOR AND DIVIDEND ARE EQUAL, BUT THE MINOR PARTS ARE SUCH THAT THE
 R1648 DIVIDEND IS STRICTLY LESS THAN THE DIVISOR IN MAGNITUDE, THE FOLLOWING APPROXIMATION IS USED. THE ASSUMPTIONS
 R1650 ARE THE SAME AS THE GENERAL ROUTINE WITH THE ADDITION THAT SIGN AGREEMENT IS NECESSARY (B, C, & D POSITIVE).

R1652
$$\frac{C + SB}{C + SD} = \frac{(C + B - D)}{(C)}$$

 R1653
 R1654

R1655 THE DIVISION MAY BE PERFORMED IMMEDIATELY SINCE B IS STRICTLY LESS THAN D AND C IS NOT LESS THAN .5.

1657	REF 565	LAST 1059	00,2642	4 0154 0	MAXDV	CS	MPAC	SEE IF MAXDV CASE STILL HOLDS AFTER
1658	REF 102	LAST 1059	00,2643	6 0130 0		AD	BUF	NORMALIZATION.
1659			00,2644	0 0006 1		EXTEND		
1660			00,2645	1 2647 1		BZF	+2	
1661	REF 2	LAST 1056	00,2646	1 2570 0		TCF	GENDDV	MPAC NOW LESS THAN BUF - DIVIDE AS USUAL
1662	REF 26	LAST 1054	00,2647	3 4733 1	+2	CAF	POS MAX	SET MAJOR PART OF RESULT.
1663	REF 566	LAST 1060	00,2650	54 154 0		TS	MPAC	
1664	REF 103	LAST 1060	00,2651	4 0131 0		CS	BUF +1	FORM DIVIDEND OF MINOR PART OF RESULT.
1665	REF 567	LAST 1060	00,2652	6 0155 0		AD	MPAC +1	
1666	REF 2	LAST 1058	00,2653	1 2624 1		TCF	ENDMAXDV	GO ADD C AND DO DIVIDE, ATTACHING SIGN
A1667								BEFORE EXITING.

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P1668 VECTOR DIVIDED BY SCALAR, V/SC, IS EXECUTED HERE. THE VECTOR IS NOW IN MPAC WITH SCALAR IN BUF.

1670	REF 110	LAST 1052	00,2654	4 4753 0	V/SC2	CS	ONE	INITIALIZE DIVIDEND NORMALIZATION COUNT
1671	REF 4	LAST 1055	00,2655	54 137 0		TS	DVNORMCT	AND DIVISION SIGN REGISTER.
1672	REF 53	LAST 1038	00,2656	54 127 1		TS	VBUF +5	
1673	REF 1		00,2657	0 3010 0		TC	VECAGREE	FORCE SIGN AGREEMENT IN VECTOR
1674	REF 104	LAST 1060	00,2660	52 131 0		DXCH	BUF	
1675	REF 2	LAST 886	00,2661	0 7543 1		TC	ALSIGNAG	SIGN AGREE BUF
1676	REF 105	LAST 1061	00,2662	52 131 0		DXCH	BUF	
1677	REF 106	LAST 1061	00,2663	10 130 1		CCS	BUF	FORCE DIVISOR POSITIVE WITH MAJOR PART
1678	REF 1		00,2664	1 2721 0		TCF	/BUF+	NON-ZERO (IF POSSIBLE).
1679			00,2665	1 2667 0		TCF	+2	
1680	REF 1		00,2666	1 2715 1		TCF	/BUF-	
1681	REF 107	LAST 1061	00,2667	56 131 1		XCH	BUF +1	SHIFT VECTOR AND SCALAR LEFT 14.
1682	REF 108	LAST 1061	00,2670	56 130 0		XCH	BUF	
1683	REF 568	LAST 1060	00,2671	56 155 0		XCH	MPAC +1	
1684	REF 569	LAST 1061	00,2672	56 154 1		XCH	MPAC	
1685			00,2673	0 0006 1		EXTEND		CHECK FOR OVERFLOW IN EACH CASE.
1686			00,2674	1 2676 0		BZF	+2	
1687	REF 3	LAST 1054	00,2675	1 2405 0		TCF	DVOVF	
1688	REF 570	LAST 1061	00,2676	56 160 0		XCH	MPAC +4	
1689	REF 571	LAST 1061	00,2677	56 157 1		XCH	MPAC +3	
1690			00,2700	0 0006 1		EXTEND		
1691			00,2701	1 2703 0		BZF	+2	
1692	REF 4	LAST 1061	00,2702	1 2405 0		TCF	DVOVF	
1693	REF 572	LAST 1061	00,2703	56 162 1		XCH	MPAC +6	
1694	REF 573	LAST 1061	00,2704	56 161 1		XCH	MPAC +5	
1695			00,2705	0 0006 1		EXTEND		
1696			00,2706	1 2710 1		BZF	+2	
1697	REF 5	LAST 1061	00,2707	1 2405 0		TCF	DVOVF	
1698	REF 109	LAST 1061	00,2710	10 130 1		CCS	BUF	
1699	REF 2	LAST 1061	00,2711	1 2721 0		TCF	/BUF+	
1700	REF 6	LAST 1061	00,2712	1 2405 0		TCF	DVOVF	ZERO DIVISOR - OVERFLOW.
1701	REF 2	LAST 1061	00,2713	1 2715 1		TCF	/BUF-	
1702	REF 7	LAST 1061	00,2714	1 2405 0		TCF	DVOVF	
1703			00,2715	0 0006 1	/BUF-	EXTEND		ON NEGATIVE, COMPLEMENT BUF AND MAINTAIN
1704	REF 110	LAST 1061	00,2716	4 0131 0		DCS	BUF	DVSIGN IN VBUF +5.
1705	REF 111	LAST 1061	00,2717	52 131 0		DXCH	BUF	
1706	REF 54	LAST 1061	00,2720	24 127 0		INCR	VBUF +5	

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1707				00,2721	0 0006 1	/BUF+	EXTEND		
1708	REF 112	LAST 1061		00,2722	3 0131 1		DCA	BUF	LEAVE ABS(ORIG DIVISOR) IN BUF2
1709	REF 17	LAST 1054		00,2723	52 134 0		DXCH	BUF2	FOR OVERFLOW TESTING
1710	REF 1			00,2724	1 2732 1		TCF	/NORM	NORMALIZE DIVISOR IN BUF.
1711				00,2725	0 0006 1	/NORM2	EXTEND		
1712	REF 5	LAST 1061		00,2726	24 137 1		AUG	DVNORMCT	IF LESS THAN .5, AUGMENT DVNORMCT AND
1713				00,2727	0 0006 1		EXTEND		DOUBLE DIVISOR.
1714	REF 113	LAST 1062		00,2730	3 0131 1		DCA	BUF	
1715	REF 114	LAST 1062		00,2731	20 131 0		DAS	BUF	
1716	REF 115	LAST 1062		00,2732	3 0130 0	/NORM	CA	BUF	SEE IF DIVISOR NORMALIZED.
1717				00,2733	6 0000 1		DOUBLE		
1718				00,2734	54 000 0		DVSK		
1719	REF 1			00,2735	1 2725 1		TCF	/NORM2	DOUBLE AND TRY AGAIN IF NOT.
1720	REF 1			00,2736	0 2750 1		TC	V/SCDV	DO X COMPONENT DIVIDE.
1721	REF 574	LAST 1061		00,2737	52 160 1		DXCH	MPAC +3	SUPPLY ARGUMENTS IN USUAL SEQUENCE.
1722	REF 575	LAST 1062		00,2740	52 155 1		DXCH	MPAC	
1723	REF 576	LAST 1062		00,2741	52 160 1		DXCH	MPAC +3	
1724	REF 2	LAST 1062		00,2742	0 2750 1		TC	V/SCDV	Y COMPONENT.
1725	REF 577	LAST 1062		00,2743	52 162 0		DXCH	MPAC +5	
1726	REF 578	LAST 1062		00,2744	52 155 1		DXCH	MPAC	
1727	REF 579	LAST 1062		00,2745	52 162 0		DXCH	MPAC +5	
1728	REF 3	LAST 1062		00,2746	0 2750 1		TC	V/SCDV	Z COMPONENT.
1729	REF 2	LAST 1045		00,2747	1 7417 0		TCF	VR0TATEX	GO RE-ARRANGE COMPONENTS BEFORE EXIT.

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P1730 SUBROUTINE USED BY V/SC TO DIVIDE VECTOR COMPONENT IN MPAC,+1 BY THE SCALAR GIVEN IN BUF.

1732	REF	55	LAST	1061	00,2750	3 0127 0	V/SCDV	CA	VBUF +5	REFLECTS SIGN OF SCALAR.
1733	REF	7	LAST	1059	00,2751	54 136 1		TS	DV SIGN	
1734	REF	580	LAST	1062	00,2752	10 154 0		CCS	MPAC	FORCE MPAC POSITIVE, EXITING ON ZERO.
1735	REF	1			00,2753	1 2767 1		TCF	/MPAC+	
1736					00,2754	1 2756 0		TCF	+2	
1737	REF	1			00,2755	1 2763 0		TCF	/MPAC-	
1738	REF	581	LAST	1063	00,2756	10 155 1		CCS	MPAC +1	
1739	REF	2	LAST	1063	00,2757	1 2767 1		TCF	/MPAC+	
1740	REF	281	LAST	1059	00,2760	0 0002 0		TC	0	
1741	REF	2	LAST	1063	00,2761	1 2763 0		TCF	/MPAC-	
1742	REF	282	LAST	1063	00,2762	0 0002 0		TC	0	
1743					00,2763	0 0006 1	/MPAC-	EXTEND		USUAL COMPLEMENTING AND SETTING OF SIGN.
1744	REF	582	LAST	1063	00,2764	4 0155 1		DCS	MPAC	
1745	REF	583	LAST	1063	00,2765	52 155 1		DXCH	MPAC	
1746	REF	8	LAST	1063	00,2766	24 136 0		INCR	DV SIGN	
1747	REF	111	LAST	1061	00,2767	4 4753 0	/MPAC+	CS	DNE	INITIALIZE NEAR-ONE SWITCH.
1748	REF	4	LAST	1056	00,2770	54 140 0		TS	MAXDVSW	
1749	REF	584	LAST	1063	00,2771	4 0154 0		CS	MPAC	CHECK POSSIBLE OVERFLOW.
1750	REF	18	LAST	1062	00,2772	6 0133 0		AD	BUF2	UNNORMALIZED INPUT DIVISOR.
1751	REF	348	LAST	1055	00,2773	10 000 0		CCS	A	
1752	REF	1			00,2774	1 3004 1		TCF	DDV CALL	NOT NEAR-ONE
1753					00,2775	1 2777 0		TCF	+2	+0 IS JUST POSSIBLE
1754	REF	8	LAST	1061	00,2776	1 2405 0		TCF	DVDVF	NO HOPE
1755	REF	5	LAST	1063	00,2777	54 140 0		TS	MAXDVSW	SIGNAL POSSIBLE NEAR-ONE CASE
1756	REF	585	LAST	1063	00,3000	4 0155 1		CS	MPAC +1	SEE IF DIVISION CAN BE DONE
1757	REF	19	LAST	1063	00,3001	6 0134 1		AD	BUF2 +1	
1758					00,3002	0 0006 1		EXTEND		
1759	REF	9	LAST	1063	00,3003	6 2405 1		BZMF	DVDVF	
1760	REF	586	LAST	1063	00,3004	52 155 1	DDV CALL	DXCH	MPAC	CALL PRE-DIVIDE NORMALIZATION.
1761	REF	6	LAST	1062	00,3005	50 137 1		INDEX	DVNORMCT	
1762	REF	2	LAST	1055	00,3006	1 2565 1		TCF	MAXTEST	

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1763 00,3007 32506 0 SLOPELD DEC .8324

1764	REF 283	LAST 1063	00,3010	56 002 0	VECAGREE	XCH	Q
1765	REF 587	LAST 1063	00,3011	52 155 1		DXCH	MPAC
1766	REF 3	LAST 1061	00,3012	0 7543 1		TC	ALSIGNAG
1767	REF 588	LAST 1064	00,3013	52 155 1		DXCH	MPAC
1768	REF 589	LAST 1064	00,3014	52 160 1		DXCH	MPAC +3
1769	REF 4	LAST 1064	00,3015	0 7543 1		TC	ALSIGNAG
1770	REF 590	LAST 1064	00,3016	52 160 1		DXCH	MPAC +3
1771	REF 591	LAST 1064	00,3017	52 162 0		DXCH	MPAC +5
1772	REF 5	LAST 1064	00,3020	0 7543 1		TC	ALSIGNAG
1773	REF 592	LAST 1064	00,3021	52 162 0		DXCH	MPAC +5
1774	REF 349	LAST 1063	00,3022	0 0000 1		TC	A

SAVE Q IN A

SIGNAGREE MPAC

SIGN AGREE MPAC +3

SIGNAGREE MPAC +5

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P1775 THE FOLLOWING ROUTINE EXECUTES THE UNIT INSTRUCTION, WHICH TAKES THE UNIT OF THE VECTOR IN MPAC.

1777	REF	2	LAST 1061	00,3023	0 3010 0	UNIT	TC	VFCAGREE	FORCE SIGN AGREEMENT IN VECTOR
1778	REF	3	LAST 1034	00,3024	0 7531 1		TC	MPACVBUF	SAVE ARGUMENT IN V8UF
1779	REF	200	LAST 1059	00,3025	3 4755 1		CAF	ZERO	MUST SENSE OVERFLOW IN FOLLOWING DOT.
1780	REF	6	LAST 1052	00,3026	56 121 0		XCH	OVFIND	
1781	REF	20	LAST 923	00,3027	54 141 1		TS	TEM1	
1782	REF	1		00,3030	0 3317 1		TC	VQSUB	DOT MPAC WITH ITSELF.
1783	REF	21	LAST 1065	00,3031	3 0141 0		CA	TEM1	
1784	REF	7	LAST 1065	00,3032	56 121 0		XCH	OVFIND	
1785				00,3033	0 0006 1		EXTEND		
1786				00,3034	1 3036 0		BZF	+2	
1787	REF	10	LAST 1063	00,3035	1 2405 0		TCF	DVDVF	
1788				00,3036	0 0006 1		EXTEND		
1789	REF	593	LAST 1064	00,3037	3 0155 0		DCA	MPAC	LEAVE THE SQUARE OF THE LENGTH OF THE
1790	REF	42	LAST 1019	00,3040	50 120 1		INDEX	FIXLOC	ARGUMENT IN LVSQUARE.
1791	REF	1		00,3041	52 043 1		DXCH	LVSQUARE	
1792	REF	1		00,3042	0 3343 0		TC	SQRTSUB	GO TAKE THE NORMALIZED SQUARE ROOT.
1793	REF	594	LAST 1065	00,3043	10 154 0		CCS	MPAC	CHECK FOR UNIT OVERFLOW.
1794				00,3044	1 3051 1		TCF	+5	MPAC IS NOT LESS THAN .5 UNLESS
1795	REF	191	LAST 1056	00,3045	54 001 1		TS	L	
1796	REF	43	LAST 1065	00,3046	50 120 1		INDEX	FIXLOC	
1797	REF	1		00,3047	52 045 1		DXCH	LV	
1798	REF	11	LAST 1065	00,3050	1 2405 0		TCF	DVDVF	INPUT TO SQRTSUB WAS 0.
1799	REF	2	LAST 573	00,3051	4 4317 1		CS	FOURTEEN	SEE IF THE INPUT WAS SO SMALL THE THE
1800	REF	47	LAST 1051	00,3052	6 0135 0		AD	MPTEMP	FIRST TWO REGISTERS OF THE SQUARE WERE 0
1801	REF	350	LAST 1064	00,3053	10 000 0		CCS	A	
1802				00,3054	4 0000 0		COM		IF SO, SAVE THE NEGATIVE OF THE SHIFT
1803	REF	1		00,3055	1 3133 1		TCF	SMALL	COUNT -150.
1804	REF	1		00,3056	1 3065 0		TCF	LARGE	(THIS IS USUALLY THE CASE.)
1805	REF	1		00,3057	4 4761 1		CS	THIRTEEN	IF THE SHIFT COUNT WAS EXACTLY 14, SET
1806	REF	48	LAST 1065	00,3060	54 135 1		TS	MPTEMP	THE PRE-DIVIDE NORM COUNT TO -130.
1807	REF	595	LAST 1065	00,3061	3 0154 1		CA	MPAC	SHIFT THE LENGTH RIGHT 14 BEFORE STORING
1808	REF	192	LAST 1065	00,3062	54 001 1	SMALL2	TS	L	(SMALL EXITS TO THIS POINT).
1809	REF	201	LAST 1065	00,3063	3 4755 1		CAF	ZERO	
1810	REF	1		00,3064	1 3112 1		TCF	LARGE2	GO TO STORE LENGTH AND PROCEED.
1811	REF	49	LAST 1065	00,3065	10 135 1	LARGE	CCS	MPTEMP	MOST ALL CASES COME HERE.
1812	REF	1		00,3066	1 3074 0		TCF	LARGE3	SEE IF NO NORMALIZATION WAS REQUIRED BY
1813	REF	1		00,3067	4 2024 1		CS	SRDDV	SORT, AND IF SO, SET UP FOR A SHIFT
1814	REF	50	LAST 1065	00,3070	54 135 1		TS	MPTEMP	RIGHT 1 BEFORE DIVIDING TO PRODUCE
1815				00,3071	0 0006 1		EXTEND		THE DESIRED HALF UNIT VECTOR.
1816	REF	596	LAST 1065	00,3072	3 0155 0		DCA	MPAC	

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1817 REF 2 LAST 1065 00,3073 1 3112 1

TCF LARGE2

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1818					00,3074	4 0000 0	LARGE3	COM				
1819	REF	51	LAST	1065	00,3075	54 135 1		TS	MPTEMP			LEAVE NEGATIVE OF SHIFT COUNT-1 FOR PREDIVIDE LEFT SHIFT.
1820					00,3076	4 0000 0		COM				
1821	REF	351	LAST	1065	00,3077	50 000 1		INDEX	A			PICK UP REQUIRED SHIFTING BIT TO UNNORM- ALIZE THE SORT RESULT.
1822	REF	68	LAST	1050	00,3100	3 4736 1		CAF	BIT14			
1823	REF	116	LAST	1062	00,3101	54 130 1		TS	BUF			
1824					00,3102	0 0006 1		EXTEND				
1825	REF	597	LAST	1065	00,3103	7 0155 1		MP	MPAC +1			
1826	REF	117	LAST	1067	00,3104	56 130 0		XCH	BUF			
1827					00,3105	0 0006 1		EXTEND				(UNNORMALIZE THE SORT FOR LV).
1828	REF	598	LAST	1067	00,3106	7 0154 0		MP	MPAC			
1829	REF	193	LAST	1065	00,3107	56 001 0		XCH	L			
1830	REF	118	LAST	1067	00,3110	6 0130 0		AD	BUF			
1831	REF	194	LAST	1067	00,3111	56 001 0		XCH	L			
1832	REF	44	LAST	1065	00,3112	50 120 1	LARGE2	INDEX	FIXLOC			
1833	REF	2	LAST	1065	00,3113	52 045 1		DXCH	LV			LENGTH NOW STORED IN WORK AREA.
1834	REF	112	LAST	1063	00,3114	4 4753 0		CS	ONE			
1835	REF	6	LAST	1063	00,3115	54 140 0		TS	MAXDVSW			NO MAXDV CASES IN UNIT.
1836	REF	56	LAST	1063	00,3116	52 123 0		DXCH	VBUF			PREPARE X COMPONENT FOR DIVIDE, SETTING LENGTH OF VECTOR AS DIVISOR IN BUF.
1837	REF	599	LAST	1067	00,3117	52 155 1		DXCH	MPAC			
1838	REF	119	LAST	1067	00,3120	52 131 0		DXCH	BUF			
1839	REF	1			00,3121	0 3151 1		TC	UNITDV			
1840	REF	57	LAST	1067	00,3122	52 125 0		DXCH	VBUF +2			DO Y AND Z IN USUAL FASHION SO WE CAN EXIT THROUGH VROTATEX.
1841	REF	600	LAST	1067	00,3123	52 155 1		DXCH	MPAC			
1842	REF	601	LAST	1067	00,3124	52 160 1		DXCH	MPAC +3			
1843	REF	2	LAST	1067	00,3125	0 3151 1		TC	UNITDV			
1844	REF	58	LAST	1067	00,3126	52 127 1		DXCH	VBUF +4			
1845	REF	602	LAST	1067	00,3127	52 155 1		DXCH	MPAC			
1846	REF	603	LAST	1067	00,3130	52 162 0		DXCH	MPAC +5			
1847	REF	3	LAST	1067	00,3131	0 3151 1		TC	UNITDV			
1848	REF	3	LAST	1062	00,3132	1 7417 0		TCF	VROTATEX			AND EXIT.

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P1849 IF THE LENGTH OF THE ARGUMENT VECTOR WAS LESS THAN 2(-28), EACH COMPONENT MUST BE SHIFTED LEFT AT LEAST
 R1851 14 PLACES BEFORE THE DIVIDE. NOTE THAT IN THIS CASE, THE MAJOR PART OF EACH COMPONENT IS ZERO.

1853	REF	52	LAST	1067	00,3133	54 135 1	SMALL	TS	MPTMP	NEGATIVE OF PRE-DIVIDE SHIFT COUNT.
1854	REF	202	LAST	1065	00,3134	3 4755 1		CAF	ZERO	SHIFT EACH COMPONENT LEFT 14.
1855	REF	59	LAST	1067	00,3135	56 123 1		XCH	VBUF +1	
1856	REF	60	LAST	1068	00,3136	56 122 0		XCH	VBUF	
1857	REF	61	LAST	1068	00,3137	56 125 1		XCH	VBUF +3	
1858	REF	62	LAST	1068	00,3140	56 124 0		XCH	VBUF +2	
1859	REF	63	LAST	1068	00,3141	56 127 0		XCH	VBUF +5	
1860	REF	64	LAST	1068	00,3142	56 126 1		XCH	VBUF +4	
1861	REF	53	LAST	1068	00,3143	4 0135 1		CS	MPTMP	
1862	REF	352	LAST	1067	00,3144	50 000 1		INDEX	A	
1863	REF	69	LAST	1067	00,3145	3 4736 1		CAF	BIT14	
1864					00,3146	0 0006 1		EXTEND		
1865	RFF	604	LAST	1067	00,3147	7 0154 0		MP	MPAC	
1866	RFF	1			00,3150	1 3062 1		TCF	SMALL2	
1867	REF	4	LAST	950	4761			THIRTEEN =	OCT15	
1868	REF	1			4317			FOURTEEN =	OCT16	
1869	REF	13	LAST	470	4317			OCT16 =	R1D1	

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P1870 THE FOLLOWING ROUTINE SETS UP THE CALL TO THE DIVIDE ROUTINES.

1871	REF 605	LAST 1068	00,3151	10 154 0	UNITDV	CCS	MPAC	FORCE MPAC POSITIVE IF POSSIBLE, SETTING
1872	REF 1		00,3152	1 3170 0		TCF	UMPAC+	DVSIGN ACCORDING TO THE SIGN OF MPAC
1873			00,3153	1 3155 1		TCF	+2	SINCE THE DIVISOR IS ALWAYS POSITIVE
1874	REF 1		00,3154	1 3162 0		TCF	UMPAC-	HERE.
1875	REF 606	LAST 1069	00,3155	10 155 1		CCS	MPAC +1	
1876	REF 2	LAST 1069	00,3156	1 3170 0		TCF	JMPAC+	
1877	REF 284	LAST 1064	00,3157	0 0002 0		TC	Q	EXIT IMMEDIATELY ON ZERO.
1878	REF 2	LAST 1065	00,3160	1 3162 0		TCF	UMPAC-	
1879	REF 285	LAST 1065	00,3161	0 0002 0		TC	Q	
1880	REF 203	LAST 1068	00,3162	4 4755 0	UMPAC-	CS	ZERO	IF NEGATIVE, SET -0 IN DVSIGN FOR FINAL
1881	REF 9	LAST 1063	00,3163	54 136 1		TS	DVSIGN	COMPLEMENT.
1882			00,3164	0 0006 1		EXTEND		
1883	REF 607	LAST 1069	00,3165	4 0155 1		DCS	MPAC	PICK UP ABSOLUTE VALUE OF ARG AND JUMP.
1884	REF 54	LAST 1068	00,3166	50 135 0		INDEX	MPTEMP	
1885	REF 3	LAST 1063	00,3167	1 2564 0		TCF	MAXTEST -1	
1886	REF 10	LAST 1069	00,3170	54 136 1	UMPAC+	TS	DVSIGN	SET DVSIGN FOR POSITIVE QUOTIENT.
1887	REF 608	LAST 1069	00,3171	52 155 1		DXCH	MPAC	
1888	REF 55	LAST 1065	00,3172	50 135 0		INDEX	MPTEMP	
1889	REF 4	LAST 1065	00,3173	1 2564 0		TCF	MAXTEST -1	

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P1890 MISCELLANEOUS UNARY OPERATIONS.

1891	REF	1		00,3174	0 3300 1	DSQ	TC	DSQSUB	SQUARE THE DP CONTENTS OF MPAC.
1892	REF	34	LAST 1055	00,3175	1 6060 0		TCF	DANZIG	
1893	REF	31	LAST 1051	00,3176	10 163 1	ABVALABS	CCS	MODE	ABVAL OR ABS INSTRUCTION.
1894	REF	3	LAST 824	00,3177	1 3226 0		TCF	ABS	DO ABS ON SCALAR.
1895	REF	4	LAST 1070	00,3200	1 3226 0		TCF	ABS	
1896	REF	2	LAST 1065	00,3201	0 3317 1	ABVAL	TC	VSQSUB	DOT MPAC WITH ITSELF.
1897	REF	32	LAST 1070	00,3202	22 163 0		LXCH	MODE	MODE IS NOW DP (L ZERO AFTER DAS).
1898				00,3203	0 0006 1		EXTEND		STORE SQUARE OF LENGTH IN WORK AREA.
1899	REF	609	LAST 1069	00,3204	3 0155 0		DCA	MPAC	
1900	REF	45	LAST 1067	00,3205	50 120 1		INDEX	FIXLCC	
1901	REF	2	LAST 1065	00,3206	52 043 1		DXCH	LVSQUARE	

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P1902 PROGRAM DESCRIPTION- SUBROUTINE SQRT
 R1903 FUNCTIONAL DESCRIPTION-DOUBLE PRECISION SQUARE ROOT ROUTINE
 R1904 THIS PROGRAM TAKES THE SQUARE ROOT OF THE 27 OR 28 MOST SIGNIFICANT BITS IN THE TRIPLE PRECISION SET OF
 R1906 NUMBERS-MPAC,MPAC+1,AND MPAC+2. THE ROOT IS RETURNED DOUBLE PRECISION IN MPAC AND MPAC+1.
 R1908 WARNING- THIS SUBROUTINE USES A TRIPLE PRECISION INPUT. THE PROGRAMMER MUST ASSURE THE CONTENTS OF MPAC+2
 R1910 ESPECIALLY IF THE CONTENTS OF MPAC IS SMALL OR ZERO. FOR DETAILS SEE STG MEMO NO.949.
 R1912 CALLING SEQUENCE- IN INTERPRETIVE MODE I.E., FOLLOWING TC INTPT, SQRT NO ADDRESS IS ALLOWED
 R1914 INPUT SCALING THE BINARY POINT IS ASSUMED TO THE RIGHT OF BIT 15. THE ANSWER IS RETURNED WITH THE SAME SCALING
 R1916 SUBROUTINES- GENSCR,MPACSHR, SQRTSUB,ABORT
 R1917 ABCRT EXIT MODE- ABORTS ON NEGATIVE INPUT -1.2X10E-4 (77775 OCTAL) OR LESS.
 R1919 DISPLAYS ERROR CODE 1302
 R1920 TC ABORT
 R1921 OCT 1302
 R1922 DEBRIS - LOCATIONS BUF,MPTMP,ADDRWD ARE USED
 1923 REF 2 LAST 1065 00,3207 0 3343 0 SQRT TC SQRTSUB TAKE THE SQUARE ROOT OF MPAC.
 1924 REF 56 LAST 1069 00,3210 10 135 1 CCS MPTMP RETURNED NORMALIZED SQUARE ROOT. SEE IF
 1925 00,3211 1 3213 0 TCF +2 ANY UN-NORMALIZATION REQUIRED AND EXIT
 1926 REF 35 LAST 1070 00,3212 1 6060 0 TCF DANZIG IF NOT.

 1927 REF 3 LAST 1050 00,3213 6 3733 0 AD NEG12 A RIGHT SHIFT OF MORE THAN 13 COULD BE
 1928 00,3214 0 0006 1 EXTEND REQUIRED IF INPUT WAS ZERO IN MPAC,+1.
 1929 REF 1 00,3215 6 3221 0 BZMF SQRTSHFT GOES HERE IN MOST CASES.
 1930 00,3216 22 007 0 ZL IF A LONG SHIFT IS REQUIRED, GO TO
 1931 REF 80 LAST 1051 00,3217 22 116 1 LXCH ADDRWD GENERAL RIGHT SHIFT ROUTINES.
 1932 REF 4 LAST 1050 00,3220 1 2303 1 TCF GENSCR +4 ADDRWD WAS ZERO TO PREVENT ROUND.

 1933 REF 57 LAST 1071 00,3221 50 135 0 SQRTSHFT INDEX MPTMP SELECT SHIFTING BIT AND EXIT THROUGH
 1934 REF 40 LAST 1021 00,3222 3 4735 1 CAF BIT15 SHIFT ROUTINES.
 1935 REF 58 LAST 1071 00,3223 54 135 1 TS MPTMP
 1936 REF 204 LAST 1069 00,3224 3 4755 1 CAF ZERO TO ZERO MPAC +2 IN THE PROCESS.
 1937 REF 2 LAST 1050 00,3225 1 2036 1 TCF MPACSHR +3

 1938 REF 6 LAST 1047 00,3226 0 6722 0 ABS TC BRANCH TEST SIGN OF MPAC AND COMPLEMENT IF
 1939 REF 36 LAST 1071 00,3227 1 6060 0 TCF DANZIG
 1940 REF 37 LAST 1071 00,3230 1 6060 0 TCF DANZIG
 1941 REF 4 LAST 1041 00,3231 1 7667 0 TCF COMP

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1942	REF	23	LAST	1036	00,3232	4 4751	1	VDEF	CS	FOUR	VECTOR DEFINE - ESSENTIALLY TREATS SCALAR IN MPAC AS X COMPONENT, PUSHES UP FOR Y AND THEN AGAIN FOR Z.
1943	REF	22	LAST	1039	00,3233	26 166	1	ADS	PUSHLOC		
1944					00,3234	0 0006	1		EXTEND		
1945	REF	353	LAST	1058	00,3235	5 0000	1		INDEX	A	
1946					00,3236	3 0003	1		DCA	2	
1947	REF	610	LAST	1070	00,3237	52 160	1		DXCH	MPAC +3	
1948					00,3240	0 0006	1		EXTEND		
1949	REF	23	LAST	1072	00,3241	5 0166	0		INDEX	PUSHLOC	
1950					00,3242	3 0001	0		DCA	0	
1951	REF	611	LAST	1072	00,3243	52 162	0		DXCH	MPAC +5	
1952	RFF	2	LAST	1036	00,3244	1 6520	1		TCF	VMODE	MODE IS NON VECTOR.
1953	REF	3	LAST	1070	00,3245	0 3317	1	VSQ	TC	VSQSUB	DOT MPAC WITH ITSELF.
1954	RFF	1			00,3246	1 7331	0		TCF	DMODE	MODE IS NOW DP.
1955					00,3247	0 0006	1	PUSH	EXTEND		PUSH DOWN MPAC LEAVING IT LOADED.
1956	REF	612	LAST	1072	00,3250	3 0155	0		DCA	MPAC	
1957	REF	24	LAST	1072	00,3251	50 166	0		INDEX	PUSHLOC	PUSH DOWN FIRST TWO REGISTERS IN EACH
1958					00,3252	52 001	1		DXCH	0	
1959	REF	33	LAST	1070	00,3253	50 163	0		INDEX	MODE	INCREMENT PUSHDOWN POINTER.
1960	RFF	5	LAST	1016	00,3254	3 6243	1		CAF	NO.WDS	
1961	REF	25	LAST	1072	00,3255	26 166	1		ADS	PUSHLOC	
1962	REF	34	LAST	1072	00,3256	10 163	1		CCS	MODE	
1963	REF	1			00,3257	1 3272	1		TCF	TPUSH	PUSH DOWN MPAC +2.
1964	REF	38	LAST	1071	00,3260	1 6060	0		TCF	DANZIG	DONE FOR DP.
1965					00,3261	0 0006	1		EXTEND		ON VECTOR, PUSH DOWN Y AND Z COMPONENTS.
1966	REF	613	LAST	1072	00,3262	3 0160	0		DCA	MPAC +3	
1967	REF	26	LAST	1072	00,3263	50 166	0		INDEX	PUSHLOC	
1968					00,3264	51'775	0		DXCH	0 -4	
1969					00,3265	0 0006	1		EXTEND		
1970	REF	614	LAST	1072	00,3266	3 0162	1		DCA	MPAC +5	
1971	REF	27	LAST	1072	00,3267	50 166	0		INDEX	PUSHLOC	
1972					00,3270	51'777	1		DXCH	0 -2	
1973	REF	39	LAST	1072	00,3271	1 6060	0		TCF	DANZIG	
1974	REF	615	LAST	1072	00,3272	3 0156	0	TPUSH	CA	MPAC +2	
1975	REF	2	LAST	1015	00,3273	1 6553	0		TCF	ENDTPUSH +2	
1976	REF	46	LAST	1070	00,3274	50 120	1	RVQ	INDEX	FIXLOC	RVQ - RETURN IVA QPRET.
1977	REF	11	LAST	1018	00,3275	3 0052	0		CA	QPRET	
1978	REF	22	LAST	1030	00,3276	54 117	1		TS	POLISH	
1979	REF	5	LAST	1019	00,3277	1 6651	1		TCF	GOTO +4	(ASSUME QPRET POINTS TO FIXED ONLY.)

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P1980 THE FOLLOWING SUBROUTINES ARE USED IN SQUARING MPAC, IN BOTH THE SCALAR AND VECTOR SENSE. THEY ARE
 R1982 SPECIAL CASES OF DMPSUB AND DOTSUB, PUT IN TO SAVE SOME TIME.

1983	REF 616	LAST 1072	00,3300	3 0155 0	DSQSUB	CA	MPAC +1	SQUARES THE SCALAR CONTENTS OF MPAC.
1984			00,3301	0 0006 1		EXTEND		
1985			00,3302	7 0000 0		SQUARE		
1986	REF 617	LAST 1073	00,3303	54 156 1		TS	MPAC +2	
1987	REF 205	LAST 1071	00,3304	3 4755 1		CAE	ZERO	FORM 2(CROSS TERM).
1988	REF 618	LAST 1073	00,3305	56 155 0		XCH	MPAC +1	
1989			00,3306	0 0006 1		EXTEND		
1990	REF 619	LAST 1073	00,3307	7 0154 0		MP	MPAC	
1991			00,3310	20 001 1		DDOUBL		AND MAYBE OVERFLOW.
1992	REF 620	LAST 1073	00,3311	20 156 1		DAS	MPAC +1	AND SET A TO NET OVERFLOW.
1993	REF 621	LAST 1073	00,3312	56 154 1		XCH	MPAC	
1994			00,3313	0 0006 1		EXTEND		
1995			00,3314	7 0000 0		SQUARE		
1996	REF 622	LAST 1073	00,3315	20 155 1		DAS	MPAC	
1997	REF 286	LAST 1069	00,3316	0 0002 0		TC	Q	
1998			00,3317	0 0006 1	VSQSUB	EXTEND		DOTS THE VECTOR IN MPAC WITH ITSELF.
1999	REF 8	LAST 1028	00,3320	22 137 1		QXCH	DOTRET	
2000	REF 2	LAST 1070	00,3321	0 3300 1		TC	DSQSUB	SQUARE THE X COMPONENT.
2001	REF 623	LAST 1073	00,3322	52 160 1		DXCH	MPAC +3	
2002	REF 624	LAST 1073	00,3323	52 155 1		DXCH	MPAC	
2003	REF 120	LAST 1067	00,3324	52 131 0		DXCH	BUF	SO WE CAN END IN DOTSUB.
2004	REF 625	LAST 1073	00,3325	3 0156 0		CA	MPAC +2	
2005	REF 121	LAST 1073	00,3326	54 132 0		TS	BUE +2	
2006	REF 3	LAST 1073	00,3327	0 3300 1		TC	DSQSUB	SQUARE Y COMPONENT.
2007	REF 626	LAST 1073	00,3330	52 156 1		DXCH	MPAC +1	
2008	REF 122	LAST 1073	00,3331	20 132 0		DAS	BUE +1	
2009	REF 627	LAST 1073	00,3332	6 0154 1		AD	MPAC	
2010	REF 123	LAST 1073	00,3333	6 0130 0		AD	BUF	
2011	REF 124	LAST 1073	00,3334	54 130 1		TS	BUF	
2012			00,3335	1 3337 1		TCF	+2	
2013	REF 8	LAST 1065	00,3336	54 121 1		TS	OVFIND	IF OVERFLOW.
2014	REF 628	LAST 1073	00,3337	52 162 0		DXCH	MPAC +5	
2015	REF 629	LAST 1073	00,3340	52 155 1		DXCH	MPAC	
2016	REF 4	LAST 1073	00,3341	0 3300 1		TC	DSQSUB	SQUARE Z COMPONENT.
2017	REF 1		00,3342	1 7204 1		TCE	ENDDOT	END AS IN DOTSUB.

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P2018 DCUBLE PRECISION SQUARE ROOT ROUTINE. TAKE THE SQUARE ROOT OF THE TRIPLE PRECISION (MPAC +2 USED ONLY
 R2020 IN NORMALIZATION) CONTENTS OF MPAC AND LEAVE THE NORMALIZED RESULT IN MPAC (C(MPAC) GREATER THAN OR EQUAL TO
 R2022 .5). THE RIGHT SHIFT COUNT (TO UNNORMALIZE) IS LEFT IN MPTEMP.

2023	REF 206	LAST 1073	00,3343	3 4755 1	SQRTSUB	CAF	ZERO	START BY ZEROING RIGHT SHIFT COUNT.
2024	REF 59	LAST 1071	00,3344	54 135 1		TS	MPTEMP	
2025	REF 630	LAST 1073	00,3345	10 154 0		CCS	MPAC	CHECK FOR POSITIVE ARGUMENT, SHIFTING
2026	REF 1		00,3346	1 3405 1		TCF	SMPAC+	FIRST SIGNIFICANT MPAC REGISTER INTO
2027			00,3347	1 3351 1		TCF	+2	MPAC ITSELF.
2028	REF 1		00,3350	1 3373 1		TCF	SQRTNEG	SEE IF MAG OF ARGUMENT LESS THAN 10(-4).
2029	REF 631	LAST 1074	00,3351	56 156 0		XCH	MPAC +2	MPAC IS ZERO - SHIFT LEFT 14.
2030	REF 632	LAST 1074	00,3352	56 155 0		XCH	MPAC +1	
2031	REF 633	LAST 1074	00,3353	54 154 0		TS	MPAC	
2032	REF 14	LAST 958	00,3354	3 4757 0		CAF	SEVEN	AUGMENT RIGHT SHIFT COUNTER.
2033	REF 60	LAST 1074	00,3355	54 135 1		TS	MPTEMP	
2034	REF 634	LAST 1074	00,3356	10 154 0		CCS	MPAC	SEE IF MPAC NOW PNZ.
2035	REF 2	LAST 1074	00,3357	1 3405 1		TCF	SMPAC+	
2036			00,3360	1 3362 1		TCF	+2	
2037	REF 1		00,3361	1 3376 1		TCF	ZEROANS	NEGATIVE BUT LESS THAN 10(-4) IN MAG.
2038	REF 635	LAST 1074	00,3362	56 155 0		XCH	MPAC +1	ZERO - SHIFT LEFT 14 AGAIN.
2039	REF 636	LAST 1074	00,3363	54 154 0		TS	MPAC	
2040	REF 15	LAST 1074	00,3364	3 4757 0		CAF	SEVEN	AUGMENT RIGHT SHIFT COUNTER.
2041	REF 61	LAST 1074	00,3365	26 135 1		ADS	MPTEMP	
2042	REF 637	LAST 1074	00,3366	10 154 0		CCS	MPAC	
2043	REF 3	LAST 1074	00,3367	1 3405 1		TCF	SMPAC+	
2044	REF 287	LAST 1073	00,3370	0 0002 0		TC	Q	SQRT(0) = 0.
2045	REF 2	LAST 1074	00,3371	1 3376 1		TCF	ZEROANS	
2046	REF 1		00,3372	1 3453 1		TCF	FIXROOT	DO NOT LEAVE SQRTSUB WITH -0 IN MPAC.
2047	REF 354	LAST 1072	00,3373	10 000 0	SQRTNEG	CCS	A	ARGUMENT IS NEGATIVE, BUT SEE IF SIGN-
2048	REF 1		00,3374	1 3402 0		TCF	SQRTABRT	CORRECTED ARGUMENT IS LESS THAN 10(-4)
2049	REF 638	LAST 1074	00,3375	10 155 1		CCS	MPAC +1	IN MAGNITUDE. IF SO, CALL ANSWER ZERO.
2050	REF 207	LAST 1074	00,3376	3 4755 1	ZEROANS	CAF	ZERO	FORCE ANSWER TO ZERO HERE.
2051	REF 2	LAST 1074	00,3377	1 3453 1		TCF	FIXROOT	
2052	REF 2	LAST 1074	00,3400	1 3402 0		TCF	SQRTABRT	
2053	REF 3	LAST 1074	00,3401	1 3453 1		TCF	FIXROOT	
2054	REF 27	LAST 1020	00,3402	52 165 1	SQRTABRT	DXCH	LOC	
2054.1	REF 1		00,3403	0 5720 1		TC	POOD001	
2055			00,3404	01302 1		OCT	1302	

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2056	REF 1	00,3405	6 2444 1	SMPAC+	AD -1/2+2	SEE IF ARGUMENT GREATER THAN OR EQUAL TO .5.
2057		00,3406	0 0006 1		EXTEND	
2058	REF 1	00,3407	6 3456 0		BZMF SRTEST	IF SO, SEE IF LESS THAN .25.
2059	REF 639 LAST 1074	00,3410	52 155 1		DXCH MPAC	WE WILL TAKE THE SQUARE ROOT OF MPAC/2.
2060	REF 16 LAST 1056	00,3411	22 021 1		LXCH SR	SHIFT RIGHT 1 AND GO TO THE SQRT ROUTINE
2061		00,3412	0 0006 1		EXTEND	
2062	REF 17 LAST 1056	00,3413	7 4736 0		MP HALF	
2063	REF 640 LAST 1075	00,3414	52 155 1		DXCH MPAC	
2064	REF 17 LAST 1075	00,3415	56 021 1		XCH SR	
2065	REF 641 LAST 1075	00,3416	26 155 1		ADS MPAC +1	GUARANTEED NO OVERFLOW.
2066	REF 1	00,3417	3 2314 0	ARGHI	CAF SLOPEHI	ARGUMENT BETWEEN .25 AND .5. GET A
2067		00,3420	0 0006 1		EXTEND	LINEAR APPROXIMATION FOR THIS RANGE.
2068	REF 642 LAST 1075	00,3421	7 0154 0		MP MPAC	
2069	REF 1	00,3422	6 2566 0		AD BIASHI	$X0/2 = (MPAC/2)(SLOPEHI) + BIASHI/2.$
2070	REF 125 LAST 1073	00,3423	54 130 1	+4	TS BUF	$X0/2$ (ARGLO ENTERS HERE).
2071	REF 643 LAST 1075	00,3424	3 0154 1		CA MPAC	SINGLE-PRECISION THROUGHOUT.
2072		00,3425	22 007 0		ZL	
2073		00,3426	0 0006 1		EXTEND	
2074	REF 126 LAST 1075	00,3427	10 130 1		DV BUF	$(MPAC/2)/(X0/2)$
2075		00,3430	0 0006 1		EXTEND	
2076	REF 18 LAST 1075	00,3431	7 4736 0		MP HALF	
2077	REF 127 LAST 1075	00,3432	26 130 1		ADS BUF	$X1 = X0/2 + .5(MPAC/2)/(X0/2).$
2078		00,3433	0 0006 1		EXTEND	
2079	REF 19 LAST 1075	00,3434	7 4736 0		MP HALF	FORM UP $X1/2$.
2080	REF 644 LAST 1075	00,3435	52 155 1		DXCH MPAC	SAVE AND BRING OUT ARGUMENT.
2081		00,3436	0 0006 1		EXTEND	TAKE DP QUOTIENT WITH $X1$.
2082	REF 128 LAST 1075	00,3437	10 130 1		DV BUF	
2083	REF 129 LAST 1075	00,3440	54 131 0		TS BUF +1	SAVE MAJOR PART OF QUOTIENT.
2084	REF 208 LAST 1074	00,3441	3 4755 1		CAF ZERO	FORM MINOR PART OF QUOTIENT USING
2085	REF 195 LAST 1067	00,3442	56 001 0		XCH L	(REMAINDER,0).
2086		00,3443	0 0006 1		EXTEND	
2087	REF 130 LAST 1075	00,3444	10 130 1		DV BUF	
2088	REF 196 LAST 1075	00,3445	54 001 1		TS L	IN PREPARATION FOR DAS.
2089	REF 131 LAST 1075	00,3446	3 0131 1		CA BUF +1	
2090	REF 645 LAST 1075	00,3447	20 155 1		DAS MPAC	$X2 = X1/2 + (MPAC/2)X1$
2091		00,3450	0 0006 1		EXTEND	OVERFLOWS IF ARG. NEAR POSMAX.
2092	REF 1	00,3451	1 3455 1		BZF TCQBNK00	
2093	REF 27 LAST 1060	00,3452	3 4733 1		CAF POSMAX	
2094	REF 646 LAST 1075	00,3453	54 154 0	FIXROOT	TS MPAC	
2095	REF 647 LAST 1075	00,3454	54 155 1		TS MPAC +1	
2096	REF 288 LAST 1074	00,3455	0 0002 0	TCQBNK00	TC Q	RETURN TO CALLER TO UNNORMALIZE, ETC.

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2097	REF	1		00,3456	6 4737	0	SRTEST	AD	QUARTER	ARGUMENT WAS LESS THAN .5, SEE IF LESS
2098				00,3457	0 0006	1		EXTEND		THAN .25.
2099	REF	1		00,3460	6 3502	0		BZMF	SQRINORM	IF SO, BEGIN NORMALIZATION.
2100	REF	648	LAST 1075	00,3461	52 155	1		DXCH	MPAC	IF BETWEEN .5 AND .25, SHIFT RIGHT 1 AND
2101	RFF	18	LAST 1075	00,3462	22 021	1		LXCH	SR	START AT ARGLO.
2102				00,3463	0 0006	1		EXTEND		
2103	REF	20	LAST 1075	00,3464	7 4736	0		MP	HALF	
2104	REF	649	LAST 1076	00,3465	52 155	1		DXCH	MPAC	
2105	RFF	19	LAST 1076	00,3466	56 021	1		XCH	SR	
2106	RFF	650	LAST 1076	00,3467	26 155	1		ADS	MPAC +1	NO OVERFLOW.
2107	REF	1		00,3470	3 3007	0	ARGLO	CAF	SLOPELO	(NORMALIZED) ARGUMENT BETWEEN .125 AND
2108				00,3471	0 0006	1		EXTEND		.25
2109	REF	651	LAST 1076	00,3472	7 0154	0		MP	MPAC	
2110	REF	1		00,3473	6 2270	0		AD	BIASLO	
2111	REF	1		00,3474	1 3423	0		TCF	ARGH1 +4	BEGIN SQUARE ROOT.
2112				00,3475	0 0006	1	SQRINM2	EXTEND		SHIFT LEFT 2 AND INCREMENT RIGHT SHIFT
2113	REF	652	LAST 1076	00,3476	3 0156	0		DCA	MPAC +1	COUNT (FOR TERMINAL UNNORMALIZATION).
2114	REF	653	LAST 1076	00,3477	20 156	1		DAS	MPAC +1	
2115	REF	654	LAST 1076	00,3500	6 0154	1		AD	MPAC	
2116	REF	655	LAST 1076	00,3501	26 154	0		ADS	MPAC	(NO OVERFLOW).
2117	REF	62	LAST 1074	00,3502	24 135	0	SQRINORM	INCR	MPTMP	FIRST TIME THROUGH, JUST SHIFT LEFT 1
2118				00,3503	0 0006	1		EXTEND		(PUTS IN EFFECTIVE RIGHT SHIFT SINCE
2119	REF	656	LAST 1076	00,3504	3 0156	0		DCA	MPAC +1	WE WANT MPAC/2).
2120	REF	657	LAST 1076	00,3505	20 156	1		DAS	MPAC +1	
2121	REF	658	LAST 1076	00,3506	6 0154	1		AD	MPAC	
2122	REF	659	LAST 1076	00,3507	26 154	0		ADS	MPAC	(AGAIN NO OVERFLOW).
2123				00,3510	6 0000	1		DOUBLE		
2124	REF	19	LAST 474	00,3511	54 022	0		TS	CYL	
2125	REF	20	LAST 1076	00,3512	10 022	0	NORMTEST	CCS	CYL	SEE IF ARGUMENT NOW NORMALIZED AT
2126	RFF	21	LAST 1076	00,3513	10 022	0		CCS	CYL	GREATER THAN .125.
2127	RFF	1		00,3514	1 3475	0		TCF	SQRINM2	NO - SHIFT LEFT 2 MORE AND TRY AGAIN.
2128	REF	2	LAST 1076	00,3515	1 3417	1		TCF	ARGH1	YES - NOW BETWEEN .5 AND .25.
2129	REF	1		00,3516	1 3470	0		TCF	ARGLO	ARGUMENT NOW BETWEEN .25 AND .125.

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P2130 TRIGONOMETRIC FUNCTION PACKAGE.

R2131 THE FOLLOWING TRIGONOMETRIC FUNCTIONS ARE AVAILABLE AS INTERPRETIVE OPERATIONS:

R2133 1. SIN COMPUTES (1/2)SINE(2 PI MPAC).
 R2134 2. COS COMPUTES (1/2)COSINE(2 PI MPAC).
 R2135 3. ASIN COMPUTES (1/2PI)ARCSINE(2 MPAC).
 R2136 4. ACOS COMPUTES (1/2PI)ARCCOSINE(2 MPAC).

R2137 SIN-ASIN AND COS-ACOS ARE MUTUALLY INVERSE, IE SIN(ASIN(X)) = X.

2138	REF	7	LAST 1071	00,3517	0 6722 0	COSINE	TC	BRANCH	FINDS COSINE USING THE IDENTITY
2139				00,3520	1 3523 1		TCF	+3	COS(X) = SIN(PI/2 - ABS(X)).
2140	REF	1		00,3521	1 3526 1		TCF	PRESINE	
2141	REF	2	LAST 1077	00,3522	1 3526 1		TCF	PRESINE	
2142				00,3523	0 0006 1	+3	EXTEND		
2143	REF	660	LAST 1076	00,3524	4 0155 1		DCS	MPAC	
2144	REF	661	LAST 1077	00,3525	52 155 1		DXCH	MPAC	
2145	REF	2	LAST 1076	00,3526	3 4737 0	PRESINE	CAF	QUARTER	PI/2 SCALED.
2146	REF	662	LAST 1077	00,3527	26 154 0		ADS	MPAC	
2147	REF	663	LAST 1077	00,3530	52 155 1	SINE	DXCH	MPAC	DOUBLE ARGUMENT.
2148				00,3531	20 001 1		DDOUBL		
2149				00,3532	54 000 0		OVSK		SEE IF OVERFLOW PRESENT.
2150				00,3533	1 3536 0		TCF	+3	IF NOT, ARGUMENT OK AS IS.
2151				00,3534	0 0006 1		EXTEND		IF SO, WE LOST (OR GAINED) PI, SO
2152				00,3535	4 0001 1		DCOM		COMPLEMENT MPAC USING THE IDENTITY
A2153									SIN(X-(+)PI) = SIN(-X).
2154	REF	664	LAST 1077	00,3536	52 155 1	+3	DXCH	MPAC	
2155	REF	665	LAST 1077	00,3537	3 0154 1		CA	MPAC	SEE IF ARGUMENT GREATER THAN .5 IN
2156				00,3540	6 0000 1		DOUBLE		MAGNITUDE. IF SO, REDUCE IT TO LESS THAN
2157	REF	197	LAST 1075	00,3541	54 001 1		TS	L	.5 (+-PI/2 SCALED) AS FOLLOWS:
2158	REF	1		00,3542	1 3553 0		TCF	SN1	
2159	REF	355	LAST 1074	00,3543	50 000 1		INDEX	A	IF POSITIVE, FORM PI - X, IF NEGATIVE
2160	REF	4	LAST 859	00,3544	3 4735 1		CAF	NEG1/2 +1	USE -PI - X.
2161				00,3545	6 0000 1		DOUBLE		
2162				00,3546	0 0006 1		EXTEND		
2163	REF	666	LAST 1077	00,3547	60 154 1		SU	MPAC	GUARANTEED NO OVERFLOW.
2164	REF	667	LAST 1077	00,3550	54 154 0		TS	MPAC	
2165	REF	668	LAST 1077	00,3551	4 0155 1		CS	MPAC +1	
2166	REF	669	LAST 1077	00,3552	54 155 1		TS	MPAC +1	

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2167			00,3553	0 0006 1	SN1	EXTEND		SET UP TO EVALUATE HASTINGS POLYNOMIAL
2168	REF 670	LAST 1077	00,3554	3 0155 0		DCA	MPAC	
2169	REF 20	LAST 1063	00,3555	52 134 0		DXCH	BUF2	
2170	REF 5	LAST 1073	00,3556	0 3300 1		TC	DSQSUB	SQUARE MPAC.
2171	REF 2	LAST 857	00,3557	0 7221 1		TC	POLY	EVALUATE FOURTH ORDER POLYNOMIAL.
2172			00,3560	00003 1		DEC	3	
2173			00,3561	14441 0		2DEC	+ .3926990796	
2173			00,3562	37325 1				
2174			00,3563	53250 0		2DEC	- .6459637111	
2174			00,3564	60764 1				
2175			00,3565	12146 1		2DEC	+ .318758717	
2175			00,3566	21276 1				
2176			00,3567	75466 1		2DEC	- .074780249	
2176			00,3570	71471 0				
2177			00,3571	00236 0		2DEC	+ .009694988	
2177			00,3572	32757 0				
2178	REF 1		00,3573	3 2470 0		CAF	LBUF2	MULTIPLY BY ARGUMENT AND SHIFT LEFT 2.
2179	REF 19	LAST 1039	00,3574	0 7105 1		TC	DMPSUB -1	
2180			00,3575	0 0006 1		EXTEND		
2181	REF 671	LAST 1078	00,3576	3 0156 0		DCA	MPAC +1	
2182	REF 672	LAST 1078	00,3577	20 156 1		DAS	MPAC +1	
2183	REF 673	LAST 1078	00,3600	6 0154 1		AD	MPAC	
2184	REF 674	LAST 1078	00,3601	26 154 0		ADS	MPAC	NEITHER SHIFT OVERFLOWS.
2185			00,3602	0 0006 1		EXTEND		
2186	REF 675	LAST 1078	00,3603	3 0156 0		DCA	MPAC +1	
2187	REF 676	LAST 1078	00,3604	20 156 1		DAS	MPAC +1	
2188	REF 677	LAST 1078	00,3605	6 0154 1		AD	MPAC	
2189	REF 678	LAST 1078	00,3606	26 154 0		ADS	MPAC	
2190	REF 40	LAST 1072	00,3607	1 6060 0		TCF	DAN7 IG	

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P2191 ARCSIN/ARCCOS ROUTINE.

2192	REF	1		00,3610	3 3631 0	ARCSIN	CAF	LASINEX	COMPUTE ARCSIN BY USING THE IDENTITY
2193				00,3611	1 3613 1		TCF	+2	ARCSIN(X) = PI/2 - ARCCOS(X).
2194	REF	1		00,3612	3 3713 1	ARCCOS	CAF	LDANZIG	(EXITS IMMEDIATELY).
2195	REF	1		00,3613	54 136 1		TS	ESCAPE	
2196	REF	8	LAST 1077	00,3614	0 6722 0		TC	BRANCH	TEST SIGN OF INPUT.
2197	REF	1		00,3615	1 3625 1		TCF	ACOSST	START IMMEDIATELY IF POSITIVE.
2198	REF	1		00,3616	1 3731 0		TCF	ACOSZERO	ARCCOS(0) = PI/2 = .25.
2199				00,3617	0 0006 1		EXTEND		IF NEGATIVE, USE THE IDENTITY
2200	REF	679	LAST 1078	00,3620	4 0155 1		DCS	MPAC	ARCCOS(X) = PI - ARCCOS(-X), FORCING
2201	REF	680	LAST 1079	00,3621	52 155 1		DXCH	MPAC	ARGUMENT POSITIVE.
2202	REF	1		00,3622	3 3734 1		CAF	TCSUBTR	SFT EXIT TO DO ABOVE BEFORE
2203	REF	2	LAST 1079	00,3623	56 136 0		XCH	ESCAPE	ARCSIN/ARCCOS CONSIDERATIONS.
2204	REF	1		00,3624	54 137 0		TS	ESCAPF2	
2205	REF	21	LAST 1076	00,3625	4 4736 0	ACOSST	CS	HALF	TEST MAGNITUDE OF INPUT.
2206	REF	681	LAST 1079	00,3626	6 0154 1		AD	MPAC	
2207	REF	356	LAST 1077	00,3627	10 000 0		CCS	A	
2208	REF	1		00,3630	1 3721 1		TCF	ACOSOVF	THIS IS PROBABLY AN OVERFLOW CASE.
2209	REF	1		00,3631	1 3707 0	LASINEX	TCF	ASINEX	
2210	REF	1		00,3632	1 3642 0		TCF	ACOSST2	NO OVERFLOW - PROCEED.
2211	REF	682	LAST 1079	00,3633	10 155 1		CCS	MPAC +1	IF MAJOR PART IS .5, CALL ANSWER 0
2212	REF	209	LAST 1075	00,3634	3 4755 1		CAF	ZERO	UNLESS MINOR PART NEGATIVE.
2213	REF	1		00,3635	1 3637 1		TCF	ACOS=0	
2214	REF	2	LAST 1079	00,3636	1 3642 0		TCF	ACOSST2	
2215	REF	683	LAST 1079	00,3637	54 155 1	ACOS=0	TS	MPAC +1	
2216	REF	684	LAST 1079	00,3640	54 154 0		TS	MPAC	
2217	REF	3	LAST 1079	00,3641	0 0136 0		TC	ESCAPE	
2218				00,3642	0 0006 1	ACOSST2	EXTEND		NOW THAT ARGUMENT IS IN PROPER RANGE,
2219	REF	685	LAST 1079	00,3643	4 0155 1		DCS	MPAC	BEGIN COMPUTATION. USE HASTINGS
2220	REF	22	LAST 1079	00,3644	6 4736 1		AD	HALF	APPROXIMATION ARCCOS(X) = SQRT[1-X]P(X)
2221	REF	686	LAST 1079	00,3645	52 155 1		DXCH	MPAC	IN A SCALED VERSION WHERE P(X) IS A
2222	REF	21	LAST 1078	00,3646	52 134 0		DXCH	BUF2	SEVENTH ORDER POLYNOMIAL.
2223	REF	3	LAST 1071	00,3647	0 3343 0		TC	SQRTSUB	RETURNS WITH NORMALIZED SQUARE ROOT.
2224	REF	63	LAST 1076	00,3650	10 135 1		CCS	MPTEMP	SEE IF UN-NORMALIZATION REQUIRED.
2225	REF	1		00,3651	1 3714 1		TCF	ACOSSHR	IF SO.

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2226	REF 687	LAST 1079	00,3652	52 155 1	ACOS3	DXCH	MPAC	SET UP FOR POLYNOMIAL EVALUATION.	
2227	REF 22	LAST 1079	00,3653	52 134 0		DXCH	BUF2		
2228	REF 688	LAST 1080	00,3654	52 155 1		DXCH	MPAC		
2229	REF 3	LAST 1078	00,3655	0 7221 1		TC	POLY		
2230			00,3656	00006 1		DEC	6		
2231			00,3657	13240 0		2DEC	+ .353553385	COEFFICIENTS ARE C 2(+I)/PISQRT(2) WHERE	
2231			00,3660	23630 0					
2232			00,3661	74721 0		2DEC*	- .0483017006 B+1*	I	
2232			00,3662	47775 1					
2233			00,3663	02440 0		2DEC*	+ .0200273085 B+2*	WHERE C STANDS FOR ORIGINAL COEFFS.	
2233			00,3664	20237 0					
2234			00,3665	75067 1		2DEC*	- .0112931863 B+3*		
2234			00,3666	70742 1					
2235			00,3667	03436 0		2DEC*	+ .00695311612 B+4*		
2235			00,3670	26756 1					
2236			00,3671	74037 0		2DEC*	- .00384617957 B+5*		
2236			00,3672	57640 1					
2237			00,3673	03046 0		2DEC*	+ .001501297736 B+6*		
2237			00,3674	07143 0					
2238			00,3675	76654 1		2DEC*	- .000284160334 B+7*		
2238			00,3676	42244 0					
2239	REF 2	LAST 1078	00,3677	3 2470 0	CAF	LBUF2		DO FINAL MULTIPLY AND GO TO ANY	
2240	REF 20	LAST 1078	00,3700	0 7105 1	TC	DMPSUB -1		EPILOGUE SEQUENCES.	
2241	REF 4	LAST 1079	00,3701	0 0136 0	TC	ESCAPE			
2242			00,3702	0 0006 1	SUBTR	EXTEND		EPILOGUE FOR NEGATIVE INPUTS TO ARCCOS.	
2243	REF 689	LAST 1080	00,3703	4 0155 1	DCS	MPAC			
2244	REF 23	LAST 1079	00,3704	6 4736 1	AD	HALF		FORMS PI - ARCCOS(-X) = ARCCOS(X).	
2245	REF 690	LAST 1080	00,3705	52 155 1	DXCH	MPAC			
2246	REF 2	LAST 1079	00,3706	0 0137 1	TC	ESCAPE2		GO TO POSSIBLE ARCSIN EPILOGUE.	
2247			00,3707	0 0006 1	ASINEX	EXTEND			
2248	REF 691	LAST 1080	00,3710	4 0155 1	DCS	MPAC		ARCSIN EPILOGUE - GET ARCSIN(X)	
2249	REF 3	LAST 1077	00,3711	6 4737 0	AD	QUARTER		= PI/2 - ARCCOS(X).	
2250	REF 692	LAST 1080	00,3712	52 155 1	DXCH	MPAC			
2251	REF 41	LAST 1078	00,3713	1 6060 0	LDANZIG	TCF	DANZIG		

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2252	REF 357	LAST 1079	00,3714	50 000 1	ACOSSHR	INDEX A		THE SHIFT RIGHT IS LESS THAN 14 SINCE THE INPUT WAS NON-ZERO DP.
2253	REF 70	LAST 1068	00,3715	3 4736 1	CAF	BIT14		
2254	REF 64	LAST 1079	00,3716	54 135 1	TS	MPTMP		
2255	REF 4	LAST 1045	00,3717	0 2073 1	TC	VSHRRND		
2256	REF 1		00,3720	1 3652 1	TCF	ACOS3		DP SHIFT RIGHT AND ROUND. PROCEED.
2257			00,3721	0 0006 1	ACOSOVF	EXTEND		IF MAJOR PART WAS ONLY 1 MORE THAN .5, CALL ANSWER ZERO.
2258	REF 2	LAST 1079	00,3722	1 3637 1	BZF	ACDS=0		
2259			00,3723	0 0006 1	ACOSABRT	EXTEND		IF OVERFLOW, CALL ANSWER ZERO BUT SOUND AN ALARM.
22591	REF 28	LAST 1074	00,3724	3 0165 0	DCA	LJC		
22592	REF 1		00,3725	0 5724 0	TC	ALARM1		
22593			00,3726	01301 1	OCT	1301		
2260	REF 210	LAST 1079	00,3727	3 4755 1		CAF	ZERO	
22601	REF 3	LAST 1081	00,3730	1 3637 1		TCF	ACOS=0	
2261	REF 4	LAST 1080	00,3731	3 4737 0	ACOSZERO	CAF	QUARTER	ACOS(0) = PI/2. SET MPAC AND EXIT VIA ESCAPE.
2262	REF 4	LAST 1081	00,3732	1 3640 1		TCF	ACOS=0 +1	
2263			00,3733	77763 0	NEG12	DEC	-12	
2264	REF 1		00,3734	1 3702 0	TCSUBTR	TCF	SUBTR	

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P2265 THE FOLLOWING INSTRUCTIONS ARE AVAILABLE FOR SETTING, MODIFYING, AND BRANCHING ON INDEX REGISTERS:

R2267	1. AXT	ADDRESS TO INDEX TRUE.
R2268	1. AXC	ADDRESS TO INDEX COMPLEMENTED.
R2269	3. LXA	LOAD INDEX FROM ERASABLE.
R2270	4. LXC	LOAD INDEX COMPLEMENTED FROM ERASABLE.
R2271	5. SXA	STORE INDEX IN ERASABLE.
R2272	6. XCHX	EXCHANGE INDEX REGISTER WITH ERASABLE.
R2273	7. INCR	INCREMENT INDEX REGISTER.
R2274	8. XAD	ERASABLE ADD TO INDEX REGISTER.
R2275	9. XSU	ERASABLE SUBTRACT FROM INDEX REGISTER.
R2276	10. TIX	BRANCH ON INDEX REGISTER AND DECREMENT.

2277			01,2341		BANK	01	
2278	REF	1			COUNT*	\$/INTER	
2279	REF	1	01,2341	0 2436 1	AXT	TC	TAGSUR
2280	REF	23	LAST 1072	01,2342	3 0117 0	CA	POLISH
2281	REF	4	LAST 1001	01,2343	50 130 0	XSTORE	INDEX INDEXLOC
2282	REF	24	LAST 1011	01,2344	54 046 1	TS	X1
2283	REF	42	LAST 1090	01,2345	1 6060 0	TCF	DANZIG
2284	REF	2	LAST 1082	01,2346	0 2436 1	AXC	TC TAGSUR
2285	REF	24	LAST 1082	01,2347	4 0117 1	CS	POLISH
2286	REF	1		01,2350	0 2343 1	TC	XSTORE
2287	REF	1		01,2351	0 2424 1	LXA	TC 15ADRRS
2288	REF	25	LAST 1082	01,2352	50 117 0	INDEX	POLISH
2289				01,2353	3 0000 1	CA	0
2290	REF	2	LAST 1082	01,2354	1 2343 0	TCF	XSTORE
2291	REF	2	LAST 1082	01,2355	0 2424 1	LXC	TC 15ADREPS
2292	REF	26	LAST 1082	01,2356	50 117 0	INDEX	POLISH
2293				01,2357	4 0000 0	CS	0
2294	REF	3	LAST 1082	01,2360	1 2343 0	TCF	XSTORE
2295	REF	3	LAST 1082	01,2361	0 2424 1	SXA	TC 15ADRRS
2296	REF	5	LAST 1082	01,2362	50 130 0	INDEX	INDEXLOC
2297	REF	25	LAST 1082	01,2363	3 0046 0	CA	X1
2298	REF	27	LAST 1082	01,2364	50 117 0	MSTORE1	INDEX POLISH
2299				01,2365	54 000 0	TS	0
2300	REF	43	LAST 1082	01,2366	1 6060 0	TCF	DANZIG

SELECT APPROPRIATE INDEX REGISTER.

CONTAINS C(FIXLOC) OR C(FIXLOC)+1.

LOAD INDEX REGISTER FROM ERASABLE.

LOAD NDX REG FROM ERASABLE COMPLEMENTED.

STORE INDEX REGISTER IN ERASABLE.

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2301	REF	4	LAST	1082	01,2367	0 2424 1	XCHX	TC	15ADPERS	EXCHANGE INDEX REGISTER WITH ERASABLE.
2302	REF	28	LAST	1082	01,2370	50 117 0		INDEX	POLISH	
2303					01,2371	3 0000 1		CA	0	
2304	REF	6	LAST	1082	01,2372	50 130 0		INDEX	INDEXLOC	
2305	REF	26	LAST	1082	01,2373	56 046 0		XCH	X1	
2306	REF	1			01,2374	1 2364 0		TCF	MSICRE1	
2307	REF	5	LAST	1083	01,2375	0 2424 1	XAD	TC	15ADPERS	ADD ERASABLE TO INDEX REGISTER.
2308	RFF	29	LAST	1083	01,2376	50 117 0		INDEX	POLISH	
2309					01,2377	3 0000 1		CA	0	
2310	REF	7	LAST	1083	01,2400	50 130 0	XAD2	INDEX	INDEXLOC	
2311	REF	27	LAST	1083	01,2401	26 046 1		ADS	X1	IGNORING OVERFLOWS.
2312	REF	44	LAST	1082	01,2402	1 6060 0		TCF	DANZIG	
2313	REF	3	LAST	1082	01,2403	0 2436 1	INCR	TC	TAGSUB	INCREMENT INDEX REGISTER.
2314	REF	30	LAST	1083	01,2404	3 0117 0		CA	POLISH	
2315	REF	1			01,2405	1 2400 0		TCF	XAD2	
2316	REF	6	LAST	1083	01,2406	0 2424 1	XSU	TC	15ADPERS	SUBTRACT ERASABLE FROM INDEX REGISTER.
2317	REF	31	LAST	1083	01,2407	50 117 0		INDEX	POLISH	
2318					01,2410	4 0000 0		CS	0	
2319	REF	2	LAST	1083	01,2411	1 2400 0		TCF	XAD2	
2320	REF	4	LAST	1083	01,2412	0 2436 1	TIX	TC	TAGSUB	BRANCH AND DECREMENT ON INDEX.
2321	REF	8	LAST	1083	01,2413	50 130 0		INDEX	INDEXLOC	
2322	REF	12	LAST	962	01,2414	4 0050 0		CS	S1	
2323	REF	9	LAST	1083	01,2415	50 130 0		INDEX	INDEXLOC	
2324	REF	28	LAST	1083	01,2416	6 0046 0		AD	X1	
2325					01,2417	0 0006 1		EXTEND		NO OPERATION IF DECREMENTED INDEX IS
2326	REF	45	LAST	1083	01,2420	6 6060 1		BZMF	DANZIG	NEGATIVE OR ZFRO.
2327	REF	10	LAST	1083	01,2421	50 130 0	DOTIXBR	INDEX	INDEXLOC	
2328	REF	29	LAST	1083	01,2422	56 046 0		XCH	X1	IGNORING OVERFLOWS.
2329	REE	6	LAST	1072	01,2423	1 6645 1		TCF	GOTO	DO THE BRANCH USING THE CADR IN POLISH.

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P2330 SUBROUTINE TO CONVERT AN ERASABLE ADDRESS (11 BITS) TO AN EBANK SETTING AND SUBADDRESS.

2332	REF	32	LAST 1083	01,2424	4 0117 1	15ADRS	CS	POLISH	
2333	REF	2	LAST 1011	01,2425	6 4772 1		AD	DEC45	
2334	REF	358	LAST 1081	01,2426	10 000 0		CCS	A	DOES THE ADDRESS POINT TO THE WORK AREA?
2335	REF	47	LAST 1072	01,2427	3 0120 1		CA	FIXLOC	YES. ADD FIXLOC. EBANK OK AS IS.
2336				01,2430	1 2435 0		TCF	+5	
2337	REF	6	LAST 1011	01,2431	3 5007 0		CA	DCT1400	NO. SET EBANK & MAKE UP SUBADDRESS.
2338	REF	33	LAST 1084	01,2432	56 117 0		XCH	POLISH	
2339	REF	49	LAST 1019	01,2433	54 003 0		TS	EBANK	
2340	REF	14	LAST 1019	01,2434	7 4357 0		MASK	LOW8	
2341	REF	34	LAST 1084	01,2435	26 117 1	+5	ADS	POLISH	FALL INTO TAGSUB, AND RETURN VIA Q.

R2342 SUBROUTINE WHICH SETS THE ADDRESS OF THE SPECIFIED INDEX IN INDEXLOC. (ACTUALLY, THE ADDRESS -38D.)

2344	REF	48	LAST 1084	01,2436	3 0120 1	TAGSUB	CA	FIXLOC	
2345	REF	11	LAST 1083	01,2437	54 130 1		TS	INDEXLOC	
2346	REF	36	LAST 1051	01,2440	10 020 1		CCS	CYR	BIT 15 SPECIFIES INDEX.
2347	REF	12	LAST 1084	01,2441	24 130 0		INCR	INDEXLOC	0 MEANS USE X2.
2348	REF	289	LAST 1075	01,2442	0 0002 0		TC	Q	
2349	REF	290	LAST 1084	01,2443	0 0002 0		TC	Q	1 FOR X1.

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P2350 MISCELLANEOUS OPERATION CODES WITH DIRECT ADDRESSES. INCLUDED HERE ARE:

R2352	1.	ITA	STORE QPRET (RETURN ADDRESS) IN ERASABLE.
R2354	2.	CALL	CALL A SUBROUTINE, LEAVING RETURN IN QPRET.
R2356	3.	RTB	RETURN TO BASIC LANGUAGE AT THE GIVEN ADDRESS.
R2358	4.	BHIZ	BRANCH IF THE HIGH ORDER OF MPAC IS ZERO (SINGLE PRECISION).
R2360	5.	BOV	BRANCH ON OVERFLOW.
R2361	6.	GOTO	SIMPLE SEQUENCE CHANGE.

2362	REF	37	LAST	1084	01,2444	10 020 1	RTB/BHIZ	CCS	CYR	
2363	REF	35	LAST	1084	01,2445	3 0117 0	RTB	CA	POLISH	
2364	REF	5	LAST	937	01,2446	0 4621 0		TC	SWCALL	-1 SO A "TC Q" FROM ROUTINE LEADS TO DANZIG
2365	REF	693	LAST	1080	01,2447	10 154 0	BHIZ	CCS	MPAC	
2366	REF	46	LAST	1083	01,2450	1 6060 0		TCF	DANZIG	
2367	REF	7	LAST	1083	01,2451	1 6645 1		TCF	GOTO	
2368	REF	47	LAST	1085	01,2452	1 6060 0		TCF	DANZIG	
2369	REF	8	LAST	1085	01,2453	1 6645 1		TCF	GOTO	
2370	REF	9	LAST	1073	01,2454	10 121 1	BOV(B)	CCS	OVFIND	BRANCH ON OVERFLOW TO BASIC OR INTERP.
2371					01,2455	1 2457 1		TCF	+2	
2372	REF	48	LAST	1085	01,2456	1 6060 0		TCF	DANZIG	
2373	REF	10	LAST	1085	01,2457	54 121 1		TS	OVFIND	
2374	REF	38	LAST	1085	01,2460	10 020 1		CCS	CYR	
2375	REF	1			01,2461	1 2445 1		TCF	RTB	IF BASIC.
2376					01,2462	00360 1	B5TOB8	OCT	360	
2377	REF	9	LAST	1085	01,2463	1 6645 1		TCF	GOTO	

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2378	REF	39	LAST	1085	01,2464	10 020 1	BZE/GOTO	CCS	CYR	SEE WHICH OP-CODE IS DESIRED.
2379	REF	9	LAST	1079	01,2465	0 6722 0		TC	BRANCH	DO BZE.
2380	REF	49	LAST	1085	01,2466	1 6060 0		TCF	DANZIG	
2381	REF	10	LAST	1085	01,2467	1 6645 1		TCF	GOTO	DO GOTO.
2382	REF	50	LAST	1086	01,2470	1 6060 0		TCF	DANZIG	
2383	REF	40	LAST	1086	01,2471	10 020 1	BPL/BMN	CCS	CYR	
2384	REF	1			01,2472	1 2500 1		TCF	BPL	
2385					01,2473	12000 1	5B10	DEC	5 B+10	SHIFTS OP CODE IN SWITCH INSTRUCTION ADR
2386	REF	10	LAST	1086	01,2474	0 6722 0		TC	BRANCH	DO BMN.
2387	REF	51	LAST	1086	01,2475	1 6060 0		TCF	DANZIG	
2388	REF	52	LAST	1086	01,2476	1 6060 0		TCF	DANZIG	
2389	REF	11	LAST	1086	01,2477	1 6645 1		TCF	GOTO	ONLY IF NNZ.
2390	REF	11	LAST	1086	01,2500	0 6722 0	BPL	TC	BRANCH	
2391	REF	12	LAST	1086	01,2501	1 6645 1		TCF	GOTO	IF POSITIVE OR ZERO.
2392	REF	13	LAST	1086	01,2502	1 6645 1		TCF	GOTO	
2393	REF	53	LAST	1086	01,2503	1 6060 0		TCF	DANZIG	
2394	REF	41	LAST	1086	01,2504	10 020 1	CALL/ITA	CCS	CYR	
2395	REF	1			01,2505	1 6637 1		TCF	CALL	
2396	REF	7	LAST	458	01,2506	0 5677 1		TC	CCSHOLE	
2397	REF	7	LAST	1083	01,2507	0 2424 1		TC	15ADRRS	STORE QPRET. (TAGSUB AFTER 15ADRRS IS
2398	REF	49	LAST	1084	01,2510	50 120 1		INDEX	FIXLOC	SLOW IN THIS CASE, BUT SAVES STORAGE.)
2399	REF	12	LAST	1072	01,2511	3 0052 0		CA	QPRET	
2400	REF	2	LAST	1083	01,2512	1 2364 0		TCF	MSTORE1	

L INTERPRETER

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P2401 THE FOLLOWING OPERATIONS ARE AVAILABLE FOR ALTERING AND TESTING INTERPRETIVE SWITCHES:

R2403	00	BONSET	SET A SWITCH AND DO A GOTO IF IT WAS ON.
R2404	01	SETGO	SET A SWITCH AND DO A GOTO.
R2405	02	BOFSET	SET A SWITCH AND DO A GOTO IF IT WAS OFF
R2406	03	SET	SET A SWITCH.

R2407	04	BONINV	INVERT A SWITCH AND BRANCH IF IT WAS ON.
R2408	05	INVGO	INVERT A SWITCH AND DO A GOTO.
R2409	06	BOFINV	INVERT A SWITCH AND BRANCH IF IT WAS OFF
R2410	07	INVERT	INVERT A SWITCH.

R2411	10	BCNCLR	CLEAR A SWITCH AND BRANCH IF IT WAS ON.
R2412	11	CLRGO	CLEAR A SWITCH AND DO A GOTO.
R2413	12	BOFCLR	CLEAR A SWITCH AND BRANCH IF IT WAS OFF.
R2414	13	CLEAR	CLEAR A SWITCH.

R2415	14	BCN	BRANCH IF A SWITCH WAS ON.
R2416	16	BOFF	BRANCH IF A SWITCH WAS OFF.

R2417 THE ADDRESS SUPPLIED WITH THE SWITCH INSTRUCTION IS INTERPRETED AS FOLLOWS:

R2419	BITS 1-4	SWITCH BIT NUMBER (1-15).
R2420	BITS 5-8	SWITCH OPERATION NUMBER.
R2421	BITS 9-	SWITCH WORD NUMBER (UP TO 64 SWITCH WORDS).

R2422 THE ADDRESS ITSELF IS MADE UP BY THE YUL SYSTEM ASSEMBLER. THE BRANCH INSTRUCTIONS REQUIRE TWO
 R2424 ADDRESSES, THE SECOND TAKEN AS THE DIRECT (OR INDIRECT IF IN ERASABLE) ADDRESS OF THE BRANCH.

2426	REF	1		01,2513	3 4762 0	SWITCHES	CAF	LDW4	LEAVE THE SWITCH BIT IN SWBIT .
2427	REF	36	LAST 1085	01,2514	7 0117 1		MASK	POLISH	
2428	REF	359	LAST 1084	01,2515	50 000 1		INDEX	A	
2429	REF	41	LAST 1071	01,2516	3 4735 1		CAF	BIT15	(NUMBER FROM LEFT TO RIGHT.)
2430	REF	1		01,2517	54 131 0		TS	SWBIT	

2431	REF	43	LAST 987	01,2520	3 4745 0		CAF	BIT7	LEAVE THE SWITCH NUMBER IN SWWORD.
2432				01,2521	0 0006 1		EXTEND		
2433	REF	37	LAST 1087	01,2522	7 0117 1		MP	POLISH	
2434	REF	1		01,2523	54 130 1		TS	SWWORD	

2435				01,2524	0 0004 0		INHINT		DURING SWITCH CHANGE SO RUPT CAN USE TOO
2436	REF	360	LAST 1087	01,2525	50 000 1		INDEX	A	LEAVE THE SWITCH WORD ITSELF IN L.
2437	REF	44	LAST 609	01,2526	3 0074 1		CA	STATE	
2438	REF	291	LAST 1084	01,2527	54 002 1		TS	Q	Q WILL BE USED AS A CHANNEL.

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2439	REF	30	LAST	917	01,2530	3 4741 1		CAF	BIT11	
2440					01,2531	0 0006 1		EXTEND		
2441	REF	38	LAST	1087	01,2532	7 0117 1		MP	POLISH	DISPATCH SWITCH BIT OPERATION AS IN BITS
2442	REF	1			01,2533	7 2573 0		MASK	B3T0B4	7-8 OF POLISH.
2443	REF	361	LAST	1087	01,2534	50 000 1		INDEX	A	GETS 4X2-BIT CODE.
2444					01,2535	1 2536 1		TCF	+1	
2445	REF	2	LAST	1087	01,2536	3 0131 1	+1	CA	SWBIT	00 - SET SWITCH IN QUESTION.
2446					01,2537	0 0006 1		EXTEND		
2447	REF	1			01,2540	04 002 1		ROR	QCHAN	
2448	REF	1			01,2541	1 2550 1		TCF	SWSTORE	
2449	REF	3	LAST	1088	01,2542	3 0131 1	+5	CA	SWBIT	01 - INVERT SWITCH.
2450					01,2543	0 0006 1		EXTEND		
2451	REF	2	LAST	1088	01,2544	06 002 0		RXOR	QCHAN	
2452	REF	2	LAST	1088	01,2545	1 2550 1		TCF	SWSTORE	
2453	REF	4	LAST	1088	01,2546	4 0131 0	+9D	CS	SWBIT	10 - CLEAR.
2454	REF	292	LAST	1087	01,2547	7 0002 1		MASK	Q	
2455	REF	2	LAST	1087	01,2550	50 130 0	SWSTORE	INDEX	SWWORD	
2456	REF	45	LAST	1087	01,2551	54 074 0		TS	STATE	NEW SWITCH WORD.

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2457				01,2552	0 0003 1	+13D	RELINT		11 - NOOP.
2458	REF 42	LAST 961		01,2553	3 4737 0		CAF	BIT13	
2459				01,2554	0 0006 1		EXTEND		DISPATCH SEQUEE CHANGING OR BRANCHING
2460	REF 39	LAST 1088		01,2555	7 0117 1		MP	POLISH	CODE.
2461	REF 2	LAST 1088		01,2556	7 2573 0		MASK	B3TOB4	
2462	REF 362	LAST 1088		01,2557	50 000 1		INDEX	A	
2463				01,2560	1 2561 0		TCF	+1	ORIGINALLY STORED IN BITS 5-6.
2464	REF 293	LAST 1088		01,2561	4 0002 1	+1	CS	Q	00 - BRANCH IF ON.
2465	REF 5	LAST 1088		01,2562	7 0131 0	TEST	MASK	SWBIT	
2466	REF 363	LAST 1089		01,2563	10 000 0		CCS	A	
2467	REF 1			01,2564	1 2574 1		TCF	SWSKIP	
2468	REF 1			01,2565	1 6714 1	+5	TCF	SWBRANCH	01 - GO TO.
2469	REF 2	LAST 1089		01,2566	1 2574 1		TCF	SWSKIP	HERE ONLY ON BIT 15.
2470	REF 8	LAST 1086		01,2567	0 5677 1		TC	CCSHOLE	
2471	REF 9	LAST 1089		01,2570	0 5677 1		TC	CCSHOLF	
2472	REF 294	LAST 1089		01,2571	3 0002 0	+9D	CA	Q	10 - BRANCH IF OFF.
2473	REF 1			01,2572	1 2562 0		TCF	TFST	
2474				01,2573	00014 1	B3TOB4	OCT	0014	
2475	REF 29	LAST 1081		01,2574	24 164 1	SWSKIP	INCR	LOC	
2476	REF 1			01,2513		SW/	EQUALS	SWITCHES	
2477	REF 54	LAST 1086		01,2575	1 6060 0	+13D	TCF	DANZIG	11 - NOOP.

L FIXED-FIXED CONSTANT POOL

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0001		4732			BLOCK 02	
00015	REF - 1				COUNT* \$1/FCONS	
R00016	THE FOLLOWING TABLE OF 18 VALUES IS INDEXED. DO NOT INSERT OR REMOVE ANY QUANTITIES.					
0002		4732	37777 1	DPOSMAX	OCT 37777	MUST PRECEDE POSMAX
0003		4733	37777 1	POSMAX	OCT 37777	
0004	REF 5 LAST 1077	4734		LIMITS	= NEG1/2	
0007		4734	57777 1	NFG1/2	OCT -20000	USED BY SIN ROUTINE (MUST BE TWO LOCATIONS IN FRONT OF BIT14)
A0008						
R0009	BIT TABLE					
0010		4735	40000 0	BIT15	OCT 40000	
0011		4736	20000 0	BIT14	OCT 20000	
0012		4737	10000 0	BIT13	OCT 10000	
0013		4740	04000 0	BIT12	OCT 04000	
0014		4741	02000 0	BIT11	OCT 02000	
0015		4742	01000 0	BIT10	OCT 01000	
0016		4743	00400 0	BIT9	OCT 00400	
0017		4744	00200 0	BIT8	OCT 00200	
0018		4745	00100 0	BIT7	OCT 00100	
0019		4746	00040 0	BIT6	OCT 00040	
0020		4747	00020 0	BIT5	OCT 00020	
0021		4750	00010 0	BIT4	OCT 00010	
0022		4751	00004 0	BIT3	OCT 00004	
0023		4752	00002 0	BIT2	OCT 00002	
0024		4753	00001 0	BIT1	OCT 00001	
R0025	DO NOT DESTROY THIS COMBINATION, SINCE IT IS USED IN DOUBLE PRECISION INSTRUCTIONS.					
0027		4754	77777 0	NEGO	OCT -0	MUST PRECEDE ZERO
0028		4755	00000 1	ZERO	OCT 0	MUST FOLLOW NFG0
A0029				BIT1	OCT 00001	
A0030				NO.WDS	OCT 2	INTERPRETER
A0031				OCTAL3	OCT 3	INTERPRETER
A0032				R3D1	OCT 4	PINBALL
0033		4756	00005 1	FIVE	OCT 5	
A0034				REVCNT	OCT 6	INTERPRETER
0035		4757	00007 0	SEVEN	OCT 7	
A0036				BIT4	OCT 00010	
A0037				R2D1	OCT 11	PINBALL
00375	REF 6 LAST 470	4320		OCT11	= R2D1	P2OS
A0038				BINCON	DEC 10	PINBALL (OCTAL 12)
0039		4760	00013 0	ELEVEN	DEC 11	
A0040				OCT14	OCT 14	ALARM AND ABORT (FILLER)
00401		4761	00015 0	OCT15	OCT 15	
A0041				R1D1	OCT 16	PINBALL
0043		4762	00017 1	LOW4	OCT 17	

L FIXED-FIXED CONSTANT POOL

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A0044				BIT5	OCT	00020	
A0045				ND1	OCT	21	PINBALL
A0046				VD1	OCT	23	PINBALL
A0047				OCT24	OCT	24	SERVICE ROUTINES
A0048				MD1	OCT	25	PINBALL
00485		4763	00030 1	BITS485	OCT	30	
A0049				OCT31	OCT	31	SERVICE ROUTINES
00491		4764	00033 1	OCT33	OCT	33	
00492	REF 3 LAST 866	4764		DEC27	=	OCT33	
00493		4765	00035 1	OCT35	OCT	35	
00494	RFF 1	4765		DEC29	=	OCT35	
0050		4766	00032 0	CALLCODE	OCT	00032	
A0051				LOW5	OCT	37	PINBALL
A0052				33DEC	DEC	33	PINBALL (OCTAL 41)
A0053				34DEC	DEC	34	PINBALL (OCTAL 42)
0054		4767	00045 0	TBUILD FX	DEC	37	BUILDUP FOR CONVENIENCE IN DAPTESTING
0055		4770	00046 0	TDECAY FX	DEC	38	CONVENIENCE FOR DAPTESTING
A0056				BIT6	OCT	00040	
0057		4771	00050 1	OCT50	OCT	50	
0058		4772	00055 1	DFC45	DEC	45	
0059		4773	00060 1	SUPER011	OCT	60	BITS FOR SUPERBNK SETTING 011.
0060		4774	00062 0	.55FC	DEC	50	
A0061				BIT7	OCT	00100	
0062	RFF 44 LAST 1087	4745		SUPER100	=	BIT7	BITS FOR SUPERBNK SETTING 100
A0063							(LAST 4K OF ROPE)
0064		4775	00120 1	SUPER101	OCT	120	BITS FOR SUPERBNK SETTING 101
A0065				OCT121	OCT	121	SERVICE ROUTINES
A0066							(FIRST 8K OF ACM)
0067		4776	00140 1	SUPER110	OCT	140	BITS FOR SUPERBNK SETTING 110.
A0068							(LAST 8K OF ACM)
0069		4777	00144 0	1SEC	DEC	100	
A0070				LOW7	OCT	177	INTERPRETER
A0071				BIT8	OCT	00200	
A0072				OT215	OCT	215	ALARM AND ABORT
A0073				8,5	OCT	00220	P20-P25 SUNDANCE
0074		5000	00310 0	2SECS	DEC	200	
A0075				LOW8	OCT	377	PINBALL
A0076				BIT9	OCT	00400	
0077		5001	00401 1	GN/CCODE	OCT	00401	SET S/C CONTROL SWITCH TO G/N
0079		5002	00454 1	3SECS	DEC	300	
0080		5003	00620 0	4SECS	DEC	400	
00801		5004	00777 0	LOW9	OCT	777	
A0081				BIT10	OCT	01000	
A0082				5.5DEGS	DEC	.03056	P20-P25 SUNDANCE (OCTAL 00765)
A0083				OCT1103	OCT	1103	ALARM AND ABORT
0084		5005	01124 1	C5/2	DEC	.0363551	(OCTAL 01124)
0085		5006	01211 1	V05N09	VN	0509	(SAME AS OCTAL 1211)
0086		5007	01400 1	OCT1400	OCT	01400	
00865		5010	01426 0	V06N22	VN	0622	

L FIXED-FIXED CONSTANT POOL

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A0087				MID5	OCT	1740	PINBALL
00875	5011	01776	0	BIT52-10	OCT	1776	
0088	5012	01777	1	LOW10	OCT	1777	
A0089				BIT11	OCT	02000	
A0090				2K+3	OCT	2003	PINBALL
0091	5013	02177	1	LOW7+2K	OCT	2177	OP CODE MASK + BANK 1 FBANK SETTING.
0092	5014	02400	1	EBANK5	OCT	02400	
0093	5015	03000	1	PRI03	OCT	03000	
0094	5016	03400	0	EBANK7	OCT	03400	
A0095				LOW11	OCT	3777	PINBALL
A0096				BIT12	OCT	04000	
A0097				RELTAB	OCT	04025	T4RUPT
0098	5017	05000	1	PRI05	OCT	05000	
0099	5020	06000	1	PRI06	OCT	06000	
0100	5021	07000	0	PRI07	OCT	07000	
A0102				BIT13	OCT	10000	
A0103					OCT	10003	T4RUPT RELTAB +1D
A0104				13,7,2	OCT	10102	P20-P25 SUNDANCE
0105	5022	11000	1	PRI011	OCT	11000	
A0106				PRI012	OCT	12000	BANKCALL
0107	5023	13000	0	PRI013	OCT	13000	
0108	5024	14000	1	PRI014	OCT	14000	
A0109					OCT	14031	T4RUPT RELTAB +2D
0110	5025	15000	0	PRI015	OCT	15000	
0111	5026	16000	0	PRI016	OCT	16000	
A0112				85DEGS	DEC	.45556	P20-P25 SUNDANCE (OCTAL 16450)
0113	5027	17000	1	PRI017	OCT	17000	
0114	5030	17770	1	OCT17770	OCT	17770	
A0115				BIT14	OCT	20000	
A0116					OCT	20033	T4RUPT RELTAB +3D
0117	5031	21000	1	PRI021	OCT	21000	
01175	7707			BLOCK		03	
01176	REF	1		COUNT*		55/FCONS	
0118	7707	22000	1	PRI022	OCT	22000	SERVICE ROUTINES
0119	7710	23000	0	PRI023	OCT	23000	
0120	7711	24000	1	PRI024	OCT	24000	
A0121				5/8+1	OCT	24001	SINGLE PRECISION SUBROUTINES
A0122					OCT	24017	T4RUPT RELTAB +4D
0123	7712	25000	0	PRI025	OCT	25000	
0124	7713	26000	0	PRI026	OCT	26000	
0125	7714	27000	1	PRI027	OCT	27000	
A0126				CHRPRI0	OCT	30000	PINBALL
A0127					OCT	30036	T4RUPT RELTAB +5D
0128	7715	31000	0	PRI031	OCT	31000	
0129	7716	31103	1	C1/2	DEC	.7853134	(OCTAL 31103)
0130	7717	32000	0	PRI032	OCT	32000	
0131	7720	33000	1	PRI033	OCT	33000	
0132	7721	34000	0	PRI034	OCT	34000	
A0133					OCT	34034	T4RUPT RELTAB +6D

L FIXED-FIXED CONSTANT POOL

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0134	7722	35000	1	PRI035	OCT	35000	
0135	7723	36000	1	PRI036	OCT	36000	
0136	7724	37000	0	PRI037	OCT	37000	
0137	7725	37401	0	63/64+1	OCT	37401	
A0138				MIO7	OCT	37600	PINBALL
0139	7726	37766	1	OCT37766	OCT	37766	
0140	7727	37774	1	OCT37774	OCT	37774	
0141	7730	37776	0	OCT37776	OCT	37776	
A01411				DPOSMAX	OCT	37777	
A0142				BIT15	OCT	40000	
A0143				OCT40001	OCT	40001	INTERPRETER (CS 1 INSTRUCTION)
0144	7731	40014	0	DLOADCOD	OCT	40014	
0145	7732	40015	1	DLOAD*	OCT	40015	
A0146					OCT	40023	T4RUPT RELTAB +7D
01465	7733	40040	1	BIT15+6	OCT	40040	
01466	7734	40200	1	OCT40200	OCT	40200	
A0147					OCT	44035	T4RUPT RELTAB +8D
A0148					OCT	50037	T4RUPT RELTAB +9D
A0149					OCT	54000	T4RUPT RELTAB +100
01495	7735	57777	1	-BIT14	OCT	57777	
A0150				RELTAB11	OCT	60000	T4RUPT
0151	7736	65552	0	C3/2	DEC	- .3216147	(OCTAL 65552)
0152	7737	70000	0	13,14,15	OCT	70000	
0153	7740	73777	1	-1/8	OCT	73777	
0154	7741	74000	1	HIGH4	OCT	74000	
0155	7742	74056	1	-FNOERAS	DEC	-2001	(OCTAL 74056)
A0156				H15	OCT	76000	PINBALL
0157	7743	77700	0	HIGH9	OCT	77700	
A0158				-ENDVAC	DEC	-45	INTERPRETER (OCTAL 77722)
A0159				-OCT10	OCT	-10	(OCT 77767)
A0161				NEG4	DEC	-4	(OCTAL 77773)
0162	7744	77774	0	NEG3	DEC	-3	
0163	7745	77775	1	NEG2	OCT	77775	
0164	7746	77776	1	NEGONE	DEC	-1	

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P0165 DEFINED BY EQUALS

R0166 IT WOULD BE TO THE USERS ADVANTAGE TO OCCASIONALLY CHECK ANY OF THESE SYMBOLS IN ORDER TO PREVENT ANY
 R0168 ACCIDENTAL DEFINITION CHANGES.

0169	REF	5	LAST	868	7746	MINUS1	=	NEG1
0170	REF	11	LAST	1054	7746	NFG1	=	NEGONE
0171	REF	53	LAST	999	4753	ONE	=	BIT1
0172	REF	51	LAST	972	4752	TWO	=	BIT2
0173	REF	1			6244	THREE	=	OCTAL3
0174	REF	31	LAST	1023	6244	LOW2	=	THREE
0175	REF	37	LAST	958	4751	FOUR	=	BIT3
0176	REF	5	LAST	1003	6241	SIX	=	REVCNT
0177	REF	16	LAST	1074	4757	LOW3	=	SEVEN
0178	REF	41	LAST	972	4750	EIGHT	=	BIT4
0179	REF	7	LAST	1090	4320	NINE	=	R2D1
0180	REF	3	LAST	483	4363	TEN	=	BINC CN
0181	REF	2	LAST	480	4760	NOUTCON	=	ELEVEN
0182	REF	15	LAST	469	4360	OCT23	=	VD1
01825	REF	2	LAST	471	4362	OCT25	=	MD1
0183	REF	46	LAST	1050	4742	PRI01	=	BIT10
0184	REF	7	LAST	1084	5007	EBANK3	=	OCT1400
0185	REF	31	LAST	1088	4741	PRI02	=	BIT11
0186	REF	1			4775	OCT120	=	SUPER101
0187	REF	3	LAST	615	4776	OCT140	=	SUPER110
0188	REF	32	LAST	1094	4741	2K	=	BIT11
0189	REF	33	LAST	1094	4741	EBANK4	=	BIT11
0190	REF	41	LAST	826	4740	PRI04	=	BIT12
0191	REF	12	LAST	874	5015	EBANK6	=	PRI03
0192	REF	43	LAST	1089	4737	QUARTER	=	BIT13
0193	REF	44	LAST	1094	4737	PRI010	=	BIT13
01935	REF	1			7662	OCT10001	=	CCSL
0194	REF	24	LAST	1080	4736	POS1/2	=	HALF
0195	REF	71	LAST	1081	4736	PRI020	=	BIT14
0196	REF	72	LAST	1094	4736	HALF	=	BIT14
0197	REF	5	LAST	481	4355	PRI030	=	CHRPRI0
0198	REF	10	LAST	1021	4355	BIT13-14	=	PRI030
01985	REF	3	LAST	1006	6470	OCT30002	=	TLJAD +1
0199	REF	2	LAST	991	7721	BIT14	=	PRI034
0200	REF	42	LAST	1087	4735	NFGMAX	=	BIT15
0201	REF	43	LAST	1094	4735	VLOADCOD	=	BIT15
0202	REF	1			6106	VLOAD*	=	OCT40001
0203	REF	2	LAST	171	4101	OCT60000	=	RELTAB11
0204	REF	6	LAST	913	4350	BANKMASK	=	H15

INTERPRETER USES IN PROCESSING STORECODE

L INTERPRETIVE CONSTANTS

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0001	REF	1	23,2000			SETLOC	INTPRET1
0002			23,2413			BANK	
0003	REF	1				COUNT*	\$\$/I CONS
0004			23,2413	10000 0	DP1/4TH	2DEC	.25
0004			23,2414	00000 1			
0005			23,2415	00000 1	UNITZ	2DEC	0
0005			23,2416	00000 1			
0006			23,2417	00000 1	UNITY	2DEC	0
0006			23,2420	00000 1			
0007			23,2421	20000 0	UNITX	2DEC	.5
0007			23,2422	00000 1			
0008			23,2423	00000 1	ZEROVECS	2DEC	0
0008			23,2424	00000 1			
0009			23,2425	00000 1		2DEC	0
0009			23,2426	00000 1			
0010			23,2427	00000 1		2DEC	0
0010			23,2430	00000 1			
0011	REF	12	23,2421		DPHALF	=	UNITX
0012		LAST	23,2431	37777 1	DPPOS MAX	OCT	37777
0013		909	23,2432	37777 1		OCT	37777

L INTERPRETIVE CONSTANTS

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P0014 INTERPRETIVE CONSTANTS IN THE OTHER HALF-MEMORY

0015	REF	- 1		11,2000		SETLOC	INTPRET2	
0016				11,2266		BANK		
0017	REF	1				COUNT*	\$/ICONS	
0018				11,2266	00000 1	ZUNIT	2DEC	0
0018				11,2267	00000 1			
0019				11,2270	00000 1	YUNIT	2DEC	0
0019				11,2271	00000 1			
0020				11,2272	20000 0	XUNIT	2DEC	.5
0020				11,2273	00000 1			
0021				11,2274	00000 1	ZEROVEC	2DEC	0
0021				11,2275	00000 1			
0022				11,2276	00000 1		2DEC	0
0022				11,2277	00000 1			
0023				11,2300	00000 1		2DEC	0
0023				11,2301	00000 1			
0024				11,2302	77777 0	OCT	77777	
0025				11,2303	77771 0	DEC-6	DEC	-6
0026				11,2304	77763 0	DEC-12	DEC	-12
0027				11,2305	37777 1	LODPMAX	2OCT	3777737777
0027				11,2306	37777 1			
0028				11,2307	37777 1	LODPMAX1	2OCT	3777737777
0028				11,2310	37777 1			
0029	REF	5	LAST 963	11,2274		ZERODP	=	ZEROVEC
0030	REF	7	LAST 965	11,2272		HALFDP	=	XUNIT

-0,-6,-12 MUST REMAIN IN THIS ORDER

THESE TWO CONSTANTS MUST REMAIN

ADJACENT AND THE SAME FOR INTEGRATION

L SINGLE PRECISION SUBROUTINES

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0001 5032
R0002 SINGLE PRECISION SINE AND COSINE

BLOCK 02

00025	RFF	1						COUNT* \$\$/INTER	
0003	REF	25	LAST 1094	5032	6 4736 1	SPCOS		AD HALF	ARGUMENTS SCALED AT PI
0004	RFF	1		5033	55'076 0	SPSIN		TS TEMK	
0005	REF	1		5034	1 5036 0			TCF SPT	
0006	RFF	2	LAST 1097	5035	4 1076 0			CS TEMK	
0007				5036	6 0000 1	SPT		DOUBLE	
0008	REF	3	LAST 1097	5037	55'076 0			TS TEMK	
0009	RFF	1		5040	1 5051 1			TCF POLLEY	
0010	REF	4	LAST 1097	5041	57'076 1			XCH TEMK	
0011	RFF	5	LAST 1097	5042	51'076 1			INDEX TEMK	
0012	REF	3	LAST 1023	5043	6 4734 0			AD LIMITS	
0013				5044	4 0000 0			COM	
0014	REF	6	LAST 1097	5045	6 1076 1			AD TFMK	
0015	RFF	7	LAST 1097	5046	55'076 0			TS TEMK	
0016	REF	2	LAST 1097	5047	1 5051 1			TCF POLLEY	
0017	RFF	1		5050	1 5067 1			TCF ARG90	
0018				5051	0 0006 1	POLLEY		EXTEND	
0019	REF	8	LAST 1097	5052	7 1076 0			MP TEMK	
0020	RFF	1		5053	55'077 1			TS SQ	
0021				5054	0 0006 1			EXTEND	
0022	REF	1		5055	7 5005 0			MP C5/2	
0023	REF	1		5056	6 7736 1			AD C3/2	
0024				5057	0 0006 1			EXTEND	
0025	REF	2	LAST 1097	5060	7 1077 1			MP SQ	
0026	REF	1		5061	6 7716 0			AD C1/2	
0027				5062	0 0006 1			EXTEND	
0028	REF	9	LAST 1097	5063	7 1076 0			MP TEMK	
0029				5064	20 001 1			DDOUBL	
0030	REF	10	LAST 1097	5065	55'076 0			TS TEMK	
0031	REF	295	LAST 1089	5066	0 0002 0			TC Q	
0032	REF	364	LAST 1089	5067	50 000 1	ARG90		INDEX A	
0033	REF	4	LAST 1097	5070	4 4734 1			CS LIMITS	
0034	REF	296	LAST 1097	5071	0 0002 0			TC Q	RESULT SCALED AT 1

L EXECUTIVE

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0001 5072 BLOCK 02
R0002 TO ENTER A JOB REQUEST REQUIRING NO VAC AREA:

00025	REF	1		5072	0 0004 0	NOVAC	COUNT* \$\$/EXEC	
00029				5072	0 0002 0		INHINT	
0003	REF	1		5073	6 5164 1		AD	FAKEPRET
00031	REF	3	LAST 382	5074	54 063 0		TS	NEWPRIO

LOC(MPAC +6) - LOC(QPRET)
PRIORITY OF NEW JOB + NOVAC C(FIXLOC)

0004				5075	0 0006 1		EXTEND	
0005	REF	297	LAST 1097	5076	5 0002 0		INDEX	Q
0006				5077	3 0001 0		DCA	0
0007	REF	1		5100	52 066 0		DXCH	NEWLOC
0008	REF	1		5101	3 5163 0		CAF	EXFCBANK
0009	REF	24	LAST 1040	5102	56 004 0		XCH	FBANK
0010	REF	1		5103	54 061 1		TS	EXECITEM1
0011	REF	1		5104	1 2622 1		TCF	NOVAC2

Q WILL BE UNDISTURBED THROUGHOUT.
2CADR OF JOB ENTERED.
ENTER EXECUTIVE BANK.

R0012 TO ENTER A JOB REQUEST REQUIRING A VAC AREA - E.G., ALL (PARTIALLY) INTERPRETIVE JOBS.

0014				5105	0 0004 0	FINDVAC	INHINT	
00145	REF	4	LAST 1098	5106	54 063 0		TS	NEWPRIO
0015				5107	0 0006 1		EXTEND	
0016	REF	298	LAST 1098	5110	5 0002 0		INDEX	Q
0017				5111	3 0001 0		DCA	0
0018	REF	2	LAST 1098	5112	52 066 0	SPVACIN	DXCH	NEWLOC
0019	REF	2	LAST 1098	5113	3 5163 0		CAF	EXECBANK
0020	REF	25	LAST 1098	5114	56 004 0		XCH	FBANK
0021	REF	1		5115	1 2576 0		TCF	FINDVAC2

OFF TO EXECUTIVE SWITCHED-BANK.

R00211 TO ENTER A FINDVAC WITH THE PRIORITY IN NEWPRIO TO THE 2CADR ARRIVING IN A AND L:

R002125 USERS OF SPVAC MUST INHINT BEFORE STORING IN NEWPRIO.

00213	REF	299	LAST 1098	5116	56 002 0	SPVAC	XCH	Q
00214	REF	5	LAST 888	5117	6 7745 0		AD	NEG2
00215	REF	300	LAST 1098	5120	56 002 0		XCH	Q
00216	REF	1		5121	1 5112 1		TCF	SPVACIN

R0022 TO SUSPEND A BASIC JOB SO A HIGHER PRIORITY JOB MAY BE SERVICED:

0024	REF	301	LAST 1098	5122	22 002 0	CHANG1	LXCH	Q
0025	REF	3	LAST 1098	5123	3 5163 0		CAF	EXECBANK
0026	REF	27	LAST 1020	5124	56 006 1		XCH	BBANK
0027	REF	1		5125	1 2703 0		TCF	CHANJOB

R0030 TO SUSPEND AN INTERPRETIVE JOB:

0031	REF	30	LAST 1089	5126	4 0164 0	CHANG2	CS	LOC
R00315			ITRACE (4) REFERS TO "CHANG2".					
0032	REF	198	LAST 1077	5127	54 001 1		TS	L

NEGATIVE LOC SHOWS JOB = INTERPRETIVE.

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0033	REF	4	LAST	1098	5130	3	5163	0	+2	CAF	EXEC BANK
00335	REF	28	LAST	1098	5131	54	006	0		TS	BBANK
0034	REF	2	LAST	1098	5132	1	2702	1		TCF	CHANJCB -1

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P0035 TC VOLUNTARILY SUSPEND A JOB UNTIL THE COMPLETION OF SOME ANTICIPATED EVENT (I/O EVENT ETC.):

0037	REF	31	LAST 1098	5133	54 164 0	JOB SLEEP	TS	LCC
0038	REF	5	LAST 1099	5134	3 5163 0		CAF	EXFCBANK
0039	REF	26	LAST 1098	5135	54 004 1		TS	FBANK
0040	REF	1		5136	1 2773 1		TCF	JOB SLP1

R0041 TO AWAKEN A JOB PUT TO SLEEP IN THE ABOVE FASHION:

0042				5137	0 0004 0	JOB WAKE	INHINT	
00421	REF	3	LAST 1098	5140	54 065 0		TS	NFWLCC
0043	REF	71	LAST 1037	5141	4 4752 1		CS	TWO
0044	REF	302	LAST 1098	5142	26 002 1		ADS	Q
0045	REF	6	LAST 1100	5143	3 5163 0		CAF	EXECBANK
0046	REF	27	LAST 1100	5144	56 004 0		XCH	FBANK
0047	REF	1		5145	1 3020 1		TCF	JOB WAKE2

EXIT IS VIA FINDVAC/NOVAC PROCEDURES.

R0048 TO CHANGE THE PRIORITY OF A JOB CURRENTLY UNDER EXECUTION:

0049				5146	0 0004 0	PRIORCHNG	INHINT	
0050	REF	5	LAST 1098	5147	54 063 0		TS	NEWPRIO
0051	REF	7	LAST 1100	5150	3 5163 0		CAF	EXECBANK
0052	REF	29	LAST 1099	5151	56 006 1		XCH	BBANK
0053	REF	9	LAST 1020	5152	54 165 1		TS	BANK SFT
0054	REF	303	LAST 1100	5153	3 0002 0		CA	Q
0055	REF	1		5154	1 3067 1		TCF	PRIORCH2

NEW PRIORITY ARRIVES IN A. RETURNS TO CALLER AS SOON AS NEW JOB PRIORITY IS HIGHEST. PREPARE FOR POSSIBLE BASIC-STYLE CHANGE-JOB.

R0058 TC REMOVE A JOB FROM EXECUTIVE CONSIDERATIONS:

0059	REF	8	LAST 1100	5155	3 5163 0	ENDOFJOB	CAF	EXECBANK
0060	REF	28	LAST 1100	5156	54 004 1		TS	FBANK
0061	REF	1		5157	1 3100 1		TCF	ENDJOB1

0062	REF	2	LAST 1098	5160	3 0061 0	ENDFIND	CA	EXECTEM1
0063	REF	29	LAST 1100	5161	54 004 1		TS	FBANK
0064	REF	2	LAST 532	5162	1 6740 0		TCF	Q+2
0066	REF	2	LAST 1098	5163	02576 1	EXECBANK	CADR	FINDVAC2

RETURN TO CALLER AFTER JOB ENTRY COMPLETE.

00665 REF 694 LAST 1085 5164 00110 1 FAKEPRFT ADRES MP4C -36D

LOC(MPAC +6) - LOC(QPRET)

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P0067 LCCATE AN AVAILABLE VAC AREA.

0068				01,2576		BANK	01		
00685	REF	1				COUNT*	\$\$/EXEC		
0069	RFF	3	LAST	1100	01,2576 54 061 1	FINDVAC2	TS	EXEITEM1	(SAVE CALLER'S BANK FIRST.)
0070	REF	4	LAST	259	01,2577 10 400 1		CCS	VAC1USE	
0071	RFF	1			01,2600 1 2615 0		TCF	VACFOUND	
0072	RFF	3	LAST	259	01,2601 10 454 0		CCS	VAC2USE	
0073	REF	2	LAST	1101	01,2602 1 2615 0		TCF	VACFOUND	
0074	RFF	3	LAST	259	01,2603 10 530 0		CCS	VAC3USE	
0075	REF	3	LAST	1101	01,2604 1 2615 0		TCF	VACFOUND	
0076	RFF	3	LAST	259	01,2605 10 604 1		CCS	VAC4USE	
0077	REF	4	LAST	1101	01,2606 1 2615 0		TCF	VACFOUND	
0078	RFF	3	LAST	259	01,2607 10 660 0		CCS	VAC5USE	
0079	REF	5	LAST	1101	01,2610 1 2615 0		TCF	VACFOUND	
00792	RFF	4	LAST	1101	01,2611 22 061 0		LXCH	EXEITEM1	
00794	REF	304	LAST	1100	01,2612 3 0002 0		CA	Q	
0080	REF	3	LAST	260	01,2613 0 5710 1		TC	BAILOUT1	
0081					01,2614 01201 0		QCT	1201	NO VAC AREAS.
0082	REF	72	LAST	1100	01,2615 6 4752 0	VACFOUND	AD	TWO	RESERVE THIS VAC AREA BY STORING A ZERO
0083					01,2616 22 007 0		ZL		IN ITS VAC USE REGISTER AND STORE THE
0084	REF	365	LAST	1097	01,2617 50 000 1		INDEX	A	ADDRESS OF THE FIRST WORD OF IT IN THE
0085					01,2620 21'777 0		LXCH	0 -1	LOW NINE BITS OF THE PRIORITY WORD.
0086	RFF	6	LAST	1100	01,2621 26 063 0		ADS	NEWPRIO	
0087	REF	211	LAST	1091	01,2622 3 4755 1	NOVAC2	CAF	ZERO	NOVAC ENTERS HERE. FIND A CORE SET.
0088	REF	5	LAST	471	01,2623 54 064 1		TS	LOCCTR	
0089	RFF	1			01,2624 3 2631 1		CAF	NO.CORES	SEVEN SETS OF ELEVEN REGISTERS EACH.
0090	REF	1			01,2625 54 062 1	NOVAC3	TS	EXEITEM2	
0091	RFF	6	LAST	1101	01,2626 50 064 0		INDEX	LOCCTR	
0092	REF	12	LAST	864	01,2627 10 167 0		CCS	PRIORITY	EACH PRIORITY REGISTER CONTAINS -0 IF
0093	REF	1			01,2630 1 2671 1		TCF	NEXTCORE	THE CORRESPONDING CORE SET IS AVAILABLE.
0094					01,2631 00007 0	NO.CORES	DEC	7	
0095	RFF	2	LAST	1101	01,2632 1 2671 1		TCF	NEXTCORE	AN ACTIVE JOB HAS A POSITIVE PRIORITY
A0096									BUT A DORMANT JOB'S PRIORITY IS NEGATIVE

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0097	REF	7	LAST	1101	01,2633	3 0063 1	CORFOUNO	CA	NEWPRIO	SET THE PRIORITY OF THIS JOB IN THE CORE
0098	RFF	7	LAST	1101	01,2634	50 064 0		INDEX	LOCCTR	SET'S PRIORITY REGISTER AND SET THE
0099	REF	13	LAST	1101	01,2635	54 167 0		TS	PRIORITY	JOB'S PUSH-DOWN POINTER AT THE BEGINNING
0100	RFF	9	LAST	864	01,2636	7 5004 1		MASK	LOW ⁹	OF THE WORK AREA AND OVERFLOW INDICATOR
0101	REF	8	LAST	1102	01,2637	50 064 0		INDEX	LOCCTR	
0102	REF	28	LAST	1072	01,2640	54 166 1		TS	PUSHLOC	OFF TO PREPARE FOR INTERPRETIVE PROGRAMS
0103	REF	9	LAST	1102	01,2641	10 064 1		CCS	LOCCTR	IF CORE SET ZERO IS BEING LOADED, SET UP
0104	REF	1			01,2642	1 2656 1		TCF	SETLOC	OVFINO AND FIXLOC IMMEDIATELY .
0105	REF	11	LAST	1085	01,2643	54 121 1		TS	OVFINO	
0106	REF	29	LAST	1102	01,2644	3 0166 0		CA	PUSHLOC	
0107	REF	50	LAST	1086	01,2645	54 120 0		TS	FIXLOC	
0108	REF	6	LAST	998	01,2646	10 067 1	SPECTEST	CCS	NEWJOB	SEE IF ANY ACTIVE JOBS WAITING (RARE).
0109	REF	2	LAST	1102	01,2647	1 2656 1		TCF	SETLOC	MUST BE AWAKENED BUT UNCHANGED JOB.
0110	REF	10	LAST	1089	01,2650	0 5677 1		TC	CCSHOLF	
0111	REF	11	LAST	1102	01,2651	0 5677 1		TC	CCSHOLF	
0112	REF	7	LAST	1102	01,2652	54 067 1		TS	NEWJOB	+0 SHOWS ACTIVE JOB ALREADY SET.
0113	REF	4	LAST	1100	01,2653	52 066 0		DXCH	NFWLOC	
0114	REF	32	LAST	1100	01,2654	52 165 1		DXCH	LOC	
0115	RFF	1			01,2655	1 5160 1		TCF	ENOFIND	
0116	REF	5	LAST	1102	01,2656	52 066 0	SETLOC	OXCH	NEWLOC	SET UP THE LOCATION REGISTERS FOR THIS
0117	REF	10	LAST	1102	01,2657	50 064 0		INDEX	LOCCTR	
0118	REF	33	LAST	1102	01,2660	52 165 1		OXCH	LOC	
0119	REF	8	LAST	1102	01,2661	50 067 0		INOEX	NEWJOB	THIS INDEX INSTRUCTION INSURES THAT THE
0120	REF	14	LAST	1102	01,2662	4 0167 0		CS	PRIORITY	HIGHEST ACTIVE PRIORITY WILL BE COMPARED
0121	REF	8	LAST	1102	01,2663	6 0063 1		AD	NEWPRIO	WITH THE NEW PRIORITY TO SEE IF NEWJOB
0122					01,2664	0 0006 1		EXTEND		SHOULD BE SET TO SIGNAL A SWITCH.
0123	REF	2	LAST	1102	01,2665	6 5160 0		BZMF	ENDFINO	
0124	REF	11	LAST	1102	01,2666	3 0064 0		CA	LOCCTR	LOCCTR IS LEFT SET AT THIS CORE SET IF
0125	REF	9	LAST	1102	01,2667	54 067 1		TS	NEWJOB	THE CALLER WANTS TO LOAD ANY MPAC
0126	REF	3	LAST	1102	01,2670	1 5160 1		TCF	ENDFINO	REGISTERS, ETC.
0127	REF	1			01,2671	3 3030 1	NEXTCORE	CAF	COREINC	
0128	REF	12	LAST	1102	01,2672	26 064 1		ADS	LOCCTR	
0129	REF	2	LAST	1101	01,2673	10 062 1		CCS	EXEC TEM2	
0130	REF	1			01,2674	1 2625 0		TCF	NOVAC3	
01302	RFF	5	LAST	1101	01,2675	22 061 0		LXCH	EXEC TEM1	
01304	REF	305	LAST	1101	01,2676	3 0002 0		CA	Q	
0131	REF	4	LAST	1101	01,2677	0 5710 1		TC	BAILCUT1	NO CORE SETS AVAILABLE.
0132					01,2700	01202 0		OCT	1202	

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P0133 THE FOLLOWING ROUTINE SWAPS CORE SET 0 WITH THAT WHOSE RELATIVE ADDRESS IS IN NEWJOB.

01345	REF	34	LAST	1102	01,2701	22 164 1	-2	LXCH	LOC	
0135	REF	10	LAST	1100	01,2702	30 165 0	-1	CAE	BANKSET	BANKSET, NOT BBANK, HAS RIGHT CONTENTS.
0136					01,2703	0 0004 0		CHANJOB	INHINT	
01362					01,2704	0 0006 1			EXTEND	
01364	REF	15	LAST	996	01,2705	04 007 1		ROR	SUPERBNK	PICK UP CURRENT SBANK FOR BBCON
01366	REF	199	LAST	1098	01,2706	56 001 0		XCH	L	LOC IN A AND BBCON IN L.
01368	REF	10	LAST	1102	01,2707	50 067 0	+4	INDEX	NEWJOB	SWAP LOC AND BANKSET.
0137	REF	35	LAST	1103	01,2710	52 165 1		DXCH	LOC	
0138	REF	36	LAST	1103	01,2711	52 165 1		DXCH	LOC	
01382	REF	11	LAST	1103	01,2712	30 165 0		CAE	BANKSET	
01384					01,2713	0 0006 1		EXTEND		
01388	REF	16	LAST	1103	01,2714	01 007 1		WRITE	SUPERBNK	SET SBANK FOR NEW JOB.
0139	REF	695	LAST	1100	01,2715	52 155 1		DXCH	MPAC	SWAP MULTI-PURPOSE ACCUMULATOR AREAS.
0140	REF	11	LAST	1103	01,2716	50 067 0		INDEX	NEWJOB	
0141	REF	696	LAST	1103	01,2717	52 155 1		DXCH	MPAC	
0142	REF	697	LAST	1103	01,2720	52 155 1		DXCH	MPAC	
0143	REF	698	LAST	1103	01,2721	52 157 0		DXCH	MPAC +2	
0144	REF	12	LAST	1103	01,2722	50 067 0		INDEX	NEWJOB	
0145	REF	699	LAST	1103	01,2723	52 157 0		DXCH	MPAC +2	
0146	REF	700	LAST	1103	01,2724	52 157 0		DXCH	MPAC +2	
0147	REF	701	LAST	1103	01,2725	52 161 0		DXCH	MPAC +4	
0148	REF	13	LAST	1103	01,2726	50 067 0		INDEX	NEWJOB	
0149	REF	702	LAST	1103	01,2727	52 161 0		DXCH	MPAC +4	
0150	REF	703	LAST	1103	01,2730	52 161 0		DXCH	MPAC +4	
0151	REF	704	LAST	1103	01,2731	52 163 1		DXCH	MPAC +6	
0152	REF	14	LAST	1103	01,2732	50 067 0		INDEX	NEWJOB	
0153	REF	705	LAST	1103	01,2733	52 163 1		DXCH	MPAC +6	
0154	REF	706	LAST	1103	01,2734	52 163 1		DXCH	MPAC +6	
0155	REF	212	LAST	1101	01,2735	3 4755 1		CAF	ZERO	
0156	REF	12	LAST	1102	01,2736	56 121 0		XCH	OVFIND	MAKE PUSHLOC NEGATIVE IF OVFINO NZ.
0157					01,2737	0 0006 1		EXTEND		
0158					01,2740	1 2743 1		BZF	+3	
0159	REF	30	LAST	1102	01,2741	4 0166 1		CS	PUSHLOC	
0160	REF	31	LAST	1103	01,2742	54 166 1		TS	PUSHLOC	
0161	REF	32	LAST	1103	01,2743	52 167 0		DXCH	PUSHLOC	
0162	REF	15	LAST	1103	01,2744	50 067 0		INDEX	NEWJOB	
0163	REF	33	LAST	1103	01,2745	52 167 0		DXCH	PUSHLOC	
0164	REF	34	LAST	1103	01,2746	52 167 0		DXCH	PUSHLOC	SWAPS PUSHLOC AND PRIORITY.
0165	REF	10	LAST	1102	01,2747	3 5004 0		CAF	LOW9	SET FIXLOC TO BASE OF VAC AREA.
0166	REF	15	LAST	1102	01,2750	7 0167 0		MASK	PRIORITY	
0167	REF	51	LAST	1102	01,2751	54 120 0		TS	FIXLOC	
0168	REF	35	LAST	1103	01,2752	10 166 1		CCS	PUSHLOC	SET OVERFLOW INDICATOR ACCORDING TO
0169	REF	213	LAST	1103	01,2753	3 4755 1		CAF	ZERO	
0170	REF	1			01,2754	1 2761 1		TCF	ENDPRCHG -1	

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0171 REF 36 LAST 1103 01,2755 4 0166 1
0172 REF 37 LAST 1104 01,2756 54 166 1
0173 REF 113 LAST 1067 01,2757 3 4753 1
0174 REF 13 LAST 1103 01,2760 56 121 0
0175 RFF 16 LAST 1103 01,2761 54 067 1

CS PUSHLOC
TS PUSHLOC
CAF ONE
XCH OVFLND
TS NEWJOB

0176 01,2762 0 0003 1
0177 REF 37 LAST 1103 01,2763 52 165 1
0178 01,2764 0 0006 1
0179 01,2765 6 2767 0
0180 01,2766 52 006 0

ENDPRCHG RELINT
DXCH LOC
EXTEND
BZMF +2
DTCB

BASIC JOBS HAVE POSITIVE ADDRESSES, SO
DISPATCH WITH A DTCB.
IF INTERPRETIVE, SET UP EBANK, ETC.

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0181 01,2767 4 0000 0
 0182 REF 114 LAST 1104 01,2770 6 4753 1
 0183 REF 38 LAST 1104 01,2771 54 164 0
 0186 REF 1 01,2772 1 6047 0

COM
 AD ONE
 TS LOC
 TCF INTRSM

EPILOGUE TO JOB CHANGE FOR INTERPRETIVE
 RESUME.

R0187 COMPLETE JOBSLEEP PREPARATIONS.

0188 01,2773 0 0004 0
 0189 REF 16 LAST 1103 01,2774 4 0167 0
 0190 REF 17 LAST 1105 01,2775 54 167 0
 0191 REF 8 LAST 1039 01,2776 3 6073 0
 0192 REF 30 LAST 1100 01,2777 7 0006 0
 01921 01,3000 0 0006 1
 01922 REF 17 LAST 1103 01,3001 04 007 1
 0193 REF 12 LAST 1103 01,3002 54 165 1
 0194 REF 214 LAST 1103 01,3003 4 4755 0
 0195 REF 132 LAST 1075 01,3004 54 131 0
 0196 REF 1 01,3005 1 3115 0

JOBSLP1 INHINT
 CS PRIORITY
 TS PRIORITY
 CAF LOW7
 MASK BBANK
 EXTEND
 ROR SUPERBNK
 TS BANKSET
 CS ZERD
 JOBSLP2 TS BUF +1
 TCF EJSCAN

NNZ PRIORITY SHOWS JOB ASLEEP.

SAVE OLD SUPERBANK VALUE.

HOLDS - HIGHEST PRIORITY.
 SCAN FOR HIGHEST PRIORITY ALA ENDOFJOB.

01961 01,3006 0 0004 0
 019611 REF 17 LAST 1104 01,3007 10 067 1
 019612 01,3010 1 3013 1
 019613 01,3011 0 0003 1
 019614 REF 1 01,3012 1 3213 0

NUCHANG2 INHINT
 CCS NEWJOB
 TCF +3
 RELINT
 TCF ADVAN +2

QUICK... DONT LET NEWJOB CHANGE TO +0 .

NEWJOB STILL PNZ
 NEWJOB HAS CHANGED TO +0. WAKE UP JOB
 VIA NUDIRECT. (VERY RARE CASE.)

01962 REF 73 LAST 1101 01,3013 3 4752 0
 01963 01,3014 0 0006 1
 01964 REF 30 LAST 864 01,3015 05 011 1
 01965 REF 39 LAST 1105 01,3016 52 165 1
 01966 REF 3 LAST 1099 01,3017 1 2707 1

CAF TWO
 EXTEND
 WOR DSALMOUT
 DXCH LOC
 TCF CHANJOB + 4

TURN ON ACTIVITY LIGHT
 AND SAVE ADDRESS INFO FOR BENEFIT OF
 POSSIBLE SLEEPING JOB.

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P0197 TO WAKE UP A JOB, EACH CORE SET IS FOUND TO LOCATE ALL JOBS WHICH ARE ASLEEP. IF THE FCADR IN THE
 R0199 LOC REGISTER OF ANY SUCH JOB MATCHES THAT SUPPLIED BY THE CALLER, THAT JOB IS AWAKENED. IF NO JOB IS FOUND,
 R0201 LOCCTR IS SET TO -1 AND NO FURTHER ACTION TAKES PLACE.

0202	REF	6	LAST	1102	01,3020	54 061 1	JOBWAKE2	TS	EXECITEM1	
0203	REF	215	LAST	1105	01,3021	3 4755 1		CAF	ZERO	BEGIN CORE SET SCAN.
0204	REF	13	LAST	1102	01,3022	54 064 1		TS	LOCCTR	
0205	REF	2	LAST	1101	01,3023	3 2631 1		CAF	NO.CORES	
0206	REF	3	LAST	1102	01,3024	54 062 1	JOBWAKE4	TS	EXECITEM2	
0207	REF	14	LAST	1106	01,3025	50 064 0		INDEX	LOCCTR	
0208	REF	18	LAST	1105	01,3026	10 167 0		CCS	PRIORITY	
0209	REF	1			01,3027	1 3032 1		TCF	JOBWAKE3	ACTIVE JOB - CHECK NEXT CORE SET.
0210					01,3030	00014 1	CORE INC	DEC	12	12 REGISTERS PER CORE SET.
0211	REF	1			01,3031	1 3041 0		TCF	WAKETEST	SLEEPING JOB - SEE IF CADR MATCHES.
0212	REF	2	LAST	1102	01,3032	3 3030 1	JOBWAKE3	CAF	CORE INC	
0213	REF	15	LAST	1106	01,3033	26 064 1		ADS	LOCCTR	
0214	REF	4	LAST	1106	01,3034	10 062 1		CCS	EXECITEM2	
0215	REF	1			01,3035	1 3024 0		TCF	JOBWAKE4	
0216	REF	115	LAST	1105	01,3036	4 4753 0		CS	ONF	EXIT IF SLEEPING JOB NOT FOUND.
0217	REF	16	LAST	1106	01,3037	54 064 1		TS	LOCCTR	
0218	REF	4	LAST	1102	01,3040	1 5160 1		TCF	ENDFIND	
0219	REF	6	LAST	1102	01,3041	4 0065 0	WAKETEST	CS	NEWLOC	
0220	REF	17	LAST	1106	01,3042	50 064 0		INDEX	LOCCTR	
0221	REF	40	LAST	1105	01,3043	6 0164 1		AD	LCC	
0222					01,3044	0 0006 1		EXTEND		
0223					01,3045	1 3047 0		BZF	+2	IF MATCH.
0224	REF	2	LAST	1106	01,3046	1 3032 1		TCF	JOBWAKE3	EXAMINE NEXT CORE SET IF NO MATCH.
0225	REF	18	LAST	1106	01,3047	50 064 0		INDEX	LOCCTR	RE-COMPLEMENT PRIORITY TO SHOW JOB AWAKE
0226	REF	19	LAST	1106	01,3050	4 0167 0		CS	PRIORITY	
0227	REF	9	LAST	1102	01,3051	54 063 0		TS	NEWPRIO	
0228	REF	19	LAST	1106	01,3052	50 064 0		INDEX	LOCCTR	
0229	REF	20	LAST	1106	01,3053	54 167 0		TS	PRIORITY	
0230	REF	1			01,3054	4 4350 1		CS	FBANKMSK	MAKE UP THE 2CADR OF THE WAKE ADDRESS
0231	REF	7	LAST	1106	01,3055	7 0065 0		MASK	NEWLOC	USING THE CADR IN NEWLOC AND THE EBANK
0232	REF	3	LAST	1018	01,3056	6 4741 1		AD	2K	HALF OF BBANK SAVED IN BANKSET.
0233	REF	8	LAST	1106	01,3057	56 065 1		XCH	NEWLOC	
0234	REF	2	LAST	1106	01,3060	7 4350 1		MASK	FBANKMSK	
0235	REF	20	LAST	1106	01,3061	50 064 0		INDEX	LOCCTR	
0236	REF	13	LAST	1105	01,3062	6 0165 0		AD	BANKSET	
0237	REF	9	LAST	1106	01,3063	54 066 0		TS	NEWLOC +1	
0238	REF	21	LAST	1106	01,3064	10 064 1		CCS	LOCCTR	SPECIAL TREATMENT IF THIS JOB WAS
0239	REF	3	LAST	1102	01,3065	1 2656 1		TCF	SETLOC	ALREADY IN THE RUN (0) POSITION.
0240	REF	1			01,3066	1 2646 0		TCF	SPECTEST	

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P0241 PRIORITY CHANGE. CHANGE THE CONTENTS OF PRIORITY AND SCAN FOR THE JOB OF HIGHEST PRIORITY.

0243	REF 41	LAST 1106	01,3067	54 164 0	PRI0CH2	TS	LOG	
0244	REF 216	LAST 1106	01,3070	3 4755 1		CAF	ZFRO	SET FLAG TO TELL FNDJOB SCANNER IF THIS
0245	REF 133	LAST 1105	01,3071	54 130 1		TS	BUF	JOB IS STILL HIGHEST PRIORITY.
0246	RFF 11	LAST 1103	01,3072	3 5004 0		CAF	LOW9	
0247	REF 21	LAST 1106	01,3073	7 0167 0		MASK	PRIORITY	
0248	REF 10	LAST 1106	01,3074	6 0063 1		AD	NEWPRIO	
0249	REF 22	LAST 1107	01,3075	54 167 0		TS	PRIORITY	
0250			01,3076	4 0000 0		COM		
0251	REF 1		01,3077	1 3004 1		TCF	JOBSLP2	AND TO EJSCAN.

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P0252 RELEASE THIS CORE SET AND VAC AREA AND SCAN FOR THE JOB OF HIGHEST ACTIVE PRIORITY.

0254				01,3100	0 0004 0	ENDJOB1	INHINT		
0255	RFF	217	LAST	1107	01,3101	4 4755 0	CS	ZERO	
0256	RFF	134	LAST	1107	01,3102	54 131 0	TS	BUF +1	
0257	REF	23	LAST	1107	01,3103	56 167 1	XCH	PRIORITY	
0258	REF	12	LAST	1107	01,3104	7 5004 1	MASK	LOW9	
02581	REF	200	LAST	1103	01,3105	54 001 1	TS	L	
02582	REF	2	LAST	1098	01,3106	4 5164 0	CS	FAKEPRET	
025821	REF	201	LAST	1108	01,3107	6 0001 0	AD	L	
02583				01,3110	0 0006 1		EXTEND		
02584	RFF	2	LAST	1105	01,3111	6 3115 1	BZMF	EJSCAN	NOVAC ENDOFJOB
0259	REF	202	LAST	1108	01,3112	10 001 1	CCS	L	
0260	REF	366	LAST	1101	01,3113	50 000 1	INDEX	A	
0261				01,3114	54 000 0		TS	0	
0262	REF	24	LAST	1108	01,3115	10 203 1	EJSCAN	CCS	PRIORITY +12D
0263	REF	1			01,3116	0 3166 0	TC	EJ1	
0264	REF	12	LAST	1102	01,3117	0 5677 1	TC	CCSHOLE	
0265					01,3120	1 3121 1	TCF	+1	
0266	REF	25	LAST	1108	01,3121	10 217 1	CCS	PRIORITY +24D	EXAMINE EACH PRIORITY REGISTER TO FIND
0267	REF	2	LAST	1108	01,3122	0 3166 0	TC	EJ1	THE JOB OF HIGHEST ACTIVE PRIORITY.
0268	REF	13	LAST	1108	01,3123	0 5677 1	TC	CCSHOLE	
0269					01,3124	1 3125 0	TCF	+1	
0270	REF	26	LAST	1108	01,3125	10 233 1	CCS	PRIORITY +36D	
0271	REF	3	LAST	1108	01,3126	0 3166 0	TC	EJ1	
0272	REF	27	LAST	1108	01,3127	67610 1	-CCSPR	-CCS	PRIORITY
0273					01,3130	1 3131 0	TCF	+1	
0274	RFF	28	LAST	1108	01,3131	10 247 1	CCS	PRIORITY +48D	
0275	REF	4	LAST	1108	01,3132	0 3166 0	TC	EJ1	
0276	REF	14	LAST	1108	01,3133	0 5677 1	TC	CCSHOLE	
0277					01,3134	1 3135 1	TCF	+1	
0278	REF	29	LAST	1108	01,3135	10 263 1	CCS	PRIORITY +60D	
0279	REF	5	LAST	1108	01,3136	0 3166 0	TC	EJ1	
0280	REF	15	LAST	1108	01,3137	0 5677 1	TC	CCSHOLE	
0281					01,3140	1 3141 1	TCF	+1	
0282	REF	30	LAST	1108	01,3141	10 277 1	CCS	PRIORITY +72D	
0283	REF	6	LAST	1108	01,3142	0 3166 0	TC	EJ1	
0284	REF	16	LAST	1108	01,3143	0 5677 1	TC	CCSHOLE	
0285					01,3144	1 3145 0	TCF	+1	
02851	REF	31	LAST	1108	01,3145	10 313 1	CCS	PRIORITY +84D	

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02852	REF	7	LAST 1108	01,3146	0 3166 0
02853	REF	17	LAST 1108	01,3147	0 5677 1
02854				01,3150	1 3151 0

TC	EJ1
TC	CCSHCLE
TCF	+1

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P0286 EVALUATE THE RESULTS OF THE SCAN.

0287	REF 135	LAST 1108	01,3151	10 131 0		CCS	BUF +1	SEE IF THERE ARE ANY ACTIVE JOBS WAITING
0288	REF 18	LAST 1109	01,3152	0 5677 1		TC	CCSHOLE	
0289	REF 19	LAST 1110	01,3153	0 5677 1		TC	CCSHOLE	
0290			01,3154	1 3156 1		TCF	+2	
0291	REF 2	LAST 228	01,3155	1 3203 1		TCF	DUMMYJOB	
0292	REF 136	LAST 1110	01,3156	10 130 1		CCS	BUF	BUF IS ZERO IF THIS IS A PRIOCHNG AND
0293			01,3157	1 3161 0		TCF	+2	CHANGED PRIORITY IS STILL HIGHEST.
0294	REF 2	LAST 1103	01,3160	1 2761 1		TCF	ENDPRCHG -1	
0295	REF 367	LAST 1108	01,3161	50 000 1		INDEX	A	OTHERWISE, SET NEWJOB TO THE RELATIVE
0296			01,3162	2'7777 0		CAF	0 -1	ADDRESS OF THE NEW JOB'S CORE SET.
0297	REF 1		01,3163	6 3127 0		AD	-CCSPR	
0298	REF 18	LAST 1105	01,3164	54 067 1		TS	NEWJOB	
0299	REF 4	LAST 1105	01,3165	1 2701 1		TCF	CHANJOB -2	
0300	REF 137	LAST 1110	01,3166	54 132 0	EJ1	TS	BUF +2	
0301	REF 138	LAST 1110	01,3167	6 0131 1		AD	BUF +1	- OLD HIGH PRIORITY.
0302	REF 368	LAST 1110	01,3170	10 000 0		CCS	A	
0303	REF 139	LAST 1110	01,3171	4 0132 0		CS	BUF +2	
0304	REF 1		01,3172	1 3176 0		TCF	EJ2	NEW HIGH PRIORITY.
0305			01,3173	13 174 1		NOOP		
0306	REF 306	LAST 1102	01,3174	50 002 0		INDEX	0	
0307			01,3175	0 0002 0		TC	2	PROCEED WITH SEARCH.
0308	REF 140	LAST 1110	01,3176	54 131 0	EJ2	TS	BUF +1	
0309			01,3177	0 0006 1		EXTEND		
0310	REF 141	LAST 1110	01,3200	22 130 0		QXCH	BUF	FOR LOCATING CCS PRIORITY + X INSTR.
0311	REF 142	LAST 1110	01,3201	50 130 0		INDEX	BUF	
0312			01,3202	0 0002 0		TC	2	

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P0314 IDLING AND COMPUTER ACTIVITY (GREEN) LIGHT MAINTENANCE. THE IDLING ROUTINE IS NOT A JOB IN ITSELF,
 R0316 BUT RATHER A SUBROUTINE OF THE EXECUTIVE.

0318	REF	4	LAST	305	1361		EBANK=	SELFRET	SELF-CHECK STORAGE IN EBANK.
0319	REF	218	LAST	1108	01,3203	4 4755 0	DUMMYJOB	CS ZERO	SET NEWJOB TO -0 FOR IDLING.
0320	RFF	19	LAST	1110	01,3204	54 067 1		TS NEWJOB	
0321					01,3205	0 0003 1		RELINT	
0322	REF	74	LAST	1105	01,3206	4 4752 1		CS TWO	TURN OFF THE ACTIVITY LIGHT.
0323					01,3207	0 0006 1		EXTEND	
0324	REF	31	LAST	1105	01,3210	03 011 1		WAND DSALMOUT	
0328	REF	20	LAST	1111	01,3211	10 067 1	ADVAN	CCS NEWJOB	IS A NEWJOB ACTIVE ?
0329	REF	1			01,3212	1 3006 0		TCF NUCHANG2	YES... ONE REQUIRING A CHANGE JOB.
0330	REF	75	LAST	1111	01,3213	3 4752 0		CAF TWO	NEW JOB ALREADY IN POSITION FOR
0331	REF	1			01,3214	1 3222 1		TCF NUDIRECT	EXECUTION.
03317	REF	5	LAST	1111	01,3215	3 1361 1		CA SELFRET	
03318	RFF	203	LAST	1108	01,3216	54 001 1		TS L	PUT RETURN ADDRESS IN L.
0332	REF	1			01,3217	3 3221 0		CAF SELFBRANK	
0333	REF	5	LAST	604	01,3220	1 5166 1		TCF SUPDXCHZ + 1	AND DISPATCH JOB.
03338	REF	6	LAST	1111	1361			EBANK= SELFRET	
0334	REF	3	LAST	306	01,3221	66102 1	SELFBANK	BBCON SELFCHK	
0335					01,3222	0 0006 1	NUDIRECT	EXTEND	TURN THE GREEN LIGHT BACK ON.
0336	REF	32	LAST	1111	01,3223	05 011 1		WOR DSALMOUT	
0337	REF	42	LAST	1107	01,3224	52 165 1		DXCH LOC	JOBS STARTED IN THIS FASHION MUST BE
03372	REF	6	LAST	1111	01,3225	1 5165 1		TCF SUPDXCHZ	
03378					5165			BLOCK 2	IN FIXED-FIXED SO OTHERS MAY USE.
03379	REF	2	LAST	1098 TO 1101:	59	59*		COUNT* \$\$/EXEC	
R033791	SUPDXCHZ								ROUTINE TO TRANSFER TO SUPERBANK.
R033792	CALLING SEQUENCE								
A033793								TCF SUPDXCHZ	WITH 2CADR OF DESIRED LOCATION IN A + L.
0338	REF	204	LAST	1111	5165	56 001 0	SUPDXCHZ	XCH L	BASIC.
03381					5166	0 0006 1	+1	EXTEND	
03382	REF	18	LAST	1105	5167	01 007 1		WRITE SUPERBNK	
03383	REF	31	LAST	1105	5170	54 006 0		TS BBANK	
03384	REF	205	LAST	1111	5171	0 0001 0		TC L	
0339					5172	77677 1	NEG100	OCT 77677	

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R0001 PROGRAM DESCRIPTION
 R0003 MOD NO - 2
 R0005 MOD 8Y - MILLER (DTMAX INCREASED TO 162.5 SEC)
 R00072 MOD 3 8Y KERNAN (INHINT INSERTED AT WAITLIST) 2/28/68 SKIPPER REV 4

DATE - 10 OCTOBER 1966
 LOG SECTION - WAITLIST
 ASSEMBLY SUNBURST REV 5

R00073 MOD 4BY KERNAN (TWIDDLE IN 54) 3/28/68 SKIPPER REV 13.
 R000799

R0008 FUNCTIONAL DESCRIPTION--
 R0009 PART OF A SECTION OF PROGRAMS,-WAITLIST, TASKOVER, T3RUPT, USED TO CALL A PROGRAM, (CALLED A TASK),
 R0011 WHICH IS TO BEGIN IN C(A) CENTISECONDS. WAITLIST UPDATES TIME3, LST1 AND LST2. THE MEANING OF THESE LISTS
 R0013 FOLLOW.

R0014 C(TIME3) = 16384 -(T1-T) CENTISECONDS, (T=PRESENT TIME, T1=TIME FOR TASK1)
 R0016

R0017 C(LST1) = -(T2-T1)+1
 R0018 C(LST1 +1) = -(T3-T2)+1
 R0019 C(LST1 +2) = -(T4-T3)+1
 R0020 .
 R0021 .
 R0022 C(LST1 +6) = -(T8-T7)+1
 R0023 C(LST1 +7) = -(T9-T8)+1
 R0024 C(LST2) = 2CADR OF TASK1
 R0025 C(LST2 +2) = 2CADR OF TASK2
 R0026 .
 R0027 .
 R0028 C(LST2 +14)= 2CADR OF TASK8
 R0029 C(LST2 +16)= 2CADR OF TASK9

R0030 WARNINGS--

R0031 -----
 R0032 1) 1 <= C(A) <= 162500 (1 CENTISECOND TO 162.5 SEC)
 R0033 2) 9 TASKS MAXIMUM
 R0034 3) TASKS CALLED UNDER INTERRUPT INHIBITED
 R0035 4) TASKS END BY TC TASKOVER

R0036 CALLING SEQUENCE--

R0037 L-1 CA DELTAT (TIME IN CENTISECONDS TO TASK START)
 R0039 L TC WAITLIST
 R0040 L+1 2CADR DESIRED TASK
 R0041 L+2 (MINOR OF 2CADR)
 R0042 L+3 RELINT (RETURNS HERE)

R00421 TWIDDLE--

R00422 -----
 R00423 TWIDDLE IS FOR USE WHEN THE TASK BEING SET UP IS IN THE SAME EBANK AND FBANK AS THE USER. IN
 R00425 SUCH CASES, IT IMPROVES UPON WAITLIST BY ELIMINATING THE NEED FOR THE B8CON HALF OF THE 2CADR,

L WAITLIST

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R00427 SAVING A WORD. TWIDDLE IS LIKE WAITLIST IN EVERY RESPECT EXCEPT CALLING SEQUENCE, TO WIT-

R0043 L-1 CA DELTAT
 R00431 L TC TWIDDLE
 R00432 L+1 ADRES DESIRED TASK
 R00433 L+2 RELINT (RETURNS HERE)

R00439 NCRMAL EXIT MODES-

R0044 AT L+3 OF CALLING SEQUENCE

R0045 ALARM OR ABORT EXIT MODES-

R0046 TC ABORT
 R0047 OCT 1203 (WAITLIST OVERFLOW - TOO MANY TASKS)

R0048 ERASABLE INITIALIZATION REQUIRED-

R0049 ACCOMPLISHED BY FRESH START,--LST2,..., LST2 +16 =ENDTASK
 R0050 LST1,..., LST1 +7 =NEG1/2

R0051 OUTPUT--

R0052 LST1 AND LST2 UPDATED WITH NEW TASK AND ASSOCIATED TIME.
 R0053 DEBRIS-

R0054 CENTRALS- A,Q,L
 R0055 OTHER - WAITEXIT, WAITADR, WAITTEMP, WAITBANK
 R0056 DETAILED ANALYSIS OF TIMING-

R0057 CONTROL WILL NOT BE RETURNED TO THE SPECIFIED ADDRESS (2CADR) IN EXACTLY DELTA T CENTISECONDS.
 R0059 THE APPROXIMATE TIME MAY BE CALCULATED AS FOLLOWS

R0060 LET TO = THE TIME OF THE TC WAITLIST
 R0061 LET TS = TO +1470 + COUNTER INCREMENTS (SET UP TIME)
 R0062 LET X = TS -(100TS)/100 (VARIANCE FROM COUNTERS)
 R0063 LET Y = LENGTH OF TIME OF INHIBIT INTERRUPT AFTER T3RUPT
 R0064 LET Z = LENGTH OF TIME TO PROCESS TASKS WHICH ARE DUE THIS T3RUPT BUT DISPATCHED EARLIER.
 R0066 (Z=0, USUALLY)
 R0067 LET DELTD = THE ACTUAL TIME TAKEN TO GIVE CONTROL TO 2CADR
 R0068 THEN DELTD = TS+DELTA T -X +Y +Z +1.05MS* +COUNTERS*
 R0069 *-THE TIME TAKEN BY WAITLIST ITSELF AND THE COUNTER TICKING DURING THIS WAITLIST TIME.
 R0071

R0072 IN SHORT, THE ACTUAL TIME TO RETURN CONTROL TO A 2CADR IS AUGMENTED BY THE TIME TO SET UP THE TASKS
 R0074 INTERRUPT, ALL COUNTERS TICKING, THE T3RUPT PROCESSING TIME, THE WAITLIST PROCESSING TIME AND THE POSSIBILITY
 R0076 OF OTHER TASKS INHIBITING THE INTERRUPT.

L WAITLIST

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0078 RFF 14 LAST 235 F3,1400

EBANK= LST1

TASK LISTS IN SWITCHED E BANK.

0079 RFF 1

COUNT* \$\$/WAIT

00795

INHINT

0080 RFF 2C6 LAST 1111

TS L

SAVE DELAY TIME IN L

0081 REF 28 LAST 1075

CA POSMAX

0082 REF 3C7 LAST 1110

ADS Q

CREATING OVERFLOW AND Q-1 IN Q

0083 REF 32 LAST 1111

CA BBANK

00832

EXTEND

00834 REF 19 LAST 1111

ROR SUPERBNK

0084 REF 2C7 LAST 1114

XCH L

00849

WAITLIST INHINT

0085 RFF 308 LAST 1114

XCH Q

SAVE DELTA T IN Q AND RETURN IN
WAITEXIT.

0086 REF 1

TS WAITEXIT

0087

EXTEND

0088 REF 2 LAST 1114

INDEX WAITFXIT

IF TWIDDLING, THE TS SKIPS TO HERE
PICK UP 2CADR OF TASK.
88CON WILL REMAIN IN L
ENTRY FROM FIXDELAY AND VARDELAY.

0089

DCA 0

0090 REF 1

TS WAITADR

0091 RFF 1

CAF WAITBB

0092 REF 33 LAST 1114

XCH BBANK

0093 RFF 1

TCF WAIT2

R0094 RETURN TO CALLER AFTER TASK INSERTION:

0095 REF 3 LAST 1114

LVWTLIST

DXCH WAITEXIT

0096 REF 76 LAST 1111

AD TWD

0097

DTCB

0099 REF 15 LAST 1114

EBANK= LST1

0100 REF 2 LAST 1114

BBCON WAIT2

R0101 RETURN TO CALLER +2 AFTER WAITING DT SPECIFIED AT CALLER +1.

0102 REF 309 LAST 1114

FIXDELAY INDEX Q

0103

CAF 0

0104 RFF 310 LAST 1114

INCR Q

BOTH ROUTINES MUST BE CALLED UNDER
WAITLIST CONTROL AND TERMINATE THE TASK
IN WHICH THEY WERE CALLED.

R0105 RETURN TO CALLER +1 AFTER WAITING THE DT AS ARRIVING IN A.

0106 REF 311 LAST 1114

VARDELAY XCH Q

DT TO Q. TASK ADRES TO WAITADR.

0107 REF 2 LAST 1114

TS WAITADR

0108 REF 34 LAST 1114

CA BBANK

BBANK IS SAVED DURING DELAY.

0109

EXTEND

0110 REF 20 LAST 1114

ROR SUPERBNK

ADD SBANK TO BBCON.

0111 REF 208 LAST 1114

TS L

0112 REF 1

CAF DELAYEX

0113 REF 4 LAST 1114

TS WAITEXIT

GO TO TASKOVER AFTER TASK ENTRY.

0114 REF 1

TCF DLY2

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0115 REF 65 LAST 964 5235 1 5257 0 DELAYEX TCF TASKOVER -2

RETURNS TO TASKOVER

L WAITLIST

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R0116 ENDTASK MUST BE ENTERED IN FIXED-FIXED SO IT IS DISTINGUISHABLE BY ITS ADRES ALONE.

0118	REF	16	LAST 1114	E3,1400				EBANK= LST1		
0119	REF	1		5236	72537	0	ENDTASK	-2CADR	SVCT3	
0119	RFF	1		5237	73714	1				
0120	REF	27	LAST 926	5240	10 076	1	SVCT3	CCS	FLAGWRD2	DRIFT FLAG
0121	REF	66	LAST 1115	5241	1 5261	0		TCF	TASKOVER	
0122	REF	67	LAST 1116	5242	1 5261	0		TCF	TASKOVER	
0123				5243	1 5244	1		TCF	+1	
01231	RFF	3	LAST 237	5244	11'304	0	CKIMUSE	CCS	IMUCADR	DON'T DO NBDONLY IF SOMEONE ELSE IS IN
01232	REF	1		5245	1 5256	1		TCF	SVCT3X	IMUSTALL.
01233				5246	1 5251	0		TCF	+3	
01234	REF	2	LAST 1116	5247	1 5256	1		TCF	SVCT3X	
01235	REF	3	LAST 1116	5250	1 5256	1		TCF	SVCT3X	
0124	REF	1		5251	3 7722	1	+3	CAF	PRIG35	COMPENSATE FOR NBD COEFFICIENTS ONLY.
0125	REF	25	LAST 889	5252	0 5072	1		TC	NDVAC	ENABLE EVERY 81.93 SECONDS
0126	REF	6	LAST 858	E3,1460				EBANK=	NBDX	
0127	RFF	1		5253	03555	1		2CADR	NBDONLY	
0127	REF	1		5254	14063	1				
0128	RFF	68	LAST 1116	5255	1 5261	0		TCF	TASKOVER	
01281	REF	15	LAST 785	5256	0 5221	0	SVCT3X	TC	FIXDELAY	DELAY MAX OF 2 TIMES FOR IMUZERO.
01282				5257	00764	1		DEC	500	
01283	REF	2	LAST 1116	5260	0 5240	1		TC	SVCT3	CHECK DRIFT FLAG AGAIN.

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P0129 BEGIN TASK INSERTION.

0130				01,3226		BANK 01	
0131	REF 1					COUNT* \$\$/WAIT	
0132	REF 1			01,3226	54 062 1	TS WAITBANK	BBANK OF CALLING PROGRAM.
01322	REF 312	LAST 1114		01,3227	3 0002 0	CA Q	
01324				01,3230	0 0006 1	EXTEND	
01326	REF 1			01,3231	6 3520 0	BZMF WAITPOOH	
0133	REF 2	LAST 234		01,3232	4 0026 1	CS TIME3	
0134	REF 36	LAST 1048		01,3233	6 4744 1	AD BIT8	BIT 8 = OCT 200
0135	REF 369	LAST 1110		01,3234	10 000 0	CCS A	TEST 200 - C(TIME3). IF POSITIVE,
A0136							IT MEANS THAT TIME3 OVERFLOW HAS OCCURRED PRIOR TO CS TIME3 AND THAT
A0137							C(TIME3) = T - T1, INSTEAD OF 1.0 - (T1 - T). THE FOLLOWING FOUR
A0138							ORDERS SET C(A) = TD - T1 + 1 IN EITHER CASE.
0139	REF 2	LAST 1094		01,3235	6 6106 0	AD OCT40001	OVERFLOW HAS OCCURRED. SET C(A) =
0140	REF 370	LAST 1117		01,3236	4 0000 0	CS A	T - T1 + 1.0 - 201
R0141							NORMAL CASE (C(A) NNZ) YIELDS SAME C(A): $-(-(1.0 - (T1 - T)) + 200) - 1$
0142	REF 1			01,3237	6 3365 1	AD OCT40201	
0143	REF 313	LAST 1117		01,3240	6 0002 0	AD Q	RESULT = TD - T1 + 1.
0144	REF 371	LAST 1117		01,3241	10 000 0	CCS A	TEST TD - T1 + 1
0145	REF 17	LAST 1116		01,3242	6 1400 1	AD LST1	IF TD - T1 POS, GO TO WTLST5 WITH
0146	REF 1			01,3243	1 3305 0	TCF WTLST5	C(A) = (TD - T1) + C(LST1) = TD - T2 + 1
0147				01,3244	13 245 0	NOOP	
0148	REF 314	LAST 1117		01,3245	4 0002 1	CS Q	
R0149							NOTE THAT THIS PROGRAM SECTION IS NEVER ENTERED WHEN T-T1 G/E -1,
R0150							SINCE $TD - T1 + 1 = (TD - T) + (T - T1 + 1)$, AND $\Delta T = TD - T$ G/E +1. (G/E
R0151							SYMBOL MEANS GREATER THAN OR EQUAL TO). THUS THERE NEED BE NO CON-
R0152							CERN OVER A PREVIOUS OR IMMINENT OVERFLOW OF TIME3 HERE.
0153	REF 1			01,3246	6 4736 1	AD POS1/2	WHEN TD IS NEXT, FORM QUANTITY
0154	REF 2	LAST 1117		01,3247	6 4736 1	AD POS1/2	1.0 - $\Delta T = 1.0 - (TD - T)$
0155	REF 3	LAST 1117		01,3250	56 026 0	XCH TIME3	
0156	REF 6	LAST 1038		01,3251	6 4735 1	AD NEGMAX	
0157	REF 315	LAST 1117		01,3252	6 0002 0	AD Q	1.0 - ΔT NOW COMPLETE.
0158				01,3253	0 0006 1	EXTEND	ZERO INDEX Q.
0159				01,3254	22 007 0	QXCH 7	(ZQ)

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0160	REF	18	LAST	1117	01,3255	57'400	1	WTLST4	XCH	LST1	
0161	REF	19	LAST	1118	01,3256	57'401	0		XCH	LST1 +1	
0162	REF	20	LAST	1118	01,3257	57'402	0		XCH	LST1 +2	
0163	REF	21	LAST	1118	01,3260	57'403	1		XCH	LST1 +3	
0164	REF	22	LAST	1118	01,3261	57'404	0		XCH	LST1 +4	
0165	REF	23	LAST	1118	01,3262	57'405	1		XCH	LST1 +5	
0166	REF	24	LAST	1118	01,3263	57'406	1		XCH	LST1 +6	
0167	REF	25	LAST	1118	01,3264	57'407	0		XCH	LST1 +7	
0168	REF	3	LAST	1114	01,3265	3 0063	1		CA	WAITADR	(MINOR PART OF TASK CADR HAS BEEN IN L.)
0169	REF	316	LAST	1117	01,3266	50 002	0		INDEX	Q	
0170					01,3267	1 3270	0		TCF	+1	
0171	REF	24	LAST	758	01,3270	53'411	0		DXCH	LST2	
0172	REF	25	LAST	1118	01,3271	53'413	1		DXCH	LST2 +2	
0173	REF	26	LAST	1118	01,3272	53'415	1		DXCH	LST2 +4	
0174	REF	27	LAST	1118	01,3273	53'417	0		DXCH	LST2 +6	
0175	REF	28	LAST	1118	01,3274	53'421	0		DXCH	LST2 +80	
0176	REF	29	LAST	1118	01,3275	53'423	1		DXCH	LST2 +100	AT END, CHECK THAT C(LST2+10) IS STD
0177	REF	30	LAST	1118	01,3276	53'425	1		DXCH	LST2 +120	
0178	REF	31	LAST	1118	01,3277	53'427	0		DXCH	LST2 +140	
0179	REF	32	LAST	1118	01,3300	53'431	1		DXCH	LST2 +160	
0180	REF	3	LAST	236	01,3301	6 5236	0		AD	ENDTASK	END ITEM, AS CHECK FOR EXCEEDING
A0181											THE LENGTH OF THE LIST.
0182					01,3302	0 0006	1		EXTEND		DUMMY TASK ADRES SHOULD BE IN FIXED-
0183	REF	1			01,3303	1 5215	0		BZF	LVWTLIST	FIXED SO ITS ADRES ALONE DISTINGUISHES
0184	REF	1			01,3304	1 3360	0		TCF	WABCRT	IT.

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0185	REF 372	LAST 1117	01,3305	10 000 0	WTLST5	CCS	A	TEST TD - T2 + 1
0186	REF 26	LAST 1118	01,3306	6 1401 0		AD	LST1 +1	
0187			01,3307	1 3313 1		TCF	+4	
0188	REF 116	LAST 1106	01,3310	6 4753 1		AD	ONE	
0189	REF 1		01,3311	0 3371 1		TC	WTLST2	
0190			01,3312	00001 0		OCT	1	
0191	REF 373	LAST 1119	01,3313	10 000 0	+4	CCS	A	TEST TD - T3 + 1
0192	REF 27	LAST 1119	01,3314	6 1402 0		AD	LST1 +2	
0193			01,3315	1 3321 0		TCF	+4	
0194	REF 117	LAST 1119	01,3316	6 4753 1		AD	ONE	
0195	REF 2	LAST 1119	01,3317	0 3371 1		TC	WTLST2	
0196			01,3320	00002 0		OCT	2	
0197	REF 374	LAST 1119	01,3321	10 000 0	+4	CCS	A	TEST TD - T4 + 1
0198	REF 28	LAST 1119	01,3322	6 1403 1		AD	LST1 +3	
0199			01,3323	1 3327 0		TCF	+4	
0200	REF 118	LAST 1119	01,3324	6 4753 1		AD	ONE	
0201	REF 3	LAST 1119	01,3325	0 3371 1		TC	WTLST2	
0202			01,3326	00003 1		OCT	3	
0203	REF 375	LAST 1119	01,3327	10 000 0	+4	CCS	A	TEST TD - T5 + 1
0204	REF 29	LAST 1119	01,3330	6 1404 0		AD	LST1 +4	
0205			01,3331	1 3335 0		TCF	+4	
0206	REF 119	LAST 1119	01,3332	6 4753 1		AD	ONE	
0207	REF 4	LAST 1119	01,3333	0 3371 1		TC	WTLST2	
0208			01,3334	00004 0		OCT	4	
0209	REF 376	LAST 1119	01,3335	10 000 0	+4	CCS	A	TEST TD - T6 + 1
0210	REF 30	LAST 1119	01,3336	6 1405 1		AD	LST1 +5	
0211			01,3337	1 3343 1		TCF	+4	
0212	REF 120	LAST 1119	01,3340	6 4753 1		AD	ONE	
0213	REF 5	LAST 1119	01,3341	0 3371 1		TC	WTLST2	
0214			01,3342	00005 1		OCT	5	
0215	REF 377	LAST 1119	01,3343	10 000 0	+4	CCS	A	TEST TD - T7 + 1
0216	REF 31	LAST 1119	01,3344	6 1406 1		AD	LST1 +6	
0217			01,3345	1 3351 1		TCF	+4	
0218	REF 121	LAST 1119	01,3346	6 4753 1		AD	ONE	
0219	REF 6	LAST 1119	01,3347	0 3371 1		TC	WTLST2	
0220			01,3350	00006 1		OCT	6	

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0221	REF 378	LAST 1119	01,3351	10 000 0	+4	CCS	A
0222	REF 32	LAST 1119	01,3352	6 1407 0		AD	LST1 +7
0223			01,3353	1 3357 1		ICF	+4
0224	REF 122	LAST 1119	01,3354	6 4753 1		AD	ONE
0225	REF 7	LAST 1119	01,3355	0 3371 1		TC	WTLST2
0226			01,3356	00007 0		OCT	7

0227	REF 379	LAST 1120	01,3357	10 000 0	+4	CCS	A
0228	REF 1		01,3360	0 3366 1	WTABORT	TC	FILLED
0229			01,3361	13 362 1		NOOP	
0230	REF 123	LAST 1120	01,3362	6 4753 1		AD	ONE
0231	REF 8	LAST 1120	01,3363	0 3371 1		TC	WTLST2
0232			01,3364	00010 0		OCT	10

CAN'T GET HERE

0233			01,3365	40201 0	OCT40201	OCT	40201
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02332	REF	5	LAST 1114	01,3366	52 062 1	FILLED	DXCH	WAITFXIT
02334	REF	5	LAST 1102	01,3367	0 5710 1		TC	BAILOUT1
02336				01,3370	01203 1		OCT	01203

NO ROOM IN THE INN

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R0234 THE ENTRY TO WTLST2 JUST PRECEDING OCT N IS FOR T LE TO LFT -1.
R0235 N N+1

R0236 (LE MEANS LESS THAN OR EQUAL TO). AT ENTRY, C(A) = -(TD - T + 1)
R0237 N+1

R0238 THE LST1 ENTRY -(T - T + 1) IS TO BE REPLACED BY -(TO - T + 1), AND
R0239 N+1 N

R0240 THE ENTRY -(T - TO + 1) IS TO BE INSERTED IMMEDIATELY FOLLOWING.
R0241 N+1

0242	REF 1	01,3371	54 064 1	WTLST2	TS	WAITTEMP	C(A) = -(TD - T + 1)
0243	REF 317	LAST 1118	01,3372 50 002 0		INOEX	Q	
0244			01,3373 3 0000 1		CAF	Q	
0245	REF 318	LAST 1122	01,3374 54 002 1		TS	Q	INOEX VALUE INTO Q.

0246	REF 124	LAST 1120	01,3375 3 4753 1		CAF	DNF	
0247	REF 2	LAST 1122	01,3376 6 0064 0		AD	WAITTEMP	
0248	REF 319	LAST 1122	01,3377 50 002 0		INOEX	Q	C(A) = -(TO - T) + 1.
0249	REF 33	LAST 1120	01,3400 27*377 1		ADS	LST1 -1	N

0250	REF 3	LAST 1122	01,3401 4 0064 1		CS	WAITTEMP	
0251	REF 320	LAST 1122	01,3402 50 002 0		INDEX	Q	
0252	REF 1		01,3403 1 3255 1		TCF	WTLST4	

R0253 C(TIME3) = 1.0 - (T1 - T)

R0254 C(LST1) = - (T2 - T1) + 1
 R0255 C(LST1+1) = - (T3 - T2) + 1
 R0256 C(LST1+2) = - (T4 - T3) + 1
 R0257 C(LST1+3) = - (T5 - T4) + 1
 R0258 C(LST1+4) = - (T6 - T5) + 1

R0259 C(LST2) = 2CA0R TASK1
 R0260 C(LST2+2) = 2CA0R TASK2
 R0261 C(LST2+4) = 2CA0R TASK3
 R0262 C(LST2+6) = 2CA0R TASK4
 R0263 C(LST2+8) = 2CA0R TASK5
 R0264 C(LST2+10) = 2CA0R TASK6

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P0265 ENTERS HERE ON T3 RUPT TO DISPATCH WAITLISTED TASK.

0266					01,3404	0 0006	1	T3RUPT	EXTEND		
0267	REF	21	LAST	1114	01,3405	04 007	1		ROR	SUPERBNK	READ CURRENT SUPERBANK VALUE AND
0268	REF	6	LAST	986	01,3406	54 016	1		TS	BANKRUPT	SAVE WITH E AND F BANK VALUES.
0269					01,3407	0 0006	1		EXTEND		
0270	REF	6	LAST	986	01,3410	22 012	1		QXCH	QRUPT	
0271	REF	6	LAST	1090	01,3411	3 4734	0	T3RUPT2	CAF	NEG1/2	DISPATCH WAITLIST TASK.
0272	REF	34	LAST	1122	01,3412	57'407	0		XCH	LST1 +7	
0273	REF	35	LAST	1123	01,3413	57'406	1		XCH	LST1 +6	
0274	REF	36	LAST	1123	01,3414	57'405	1		XCH	LST1 +5	
0275	REF	37	LAST	1123	01,3415	57'404	0		XCH	LST1 +4	1. MOVE UP LST1 CONTENTS, ENTERING
0276	REF	38	LAST	1123	01,3416	57'403	1		XCH	LST1 +3	A VALUE OF 1/2 +1 AT THE BOTTOM
0277	REF	39	LAST	1123	01,3417	57'402	0		XCH	LST1 +2	FOR T6-T5, CORRESPONDING TO THE
0278	REF	40	LAST	1123	01,3420	57'401	0		XCH	LST1 +1	INTERVAL 81.91 SEC FOR ENDTASK.
0279	REF	41	LAST	1123	01,3421	57'400	1		XCH	LST1	
0280	REF	29	LAST	1114	01,3422	6 4733	1		AD	POS MAX	2. SET T3 = 1.0 - T2 -T USING LIST 1.
0281	REF	4	LAST	1117	01,3423	26 026	1		ADS	TIME 3	SO T3 WONT TICK DURING UPDATE.
0282	REF	4	LAST	574	01,3424	54 734	0		TS	RUPTAGN	
0283	REF	219	LAST	1111	01,3425	4 4755	0		CS	ZERO	
0284	REF	5	LAST	1123	01,3426	54 734	0		TS	RUPTAGN	SETS RUPTAGN TO +1 ON OVERFLOW.
0285					01,3427	0 0006	1		EXTEND		DISPATCH TASK.
0286	REF	4	LAST	1118	01,3430	4 5237	0		DCS	ENDTASK	
0287	REF	33	LAST	1118	01,3431	53'431	1		DXCH	LST2 +16D	
0288	REF	34	LAST	1123	01,3432	53'427	0		DXCH	LST2 +14D	
0289	REF	35	LAST	1123	01,3433	53'425	1		DXCH	LST2 +12D	
0290	REF	36	LAST	1123	01,3434	53'423	1		DXCH	LST2 +10D	
0291	REF	37	LAST	1123	01,3435	53'421	0		DXCH	LST2 +8D	
0292	REF	38	LAST	1123	01,3436	53'417	0		DXCH	LST2 +6	
0293	REF	39	LAST	1123	01,3437	53'415	1		DXCH	LST2 +4	
0294	REF	40	LAST	1123	01,3440	53'413	1		DXCH	LST2 +2	
0295	REF	41	LAST	1123	01,3441	53'411	0		DXCH	LST2	
0296	REF	209	LAST	1114	01,3442	56 001	0		XCH	L	
0297					01,3443	0 0006	1		EXTEND		
0298	REF	22	LAST	1123	01,3444	01 007	1		WRITE	SUPERBNK	SET SUPERBANK FROM BBCON OF 2CADR
0299	REF	210	LAST	1123	01,3445	56 001	0		XCH	L	RESTORE TO L FOR DXCH Z.
0300					01,3446	52 006	0		DTCB		

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P0301 RETURN, AFTER EXECUTION OF T3 OVERFLOW TASK:

0302				5261				BLOCK 02		
0303	REF	2	LAST 1114 TO 1117:	54	54*			COUNT* \$\$/WAIT		
0304	REF	6	LAST 1123	5261	10 734 0	TASKOVER		CCS RUPTAGN	IF +1 RETURN TO T3RUPT, IF -0 RESUME.	
0305	REF	2	LAST 1114	5262	3 5220 1			CAF WAITBB		
0306	REF	35	LAST 1114	5263	54 006 0			TS BBANK		
0307	REF	1		5264	1 3411 1			TCF T3RUPT2	DISPATCH NEXT TASK IF IT WAS DUE.	
0308	REF	7	LAST 1123	5265	3 0016 0			CA BANKRUPT		
0309				5266	0 0006 1			EXTEND		
0310	REF	23	LAST 1123	5267	01 007 1			WRITE SUPERBNK	RESTORE SUPERBANK BEFORE RESUME IS DONE	
0311				5270	0 0006 1	RESUME		EXTEND		
0312	REF	7	LAST 1123	5271	22 012 1			QXCH QRUPT		
0313	REF	8	LAST 1124	5272	3 0016 0	NOQRSM		CA BANKRUPT		
0314	REF	36	LAST 1124	5273	56 006 1			XCH BBANK		
0315	REF	11	LAST 169	5274	52 011 0	NOQBRSM		DXCH ARUPT		
03155				5275	0 0003 1			RELINT		
0316				5276	5 0017 1			RESUME		

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P0317 LONGCALL

R0318 PROGRAM DESCRIPTION DATE- 17 MARCH 1967
 R0319 PROGRAM WRITTEN BY W.H. VANDEVER LDG SECTION WAITLIST
 R0320 MCD BY- R. MELANSEN TO ADD DOCUMENTATION ASSEMBLY SUNDISK REV. 100

R0321 FUNCTIONAL DESCRIPTION-
 R0322 LONGCALL IS CALLED WITH THE DELTA TIME ARRIVING IN A,L SCALED AS TIME2,TIME1 WITH THE 2CADR OF THE TASK
 R0324 IMMEDIATELY FOLLOWING THE TC LONGCALL. FOR EXAMPLE, IT MIGHT BE DONE AS FOLLOWS WHERE TIMELOC IS THE NAME OF
 R0326 A DP REGISTER CONTAINING A DELTA TIME AND WHERE TASKTODD IS THE NAME OF THE LOCATION AT WHICH LONGCALL IS TO
 R0328 START

R0329 CALLING SEQUENCE-

A0330 EXTEND
 A0331 DCA TIMELOC
 A0332 TC LONGCALL
 A0333 2CADR TASKTODD

R0334 NORMAL EXIT MODE-

R0335 1). TC WAITLIST
 R0336 2). DTCB (TO L+3 OF CALLING ROUTINE 1ST PASS THRU LONGCYCL)
 R0337 3). DTCB (TO TASKOVER ON SUBSEQUENT PASSES THRU LONGCYCL)

R0338 ALARM OR ABORT-EXIT MODE--

R0339 NDNE

R0340 OUTPUT-

R0341 LONGTIME AND LONGTIME+1 = DELTA TIME
 R0342 LONGEXIT AND LONGEXIT+1 = RETURN 2CADR
 R0343 LONGCADR AND LONGCADR+1 = TASK 2CADR
 R0344 A = SINGLE PRECISION TIME FOR WAITLIST

R0345 ERASABLE INITIALIZATION-

R0346 A = MOST SIGNIFICANT PART OF DELTA TIME
 R0347 L = LEAST SIGNIFICANT PART OF DELTA TIME
 R0348 Q = ADDRESS OF 2CADR TASK VALUE

R0349 DEPRIS-

R0350 A,Q,L
 R0351 LDNGCADR AND LONGCADR+1
 R0352 LDNGEXIT AND LONGEXIT+1
 R0353 LONGTIME AND LONGTIME+1

P0354 *** THE FOLLOWING IS TO BE IN FIXED-FIXED AND UNSWITCHED ERASABLE ***

0355 5277 BLOCK 02
 0356 REE 42 LAST 1123 E3,1400 EBANK= LST1
 0357 REF 1 5277 53'154 1 LONGCALL DXCH LONGTIME OBTAIN THE DELTA TIME
 0358 5300 0 0006 1 EXTEND OBTAIN THE 2CADR

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0359	REF 321	LAST 1122	5301	5 0002 0	NDX	Q
0360			5302	3 0001 0	DCA	0
0361	REF 1		5303	53'150 0	DXCH	LONGCALL

0362			5304	0 0006 1	EXTEND	
0363	REF 1		5305	3 5310 0	DCA	LGCL2CDR
0364			5306	52 006 0	DTCB	

NOW GO TO THE APPROPRIATE SWITCHED BANK
FOR THE REST OF LONGCALL

0365	REF 43	LAST 1125	F3,1400		EBANK=	LST1
0366	REF 1		5307	03447 0	LGCL2CDR	2CA DR LN GCALL2
0366	REF 1		5310	02063 0		

R0367 *** THE FOLLOWING MAY BE IN A SWITCHED BANK, INCLUDING ITS FRASABLE ***

0368			01,3447		BANK	01
0369	REF 2	LAST 1117 TO	1124:	145 145*	COUNT*	\$/WAIT
0370	REF 1		01,3447	23'435 1	LN GCALL2	LXCH LONGEXIT +1
0371	REF 77	LAST 1114	01,3450	3 4752 0	CA	TWO
0372	REF 322	LAST 1126	01,3451	26 002 1	ADS	0
0373	REF 2	LAST 1126	01,3452	55'434 1	TS	LONGEXIT

SAVE THE CORRECT BB FOR RETURN
OBTAIN THE RETURN ADDRESS

03731	REF 2	LAST 1125	01,3453	3 1153 1	CA	LONGTIME
03732	REF 380	LAST 1120	01,3454	10 000 0	CCS	A
03733	REF 1		01,3455	1 3463 1	TCF	LONGCYCL
03734			01,3456	1 3460 1	TCF	+2
03735	REF 1		01,3457	1 3516 1	TCF	LONGPOOH
03736	REF 3	LAST 1126	01,3460	3 1154 0	+2 CA	LONGTIME +1
03737			01,3461	0 0006 1	EXTEND	
03738	REF 2	LAST 1126	01,3462	6 3516 0	BZMF	LONGPOOH

CHECK FOR LEGITIMATE DELTA-TIME
HI-ORDER OK --> ALL IS OK.
HI-ORDER ZERO --> CHECK LO-ORDER.
HI-ORDER NEG. --> NEG. DT
CHECK LO-ORDER FOR ZERO OR NEGATIVE.
BAD DELTA-TIME. ABORT

R0374 *** WAITLIST TASK LONGCYCL ***

0375			01,3463	0 0006 1	LONGCYCL	EXTEND
0376	REF 1		01,3464	4 3475 0	DCS	DPBIT14
0377	REF 4	LAST 1126	01,3465	21'154 1	DAS	LONGTIME

CAN WE SUCCESSFULLY TAKE ABOUT 1.25
MINUTES OFF OF LONGTIME

0378	REF 5	LAST 1126	01,3466	11'154 1	CCS	LONGTIME +1
0379	REF 1		01,3467	1 3506 0	TCF	MUCHTIME

THE REASONING BEHIND THIS PART IS
INVOLVED, TAKING INTO ACCOUNT THAT THE
WORDS MAY NOT BE SIGNED CORRECTED (DP
BASIC INSTRUCTIONS
DO NOT SIGN CORRECT) AND THAT WE SUBTRAC
TED BIT14 (1 OVER HALF THE POS. VALUE
REPRESENTABLE IN SINGLE WORD)
CAN'T GET HERE *****

A0380						
A0381						
A0382						
A0383						
A0384						
0385			01,3470	13 471 1	NOOP	
0386			01,3471	1 3472 1	TCF	+1
0387	REF 6	LAST 1126	01,3472	11'153 0	CCS	LONGTIME
0388	REF 2	LAST 1126	01,3473	1 3506 0	TCF	MUCHTIME
0389			01,3474	00000 1	DPBIT14	OCT 00000
0390			01,3475	20000 0	OCT	20000

A0391

LONGCALL

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0392	REF	73	LAST 1094	01,3476	3 4736 1	LASTTIME	CA	BIT14	GET BACK THE CORRECT DELTA TFOR WAITLIST
0393	REF	7	LAST 1126	01,3477	27'154 1		ADS	LONGTIME +1	
0395	REF	35	LAST 892	01,3500	0 5203 0		TC	WAITLIST	
0396	REF	44	LAST 1126	E3,1400			EBANK=	LST1	
0397	RFF	1		01,3501	03513 0		2CADR	GETCADR	THE ENTRY TO OUR LONGCADR
0397	REF	1		01,3502	02063 0				
0399	RFF	1		01,3503	3 3515 0	LONGRTRN	CA	TSKOVCDR	SET IT UP SO THAT ONLY THE FIRST EXIT IS
0400	REF	3	LAST 1126	01,3504	53'435 0		DXCH	LONGEXIT	TO THE CALLER OF LONGCALL
0401				01,3505	52 006 0		DTCB		THE REST ARE TO TASKOVER
0402	RFF	74	LAST 1127	01,3506	3 4736 1	MUCHTIME	CA	BIT14	WE HAVE OVER OUR ABOUT 1.25 MINUTES
0404	REF	36	LAST 1127	01,3507	0 5203 0		TC	WAITLIST	SO SET UP FOR ANOTHER CYCLE THROUGH HERE
0405	RFF	45	LAST 1127	E3,1400			EBANK=	LST1	
0406	REF	2	LAST 1126	01,3510	03463 0		2CADR	LONGCYCL	
0406				01,3511	02063 0				
0408	REF	1		01,3512	1 3503 0		TCF	LONGRTRN	NOW EXIT PROPERLY
R0409			*** WAITLIST TASK GETCADR ***						
0410	REF	2	LAST 1126	01,3513	53'150 0	GETCADR	DXCH	LONGCADR	GET THE LONGCALL THAT WE WISHED TO START
0411				01,3514	52 006 0		DTCB		AND TRANSFER CONTROL TO IT
0412	REF	69	LAST 1116	01,3515	05261 1	TSKOVCDR	GENADR	TASKOVER	
0413	RFF	4	LAST 1127	01,3516	53'435 0	LONGPOOH	DXCH	LONGEXIT	
0414				01,3517	1 3521 0		TCF	+2	
0415	RFF	6	LAST 1121	01,3520	52 062 1	WAITPOOH	DXCH	WAITEXIT	
0416	REF	2	LAST 1074	01,3521	0 5720 1		+2	TC	POOD001
0417				01,3522	01204 0		OCT	01204	

L LATITUDE LONGITUDE SUBROUTINES

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R0001 SUBROUTINE TO CONVERT RAD VECTOR AT GIVEN TIME TO LAT, LONG AND ALT

R0002 CALLING SEQUENCE

R0003 L-1 CALL
 R0004 L LAT-LONG
 R0005 SUBROUTINES USED

R0006 R-TO-RP, ARCTAN, SETGAMMA, SETRE
 R0007 ERASABLE INIT. REQ.

R0008 AX0,-AY0,AZ0,TEPHEM (SET AT LAUNCH TIME)
 R0009 ALPHAV = POSITION VECTOR METERS B-29
 R0010 MPAC-- TIME (CSECS B-28)
 R0011 ERADFLAG =1, TO COMPUTE EARTH RADIUS, =0 FOR FIXED EARTH RADIUS
 R0012 LUNAFLAG=0 FOR EARTH,1 FOR MOON
 R0013 OUTPUT

R0014 LATITUDE IN LAT (REVS. B-0)
 R0015 LONGITUDE IN LONG (REVS. B-0)
 R0016 ALTITUDE IN ALT METERS B-29

0017 30,3746 BANK 30
 0018 REF 1 13,2000 SETLOC LATLONG
 0019 13,2351 BANK

0020 RFF 1 COUNT* \$\$/LT-LG
 0021 REF 6 LAST 930 E4,1431 EBANK= ALPHAV
 0022 13,2351 40220 0 LAT-LONG STQ SETPD
 0023 REF 2 LAST 159 13,2352 03672 1 INCORPEX
 0024 13,2353 00001 0 OD
 0025 13,2354 24007 0 STOVL 6D
 0026 REF 7 LAST 1128 13,2355 02032 1 ALPHAV
 0027 13,2356 51406 1 PUSH ABVAL
 0028 RFF 2 LAST 130 13,2357 16070 1 STODL ALPHAM
 0029 REF 6 LAST 1096 13,2360 22275 1 ZEROVEC
 0030 13,2361 71414 0 BOFF COS
 0031 REF 5 LAST 930 13,2362 01743 0 LUNAFLAG
 0032 REF 1 13,2363 26364 1 CALLRTRP
 0033 13,2364 77624 1 CALLRTRP CALL

0034 REF 4 LAST 974 13,2365 51531 1 R-TO-RP
 0035 13,2366 77656 1 UNIT
 0036 REF 8 LAST 1128 13,2367 36032 0 STCALL ALPHAV
 0037 REF 1 13,2370 26550 0 SETGAMMA
 0038 13,2371 77624 1 CALL
 0039 REF 1 13,2372 26560 0 SETRE
 0040 13,2373 63545 0 DLOAD DSQ
 0041 REF 9 LAST 1128 13,2374 02032 1 ALPHAV
 0042 13,2375 63525 0 PDDL DSQ
 0043 RFF 10 LAST 1128 13,2376 02034 1 ALPHAV +2
 0044 13,2377 75415 0 DAD SQRT

SAVE TIME IN 6-7D FOR R-TO-RP

0-50= R FOR R-TO-RP

ABS. VALUE OF R FOR ALT FORMULA BELOW
 SET MPAC=0 FOR EARTH, NON-ZERO FOR MOON
 USE COS(0) TO GET NON-ZERO IN MPAC
 0=EARTH,1=MOON

RP VECTOR CONVERTED FROM R B-29

UNIT RP B-1

U2= 1/2 SINL FOR SETRE SUBR BELOW

SFT GAMMA=B2/A2 FOR EARTH, =1 FOR MOON
 SCALED B-1

CALC RE METERS B-29

L LATITUDE LONGITUDE SUBROUTINES

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0045				13,2400	76405 1
0046	REF	1		13,2401	00011 1
0047	REF	7	LAST 591	13,2402	14021 1
0048	RFF	11	LAST 1128	13,2403	02036 0
0049	REF	7	LAST 591	13,2404	34023 1
0050	REF	4	LAST 591	13,2405	26510 1
0051	REF	5	LAST 930	13,2406	15121 1
0052	REF	12	LAST 1129	13,2407	02032 1
0053	REF	8	LAST 1129	13,2410	14021 1
0054	REF	13	LAST 1129	13,2411	02034 1
0055	REF	8	LAST 1129	13,2412	34023 1
0056	REF	5	LAST 1129	13,2413	26510 1
0057	REF	11	LAST 930	13,2414	15123 0
0058	REF	3	LAST 1128	13,2415	02070 1
0059				13,2416	77625 0
0060	RFF	2	LAST 159	13,2417	03671 1
0061	REF	5	LAST 930	13,2420	35125 1
0062	REF	3	LAST 1128	13,2421	03672 1

DMP	SLIP	
	GAMRP	
STODL	COSTH	COS(LAT) B-1
	ALPHAV +4	
STCALL	SINTH	SIN(LAT) B-1
	ARCTAN	
STODL	LAT	LAT B0
	ALPHAV	
STODL	COSTH	COS(LONG) B-1
	ALPHAV +2	
STCALL	SINTH	SIN(LONG) B-1
	ARCTAN	
STODL	LONG	LONG. REVS B-0 IN RANGE -1/2 TO 1/2
	ALPHAM	
DSU		ALT= R-RE METERS B-29
	ERADM	
STCALL	ALT	EXIT WITH ALT METERS B-29
	INCORPEX	

L LATITUOF LONGITUDF SUBROUTINES

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R0063 SUBROUTINE TO CONVERT LAT, LONG, ALT AT GIVEN TIME TO RADIUS VECTOR
 R0064 CALLING SEQUENCE

R0065 L-1 CALL
 R0066 L LALOTRV
 R0067 SUBROUTINES USED

R0068 SETGAMMA, SETRF, RP-TO-R
 R0069 FRASABLE INIT. REQ.

R0070 AX0, AY0, AZ0, TEPHEM SET AT LAUNCH TIME
 R0071 LAT-- LATITUDE (REVS B0)
 R0072 LONG-- LONGITUDE (REVS B0)
 R0073 ALT-- ALTITUDE (METERS) B-29
 R0074 MPAC-- TIME (CSECS B-28)
 R0075 ERACFLAG =1 TO COMPUTE EARTH RADIUS, =0 FOR FIXED EARTH RADIUS
 R0076 LUNAFLAG=0 FOR EARTH, 1 FOR MOON
 R0077 OUTPUT

R0078 R-VECTOR IN ALPHAV (METERS B-29)

0079				13,2422	40220 0	LALOTRV STQ	SETPD	LAT, LONG, ALT TO R VECTOR
0080	REF	4	LAST 1129	13,2423	03672 1		INCOPPEX	
0081				13,2424	00001 0		OD	
0082				13,2425	34007 1	STCALL	6D	6-7D= TIME FOR RP-TO-R
0083	REF	2	LAST 1128	13,2426	26550 0		SETGAMMA	GAMMA=B2/A2 FOR EARTH, 1 FOR MOON B-1
0084				13,2427	73545 1	DLOAD	SIN	COS(LONG)COS(LAT) IN MPAC
0085	REF	6	LAST 1129	13,2430	01121 1		LAT	UNIT RP= SIN(LONG)COS(LAT) 2-3D
0086				13,2431	65275 1	OMPR	PDDL	PD 2 GAMMA*SIN(LAT) 0-1D
0087	REF	2	LAST 1129	13,2432	00011 1		GAMPP	
0088	REF	7	LAST 1130	13,2433	01121 1		LAT	0-1D= GAMMA*SIN(LAT) B-2
0089				13,2434	65346 0	COS	PDDL	PD 4 2-3D=COS(LAT) B-1 TEMPORARILY
0090	REF	12	LAST 1129	13,2435	01123 0		LONG	
0091				13,2436	57356 0	SIN	DMPR	PD 2
0092				13,2437	71525 0	PDDL	COS	PD 4 2-3D=SIN(LONG)COS(LAT) B-2
0093	REF	8	LAST 1130	13,2440	01121 1		LAT	
0094				13,2441	71525 0	PDDL	COS	PD 6 4-5D=COS(LAT) B-1 TEMPORARILY
0095	REF	13	LAST 1130	13,2442	01123 0		LONG	
0096				13,2443	55475 1	DMPR	VDEF	PD 4 MPAC= COS(LONG)COS(LAT) B-2
0097				13,2444	41456 0	UNIT	PUSH	0-5D= UNIT RP FOR RP-TO-R SUBR.
0098	REF	14	LAST 1129	13,2445	36032 0	STCALL	ALPHAV	ALPHAV +4= SINL FOR SETRE SUBR.
0099	REF	2	LAST 1128	13,2446	26560 0		SETRF	RE METERS B-29
0100				13,2447	43145 0	DLOAD	BOFF	SET MPAC=0 FOR EARTH, NON-ZERO FOR MOON
0101	REF	7	LAST 1128	13,2450	22275 1		ZEROVEC	
0102	REF	6	LAST 1128	13,2451	01743 0		LUNAFLAG	
0103	REF	1		13,2452	26454 0		CALLRPRT	
0104				13,2453	77746 1	COS		USE COS(0) TO GET NON-ZERO IN MPAC
0105				13,2454	77624 1	CALLRPRT	CALL	
0106	REF	6	LAST 973	13,2455	51504 1		RP-TO-R	EXIT WITH UNIT R VECTOR IN MPAC
0107	REF	15	LAST 1130	13,2456	16032 1	STODL	ALPHAV	
0108	REF	3	LAST 1129	13,2457	03671 1		FRADM	

L LATITUDE LONGITUDE SUBROUTINES

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0109				13,2460	74215 1	DAD	VXSC	(RE + ALT)(UNIT R) METERS B-30
0110	REF	6	LAST 1129	13,2461	01125 0		ALT	
0111	REF	16	LAST 1130	13,2462	02032 1		ALPHAV	
0112				13,2463	77772 0	VSL1		R METERS B-29
0113	REF	17	LAST 1131	13,2464	36032 0	STCALL	ALPHAV	EXIT WITH R IN METERS B-29
0114	REF	5	LAST 1130	13,2465	03672 1		INCORPEX	
R0115	SUBROUTINE TO COMPUTE EARTH RADIUS							

R0116 INPUT

R0117 1/2 SIN LAT IN ALPHAV +4

R0118 OUTPUT

R0119 EARTH RADIUS IN ERADM AND MPAC (METERS B-29)

0120				13,2466	63545 0	GETERAD	DLOAD	DSQ	
0121	REF	18	LAST 1131	13,2467	02036 0			ALPHAV +4	SIN**2(L)
0122				13,2470	44352 0		SL1	BDSU	
0123	REF	1		13,2471	22273 1			DP1/2	COS**2(L)
0124				13,2472	44275 1	DMPR		BDSU	
0125	REF	1		13,2473	26507 1			EF	
0126	REF	2	LAST 1131	13,2474	22273 1			DP1/2	
0127				13,2475	75465 1	BDDV		SQRT	
0128	REF	1		13,2476	26503 0			B2XSC	
0129				13,2477	77622 1		SR4R		
0130	REF	4	LAST 1130	13,2500	03671 1		STORE	ERADM	
0131				13,2501	77616 0		RVQ		

R01311 THE FOLLOWING CONSTANTS WERE COMPUTED WITH A=6378166,B=6356784 METERS

R01312 B2XSC= B**2 SCALED B-51

R01313 B2/A2= B**2/A**2 SCALED B-1

R01314 EE=(1-B**2/A**2) SCALED B-0

0132				13,2502	00446 1	B2XSC	2DEC	.0179450689	B**2 SCALED B-51
0132				13,2503	00305 1				
0133	REF	8	LAST 1096	11,2272		DP1/2	=	XUNIT	
0134				13,2504	17711 0	B2/A2	2DEC	.9933064884 B-1	GAMMA= B**2/A**2 B-1
0134				13,2505	05254 1				
0135				13,2506	00155 0	EE	2DEC	6.6935116 E-3	(1-B**2/A**2) B-0
0135				13,2507	25250 1				

L LATITUDE LONGITUDE SUBROUTINES

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P0137 ARCTAN SUBROUTINE

R0138 CALLING SEQUENCE

R0139 SIN THETA IN SINTH B-1
 R0140 COS THETA IN COSTH B-1
 R0141 CALL ARCTAN

R0142 OUTPUT
 R0143 ARCTAN THETA IN MPAC AND THETA B-0 IN RANGE -1/2 TO +1/2

0144				13,2510	77600	1	ARCTAN	BOV		
0145	REF	1		13,2511	26512	0			CLROVFLW	
0146				13,2512	63545	0	CLROVFLW	DLOAD	DSQ	
0147	REF	9	LAST 1129	13,2513	00023	0			SINTH	
0148				13,2514	63525	0		PDDL	DSQ	
0149	REF	9	LAST 1129	13,2515	00021	1			COSTH	
0150				13,2516	77615	0		DAD		
0151				13,2517	75454	0		BZE	SQRT	
0152	REF	1		13,2520	26536	0			ARCTANXX	ATAN=0/0 SFT THETA=0
0153				13,2521	40065	0		BDDV	BOV	
0154	REF	10	LAST 1132	13,2522	00023	0			SINTH	
0155	REF	1		13,2523	26543	1			ATAN=90	
0156				13,2524	67542	0		SR1	ASIN	
0157	REF	4	LAST 943	13,2525	00025	0		STORE	THETA	
0158				13,2526	50125	1		PDDL	BMN	
0159	REF	10	LAST 1132	13,2527	00021	1			COSTH	
0160	REF	1		13,2530	26532	1			NEGCOS	
0161				13,2531	43545	1		DLOAD	RVQ	
0162				13,2532	57545	1	NEGCOS	DLOAD	DCOMP	
0163				13,2533	43244	1		BPL	DAD	
0164	REF	1		13,2534	26540	1			NEGOUT	
0165	REF	3	LAST 1131	13,2535	22273	1			DP1/2	
0166	REF	5	LAST 1132	13,2536	00025	0	ARCTANXX	STORE	THETA	
0167				13,2537	77616	0		RVQ		
0168				13,2540	52025	1	NEGOUT	DSU	GOTO	
0169	REF	4	LAST 1132	13,2541	22273	1			DP1/2	
0170	REF	2	LAST 1132	13,2542	26536	0			ARCTANXX	
0171				13,2543	75345	1	ATAN=90	DLOAD	SIGN	
0172	REF	1		13,2544	10760	1			LODP1/4	
0173	REF	11	LAST 1132	13,2545	00023	0			SINTH	
0174	REF	6	LAST 1132	13,2546	00025	0		STORE	THETA	
0175				13,2547	77616	0		RVQ		
0176	REF	2	LAST 935	11,2274			2DZERO	=	DPZERO	

L LATITUDE LONGITUDE SUBROUTINES

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R0177 SETGAMMA SUBROUTINE
 R0178 SUBROUTINE TO SET GAMMA FOR THE LAT-LONG AND LALOTORY SUBROUTINES

R0179 GAMMA = B**2/A**2 FOR EARTH (B-1)
 R0180 GAMMA = 1 FOR MOON (B-1)

R0181 CALLING SEQUENCE
 R0182 L CALL
 R0183 L+1 SETGAMMA

R0184 INPUT
 R0185 LUNAFLAG=0 FOR EARTH,=1 FOR MOON

R0186 OUTPUT
 R0187 GAMMA IN GAMRP (B-1)

0188			13,2550	43145 0	SETGAMMA DLOAD	BUFF	BRANCH FOR EARTH
0189	REF	1	13,2551	26505 0		B2/A2	EARTH GAMMA
0190	REF	7 LAST 1130	13,2552	01743 0		LUNAFLAG	
0191	REF	1	13,2553	26556 0		SETGMEX	
0192			13,2554	77735 0	SLOAD		
0193	REF	1	13,2555	22273 1		1R1	MOON GAMMA
0194	REF	3 LAST 1130	13,2556	00011 1	SETGMEX STORE	GAMRP	
0195			13,2557	77616 0		RVQ	
0196			0010		GAMRP =	8D	

L LATITUDE LONGITUDE SUBROUTINES

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R0197SETRE SUBROUTINE
 R0198 SUBROUTINE TO SET RE (EARTH OR MOON RADIUS)

R0199 RE= RM FOR MOON
 R0200 RE= RREF FOR FIXED EARTH RADIUS OR COMPUTED RF FOR FISCHER ELLIPSOID

R0201 CALLING SEQUENCE
 R0202 L CALL
 R0203 L+1 SETRE

R0204 SUBROUTINES USED
 R0205 GETERAD

R0206 INPUT
 R0207 ERADFLAG=0 FOR FIXED RE, 1 FOR COMPUTED RE
 R0208 ALPHAV +4= 1/2 SINL IF GETERAD IS CALLED
 R0209 LUNAFLAG=0 FOR EARTH,=1 FOR MOON

R0210 OUTPUT
 R0211 ERADM= 504RM FOR MOON (METERS 8-29)
 R0212 ERADM= ERAD OR COMPUTED RF FOR EARTH (METERS 8-29)

0213				13,2560	71220 1	SETRE	STQ	DLOAD	
0214	REF	1		13,2561	00051 0			SETREX	
0215	REF	1		13,2562	10003 0			504RM	
0216				13,2563	71214 0		BON	DLOAD	BRANCH FOR MOON
0217	REF	8	LAST 1133	13,2564	01703 1			LUNAFLAG	
0218	REF	1		13,2565	26575 1			TSTRLSRM	
0219	REF	1		13,2566	10001 1			ERAD	
0220				13,2567	45014 0		BOFF	CALL	ERADFLAG=0 FOR FIXED RE,1 FOR COMPUTED
0221	REF	3	LAST 930	13,2570	00742 0			ERADFLAG	
0222	REF	1		13,2571	26573 1			SETRXX	
0223	REF	1		13,2572	26466 1			GETERAD	
0224	REF	5	LAST 1131	13,2573	37671 0	SETRXX	STCALL	ERADM	EXIT WITH RE OR RM METERS 8-29
0225	REF	2	LAST 1134	13,2574	00051 0			SETREX	
0226				13,2575	77214 0	TSTRLSRM	BON	VLOAD	ERADFLAG=0,SET R0=RLS
0227	REF	4	LAST 1134	13,2576	00702 1			ERADFLAG	=1 R0=RM
0228	REF	2	LAST 1134	13,2577	26573 1			SETRXX	
0229	REF	11	LAST 977	13,2600	02023 1			RLS	
0230				13,2601	64446 0		ABVAL	SR2R	SCALE FROM 8-27 TO 8-29
0231				13,2602	77650 1		GOTO		
0232	REF	3	LAST 1134	13,2603	26573 1			SETRXX	
0233	REF	12	LAST 968	0051		SETREX	=	S2	

L PLANETARY INFRTIAL ORIENTATION

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P0001 RP-TO-R SUBROUTINE
 R0002 SUBROUTINE TO CONVERT RP (VECTOR IN PLANETARY COORDINATE SYSTEM, EITHER
 R0003 EARTH-FIXED OR MOON-FIXED) TO R (SAME VECTOR IN THE BASIC REF. SYSTEM)

R0004 $R=MT(T)*(RP+LPXRP)$ MT= M MATRIX TRANSPOSE

R0005 CALLING SEQUENCE

R0006 L CALL
 R0007 L+1 RP-TO-R

R0008 SUBROUTINES USED

R0009 EARTHMX, MCONMX, EARTH

R0010 ITEMS AVAILABLE FROM LAUNCH DATA

R0011 504LM= THE LIBRATION VECTOR L OF THE MOON AT TIME TIMSUBL, EXPRESSED
 R0012 IN THE MOON-FIXED COORD. SYSTEM RADIANS B0

R0013 ITEMS NECESSARY FOR SUBR. USED (SEE DESCRIPTION OF SUBR.)

R0014 INPUT

R0015 MPAC= 0 FOR EARTH, NON-ZERO FOR MOON

R0016 0-50= RP VECTOR

R0017 6-70= TIME

R0018 OUTPUT

R0019 MPAC= R VECTOR METERS B-29 FOR EARTH, B-27 FOR MOON

0020 REF 2 LAST 68 24,2000 SETLOC PLANTIN
 0021 24,3504 BANK

0022 REF 2 LAST 68 TO 168: 18 18* COUNT* \$\$/LUROT

0023				24,3504	46020 1	RP-TO-R	STQ	BHIZ	
0024	RFF	1		24,3505	00050 1			RPREXIT	
0025	REF	1		24,3506	51521 0			RPTORA	
0026				24,3507	77624 1		CALL		COMPUTE M MATRIX FOR MOON
0027	REF	1		24,3510	51561 1			MOONMX	LP=LM FOR MOON RADIANS B0
0028				24,3511	77775 1		VLOAD		
0029	RFF	1		24,3512	02013 1			504LM	
0030				24,3513	53235 0	RPTORB	VXV	VAD	
0031	REF	1		24,3514	00001 0			504RPR	
0032	RFF	2	LAST 1135	24,3515	00001 0			504RPR	
0033				24,3516	52105 1		VXM	GOTO	
0034	REF	1		24,3517	00025 0			MMATRIX	MPAC=R=MT(T)*(RP+LPXRP)
0035	RFF	1		24,3520	51547 0			RPRPXXXX	RESET PUSHLOC TO 0 BEFORE EXITING
0036				24,3521	77624 1	RPTORA	CALL		EARTH COMPUTATIONS
0037	REF	1		24,3522	55657 0			EARTHMX	M MATRIX B-1
0038				24,3523	77624 1		CALL		
0039	REF	1		24,3524	55711 0			EARTH	L VECTOR RADIANS B0
0040				24,3525	76521 0		MXV	VSL1	LP=M(T)*L RAD B-0
0041	REF	2	LAST 1135	24,3526	00025 0			MMATRIX	

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0042			24,3527	77650	1
0043	REF	1	24,3530	51513	1

GOTO

RPTORB

L PLANETARY INERTIAL ORIENTATION

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P0044 R-TO-RP SUBROUTINE
 R0045 SUBROUTINE TO CONVERT R (VECTOR IN REFERENCE COORD. SYSTEM) TO RP
 R0046 (VECTOR IN PLANETARY COORD SYSTEM) EITHER EARTH-FIXED OR MOON-FIXED

R0047 $RP=M(T)*(R-LXR)$

R0048 CALLING SEQUENCE

R0049 L CALL

R0050 L+1 R-TO-RP

R0051 SUBROUTINES USED

R0052 EARTHMX,MCONMX,EARTH

R0053 INPUT

R0054 MPAC= 0 FOR EARTH, NON-ZERO FOR MOON

R0055 0-50= R VECTOR

R0056 6-70= TIME

R0057 ITEMS AVAILABLE FROM LAUNCH DATA

R0058 504LM= THE LIBRATION VECTOR L OF THE MOON AT TIME TIMSURL, EXPRESSED

R0059 IN THE MOON-FIXED COORD. SYSTEM RADIANS B0

R0060 ITEMS NECESSARY FOR SUBROUTINES USED (SEE DESCRIPTION OF SUBR.)

R0061 OUTPUT

P0062 MPAC=RP VECTOR METERS B-29 FOR EARTH, B-27 FOR MOON

0063				24,3531	46020 1	R-TO-RP	STQ	BHIZ	
0064	REF	2	LAST 1135	24,3532	00050 1			RPRFXIT	
0065	REF	1		24,3533	51553 0			RTORPA	
0066				24,3534	77624 1		CALL		
0067	REF	2	LAST 1135	24,3535	51561 1			MCONMX	
0068				24,3536	61375 1		VLOAD	VXM	
0069	REF	2	LAST 1135	24,3537	02013 1			504LM	LP=LM
0070	REF	3	LAST 1135	24,3540	00025 0			MMATRIX	
0071				24,3541	77772 0		VSL1		L=MT(T)*LP RADIANS B0
0072				24,3542	51235 1	RTORPB	VXV	BVSU	
0073	REF	3	LAST 1135	24,3543	00001 0			504RPR	
0074	REF	4	LAST 1137	24,3544	00001 0			504RPR	
0075				24,3545	77721 0		MXV		M(T)*(R-LXR) B-2
0076	REF	4	LAST 1137	24,3546	00025 0			MMATRIX	
0077				24,3547	40372 0	RPRPXXXX	VSL1	SETPD	
0078				24,3550	00001 0			OD	
0079				24,3551	77650 1		GOTO		
0080	REF	3	LAST 1137	24,3552	00050 1			RPRFXIT	
0081				24,3553	77624 1	RTORPA	CALL		EARTH COMPUTATIONS
0082	REF	2	LAST 1135	24,3554	55657 0			EARTHMX	
0083				24,3555	77624 1		CALL		
0084	REF	2	LAST 1135	24,3556	55711 0			EAFTHL	
0085				24,3557	77650 1		GOTO		MPAC=L=(-AX,-AY,0) RAD B-0
0086	REF	1		24,3560	51542 0			RTORPB	

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P0087 MOONMX SUBROUTINE
 R0088 SUBROUTINE TO COMPUTE THE TRANSFORMATION MATRIX M FOR THE MOON

R0089 CALLING SEQUENCE
 R0090 L CALL
 R0091 L+1 MCONMX

R0092 SUBROUTINES USED
 R0093 NEWANGLE

R0094 INPUT
 R0095 6-7D= TIME
 R0096 ITEMS AVAILABLE FROM LAUNCH DATA
 R0097 BSUBO,BDOT
 R0098 TIMSUBC,NODIO,NODDOT,FSUBO,FDOOT
 R0099 CCSI= COS(I) B-1
 R0100 SINI= SIN(I) B-1
 R0101 I IS THE ANGLE BETWEEN THE MEAN LUNAR EQUATORIAL PLANE AND THE
 R0102 PLANE OF THE ECLIPTIC (1 DEGREE 32.1 MINUTES)

R0103 OUTPUT
 R0104 MMATRIX= 3X3 M MATRIX B-1 (STORED IN VAC AREA)

0105			24,3561	40220 0	MOONMX	STQ	SETPD	
0106	REF	1	24,3562	00051 0			EARTHMX	
0107			24,3563	00011 1			8D	
0108			24,3564	77770 1		AXT,1		B REQUIRES SL 0, SL 5 IN NEWANGLE
0109			24,3565	00005 1			5	
0110			24,3566	65345 0		DLOAD	PDDL	PD 10D B-9D=BSUBO
0111	REF	1	24,3567	10017 0			BSUBO	10-11D=BDOT
0112	REF	1	24,3570	10011 0			BDOT	
0113			24,3571	45006 0		PUSH	CALL	PD 12D
0114	REF	1	24,3572	51706 1			NEWANGLE	EXIT WITH PD BD AND MPAC= B REVS B0
0115			24,3573	71406 0		PUSH	COS	PD 10D
0116	REF	1	24,3574	14041 1		STODL	COB	PD BD COS(B) B-1
0117			24,3575	77756 0		SIN		SIN(B) B-1
0118	REF	1	24,3576	14043 0		STODL	SOB	SETUP INPUT FOR NEWANGLE
0119	REF	1	24,3577	10015 1			FSUBO	B-9D=FSUBO
0120			24,3600	41525 0		PDDL	PUSH	PD 10D THEN 12D 10-11D=FDOOT
0121	REF	1	24,3601	10007 1			FDOOT	
0122			24,3602	45170 0		AXT,1	CALL	F REQUIRES SL 1, SL 6 IN NEWANGLE
0123			24,3603	00004 0			4	
0124	REF	2	24,3604	51706 1			NEWANGLE	EXIT WITH PD 8D AND MPAC= F REVS B0
0125	REF	1	24,3605	14027 1		STODL	AVECTR +2	SAVE F TEMP
0126	REF	1	24,3606	10013 1			NODIO	B-9D=NODIO
0127			24,3607	41525 0		PDDL	PUSH	PD 10D THEN 12D 10-11D=NODDOT
0128	REF	1	24,3610	10005 0			NODDOT	MPAC=T
0129			24,3611	45170 0		AXT,1	CALL	NODE REQUIRES SL 0, SL 5 IN NEWANGLE
0130			24,3612	00005 1			5	
0131	REF	3	24,3613	51706 1			NEWANGLE	EXIT WITH PD 8D AND MPAC= NODI REVS B0

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0132			24,3614	71406 0	PUSH	COS	PD 100	8-90= NOOI	REVS	B0
0133			24,3615	77606 1	PUSH		PD 120	10-110= COS(NOOI)		B-1
0134	REF	2	LAST 1138	24,3616	00025 0	STORE	AVECTR			
0135			24,3617	76405 1	OMP	SLIR				
0136	REF	2	LAST 1138	24,3620	00041 1					COS(NOOI) B-1
0137	REF	1		24,3621	14035 1	STOOL	BVECTR +2	PD 100	20-250=AVECTR=	COB*SIN(NOOI)
0138			24,3622	76405 1	DMP	SLIR				SOB*SIN(NODI)
0139	REF	2	LAST 1138	24,3623	00043 0					
0140	REF	2	LAST 1139	24,3624	14037 0	STODL	BVECTR +4	PD 80		
0141			24,3625	41556 1	SIN	PUSH	PD 100		-SIN(NODI)	B-1
0142			24,3626	77676 0	DCOMP				26-310=BVECTR=	COB*COS(NOOI)
0143	REF	3	LAST 1139	24,3627	14033 1	STOOL	BVECTR	PD 80		SOB*COS(NOOI)
0144	REF	3	LAST 1139	24,3630	00027 1		AVECTR +2	MOVE F	FROM TEMP LOC. TO	504F
0145	REF	1		24,3631	14007 0	STODL	504F			
0146			24,3632	76405 1	OMP	SLIR				
0147	REF	3	LAST 1139	24,3633	00041 1		COB			
0148	REF	4	LAST 1139	24,3634	14027 1	STODL	AVECTR +2			
0149	REF	1		24,3635	00011 1		SINNODI	8-90=SIN(NOOI)		B-1
0150			24,3636	76405 1	OMP	SLIR				
0151	REF	3	LAST 1139	24,3637	00043 0		SOB			
0152	REF	5	LAST 1139	24,3640	14031 0	STODL	AVECTR +4			0
0153	REF	13	LAST 851	24,3641	06424 0		H16ZEROS	8-130= CVECTR=	-SOB	B-1
0154			24,3642	57525 1	PDOL	DCOMP	PD 100			COB
0155	REF	4	LAST 1139	24,3643	00043 0		SOB			
0156			24,3644	63325 0	PDOL	PDVL	PD 120	THEN	PD 140	
0157	REF	4	LAST 1139	24,3645	00041 1		COB			
0158	REF	4	LAST 1139	24,3646	00033 1		BVECTR			
0159			24,3647	63361 0	VXSC	PDVL	PD 200		BVECTR*SINI	B-2
0160	REF	1		24,3650	10003 0		SINI			
0161	REF	1		24,3651	00011 1		CVECTR			
0162			24,3652	53361 0	VXSC	VAD	PD 140		CVECTR*COSI	B-2
0163	REF	1		24,3653	10001 1		COSI			
0164			24,3654	77772 0	VSL1					
0165	REF	5	LAST 1137	24,3655	24041 1	STOVL	MMATRIX +120	PD 80	M2=BVECTR*SINI+CVECTR*COSI	B-1
0166			24,3656	63361 0	VXSC	POVL	PD 140			
0167	REF	2	LAST 1139	24,3657	10003 0		SINI		CVECTR*SINI	B-2
0168	REF	5	LAST 1139	24,3660	00033 1		BVECTR			
0169			24,3661	52361 1	VXSC	VSU	PD 80		BVECTR*COSI	B-2
0170	REF	2	LAST 1139	24,3662	10001 1		COSI			
0171			24,3663	65372 1	VSL1	PODL	PD 140			
0172	REF	2	LAST 1139	24,3664	00007 0		504F	8-130=OVECTR=	BVECTR*COSI-CVECTR*SINI	B-1
0173			24,3665	74346 0	COS	VXSC				
0174	REF	1		24,3666	00011 1		DVECTR			
0175			24,3667	73525 1	POOL	SIN	PD 200	14-190=	OVECTR*COSF	B-2
0176	REF	3	LAST 1139	24,3670	00007 0		504F			
0177			24,3671	52361 1	VXSC	VSU	PD 140		AVECTR*SINF	B-2
0178	REF	6	LAST 1139	24,3672	00025 0		AVECTR			
0179			24,3673	77772 0	VSL1					
0180	REF	6	LAST 1139	24,3674	14033 1	STOOL	MMATRIX +6	M1=	AVECTR*SINF-DVECTR*COSF	B-1
0181	REF	4	LAST 1139	24,3675	00007 0		504F			

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0182		24,3676	74356 1	SIN	VXSC	PD 80
0183		24,3677	71525 0	PDDL	COS	PD 140 8-130=DVECTR*SINF B-2
0184	REF 5 LAST 1139	24,3700	00007 0		504F	
0185		24,3701	53361 0	VXSC	VAD	PD 80 AVECTR*COSF B-2
0186	REF 7 LAST 1139	24,3702	00025 0		AVECTR	
0187		24,3703	57572 0	VSL1	VCOMP	
0188	REF 7 LAST 1139	24,3704	34025 1	STCALL	MMATRIX	MO= -(AVECTR*COSF+DVECTR*SINF) B-1
0189	REF 2 LAST 1138	24,3705	00051 0		EARTHMX	
RO190	CCMPUTE X=X0+(XDOT)(T+T0)					
RO191	8-9D= X0 (REVS B-0),PUSHLOC SET AT 120					
RO192	10-11C=XDOT (REVS/CSEC) SCALED B+23 FOR WEARTH,B+28 FOR NODDOT AND BOOT					
RO193	AND B+27 FOR FDOT					
RO194	X1=DIFFERENCE IN 23 AND SCALING OF XDOT,=0 FOR WEARTH,5 FOR NODDOT AND					
RO195	BOOT AND 4 FOR FDOT					
RO196	6-7D=T (CSEC B-28), TIMSUBC= (CSEC B-42 TRIPLE PREC.)					
0197		24,3706	54345 1	NEWANGLE DLOAD	SR	ENTER PD 120
0198		24,3707	00007 0		60	
0199		24,3710	20617 0		140	
0200		24,3711	72371 1	TAD	TLOAD	CHANGE MODE TO TP
0201	REF 1	24,3712	01707 0		TIMSUB0	
0202	REF 707 LAST 1103	24,3713	00155 0		MPAC	
0203	REF 1	24,3714	14017 1	STODL	TIMSUBM	T+T0 CSEC B-42
0204	REF 2 LAST 1140	24,3715	00020 0		TIMSUBM +1	
0205		24,3716	77605 1	DMP		PD 100 MULT BY XDOT IN 10-110
0206		24,3717	43257 0	SL*	DAD	PD 80 ADD X0 IN 8-9D AFTER SHIFTING
0207		24,3720	20206 1		5,1	SUCH THAT SCALING IS B-0
0208		24,3721	67206 1	PUSH	SLOAD	PD 100 SAVE PARTIAL (X0+XDOT*T) IN 8-9D
0209	REF 3 LAST 1140	24,3722	00017 1		TIMSUBM	
0210		24,3723	41261 1	SL	DMP	
0211		24,3724	20212 1		90	
0212		24,3725	00013 0		100	XDOT
0213		24,3726	43257 0	SL*	DAD	PD 80 SHIFT SUCH THAT THIS PART OF X
0214		24,3727	20213 0		100,1	IS SCALED REVS/CSEC B-0
02141		24,3730	77600 1	BNV		TURN OFF OVERFLOW IF SET BY SHIFT
02142		24,3731	51732 0		+1	INSTRUCTION BEFORE EXITING
0215		24,3732	77616 0	RVQ		MPAC=X= X0+(XDOT)(T+T0) REVS B0

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R0216 EARTHMX SUBROUTINE
 R0217 SUBROUTINE TO COMPUTE THE TRANSFORMATION MATRIX M FOR THE EARTH

R0218 CALLING SEQUENCE
 R0219 L CALL
 R0220 L+1 EARTHMX

R0221 SUBROUTINES USED
 R0222 NEWANGLE

R0223 INPUT
 R0224 INPUT AVAILABLE FROM LAUNCH DATA AZO REVS B-0
 R0225 TEPHEM CSEC B-42
 R0226 6-7D= TIME CSEC B-28

R0227 OUTPUT
 R0228 MMATRIX= 3X3 M MATRIX B-1 (STORED IN VAC ARFA)

02282 * 26,3657 BANK 26
 02284 *RFF 1 26,2000 SETLOC PLANTINI
 02286 * 26,3657 BANK
 02288 *RFF 1 COUNT* \$\$/LUROT

0229			26,3657	40220 0	EARTHMX	STQ	SETPD	SET	8-9D=AZO
0230	REF	3	LAST 1140	26,3660	00051 0		EARTHMX		
0231				26,3661	00011 1		8D		10-11D=WEARTH
0232				26,3662	77770 1	AXT,1			FOR SL 5, AND SL 10 IN NEWANGLE
0233				26,3663	00000 1		0		
0234				26,3664	65345 0	DLOAD	PDDL		LEAVING PD SET AT 12D FOR NEWANGLE
0235	REF	1		26,3665	01712 1		AZO		
0236	REF	1		26,3666	10021 0		WEARTH		
0237				26,3667	45006 0	PUSH	CALL		
0238	REF	4	LAST 1138	26,3670	51706 1		NEWANGLE		
0239				26,3671	41401 1	SETPD	PUSH		18-19D=504AZ
0240				26,3672	00023 0		18D		
0241				26,3673	65346 0	COS	PDDL		20-37D= MMATRIX=
0242	REF	1		26,3674	00023 0		504AZ		COS(AZ) SIN(AZ) 0
0243				26,3675	65356 1	SIN	PDDL		-SIN(AZ) COS(AZ) 0 8-1
0244	REF	14	LAST 1139	26,3676	06424 0		H16ZEROS		0 0 1
0245				26,3677	73525 1	PDDL	SIN		
0246	REF	2	LAST 1141	26,3700	00023 0		504AZ		
0247				26,3701	65276 1	DCOMP	PDDL		
0248	RFF	3	LAST 1141	26,3702	00023 0		504AZ		
0249				26,3703	63346 0	COS	PDVL		
0250	REF	15	LAST 1141	26,3704	06424 0		H16ZEROS		
0251				26,3705	41525 0	PDDL	PUSH		
0252	REF	5	LAST 500	26,3706	06422 0		HIDPHALF		
0253				26,3707	77650 1	GOTO			
0254	REF	4	LAST 1141	26,3710	00051 0		EARTHMX		

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R0255 EARTH SUBROUTINE
 R0256 SUBROUTINE TO COMPUTE L VECTOR FOR EARTH

R0257 CALLING SEQUENCE
 R0258 L CALL
 R0259 L+I EARTH

R0260 INPUT
 R0261 AX0,AY0 SET AT LAUNCH TIME WITH AYO IMMEDIATELY FOLLOWING AX0 IN CORE

R0262 OUTPUT
 R0263 -AX
 R0264 MPAC= -AY RADIANS B-0
 R0265 0

0266				26,3711	57545 1	EARTH	DLOAD	DCOMP
0267	REF	1		26,3712	01716 0			AX0
0268	REF	1		26,3713	14017 1		STODL	504L PL
0269	REF	1		26,3714	01714 1			-AY0
0270	REF	2	LAST 1142	26,3715	14021 1		STODL	504L PL +2
0271	REF	16	LAST 1141	26,3716	06424 0			HI6ZEROS
0272	REF	3	LAST 1142	26,3717	24023 0		STOVL	504L PL +4
0273	REF	4	LAST 1142	26,3720	00017 1			504L PL
0274				26,3721	77616 0		RVQ	

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P0275 CCNASTANTS AND ERASABLE ASSIGNMENTS

0276	REF 5	LAST 1132	11,2272	1B1	=	DP1/2
0279	REF 13	LAST 10B3	0050	RPREXIT	=	S1
0280	REF 13	LAST 1134	0051	EARTHMX	=	S2
0281			0000	504RPR	=	0D
0282			0010	SINNODI	=	8D
0283			0010	DVECTR	=	8D
0284			0010	CVECTR	=	8D
0285			0022	504AZ	=	18D
0286			0016	TIMSUBM	=	14D
0287			0016	504LPL	=	14D
0288			0024	AVECTR	=	20D
0289			0032	BVECTR	=	26D
0290			0024	MMATRIX	=	20D
0291			0040	COB	=	32D
0292			0042	SOR	=	34D
0293			0006	504F	=	6D

1	SCALED B-1
	R-TO-RP AND RP-TO-R SUBR EXIT
	EARTHMX, MOONMX SUBR. EXITS
6	REGS R OR RP VECTOR
2	SIN(NODI)
6	D VECTOR MOON
6	C VECTR MOON
2	AZ
3	TIME SUB M (MOON) T+TO IN GETAZ
6	L OR LP VECTOR
6	A VECTOR (MOON)
6	B VECTOR (MOON)
18	M MATRIX
2	COS(B) B-I
2	SIN(B) B-1
2	F (MOON)

L MEASUREMENT INCORPORATION

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R0001 INCORP1--PERFORMS THE SIX DIMENSIONAL STATE VECTOR DEVIATION FOR POSITI
 R0002 ON AND VELOCITY OR THE NINE DIMENSIONAL DEVIATION OF POSITION,VELOCITY,A
 R0003 NO RACAR OR LANDMARK BIAS.THE OUTPUT OF THE BVECTOR ROUTINE ALONG WITH T
 R0004 HE ERROR TRANSITION MATRIX(W) ARE USED AS INPUT TO THE ROUTINE.THE DEVI
 R0005 TION IS OBTAINED BY COMPUTING AN ESTIMATED TRACKING MEASUREMENT FROM THE
 R0006 CURRENT STATE VECTOR AND COMPARING IT WITH AN ACTUAL TRACKING MEASUREMENT
 R0007 T AND APPLYING A STATISTICAL WEIGHTING VECTOR.
 R0008 INPUT

R0009 DMENELG = 0 60 DIMENSIONAL BVECTOR 1= 90 DIMENSIONAL
 R0010 W = ERROR TRANSITION MATRIX 6X6 OR 9X9
 R0011 VARIANCE = VARIANCE (SCALAR)
 R0012 DELTAQ = MEASURED DEVIATION(SCALAR)
 R0013 BVECTOR = 6 OR 9 DIMENSIONAL BVECTOR

R0014 OUTPUT
 R0015 DELTAX = STATE VECTOR DEVIATIONS 6 OR 9 DIMENSIONAL
 R0016 ZI = VECTOR USED FOR THE INCORPORATION 6 OR 9 DIMENSIONAL
 R0017 GAMMA = SCALAR
 R0018 OMEGA = OMEGA WEIGHTING VECTOR 6 OR 9 DIMENSIONAL
 R0019 CALLING SEQUENCE
 R0020 L CALL INCORP1

R0021 NORMAL EXIT

R0022 L+1 OF CALLING SEQUENCE

0023				37,3641		BANK	37
0024	REF	1		23,2000		SETLOC	MFAS INC
0025				23,2433		BANK	

0026	REF	1				COUNT*	\$/INCOR
------	-----	---	--	--	--	--------	----------

0027	REE	17	LAST	620	E5,1400	EBANK=	W
------	-----	----	------	-----	---------	--------	---

0028				23,2433	77620 0	INCORP1	STO		
0029	REF	2	LAST	141	23,2434	02772 1		EGRESS	
0030				23,2435	66370 0		AXT,1	SSP	
0031				23,2436	00066 1			540	
0032	RFE	14	LAST	1143	23,2437	00051 0		S1	
0033				23,2440	00022 1			180	IX1 = 54 S1= 18
0034				23,2441	66374 1		AXT,2	SSP	
0035				23,2442	00022 1			180	
0036	REF	14	LAST	1143	23,2443	00052 0		S2	
0037				23,2444	00006 1			6	IX2 = 18 S2=6
0038				23,2445	63775 1	Z123	VLOAD	MXV*	
0039	REE	22	LAST	592	23,2446	03523 0		BVECTOR	BVECTOR (0)
0040	REF	18	LAST	1144	23,2447	02467 0		W +540,1	
0041	REF	2	LAST	141	23,2450	12665 1		STORE	ZI +180,2
0042				23,2451	77775 1		VLOAD		
0043	REF	23	LAST	1144	23,2452	03531 0		BVECTOR +6	BVECTOR (1)

L MEASUREMNT INCORPORATION

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0044				23,2453	52717 1		MXV*	VAD*	
0045	REF	19	LAST	1144	23,2454	02555 0		W +1080,1	
0046	REF	3	LAST	1144	23,2455	75112 1		ZI +180,2	
0047	REF	4	LAST	1145	23,2456	12665 1		STORE	ZI +180,2
0048					23,2457	77775 1		VLOAD	
0049	REF	24	LAST	1144	23,2460	03537 0		BVECTOR +12D	BVECTOR (2)
0050					23,2461	52717 1		MXV*	VAD*
0051	REF	20	LAST	1145	23,2462	02643 1		W +1620,1	
0052	REF	5	LAST	1145	23,2463	75112 1		ZI +180,2	B(0)*W+B(1)*(W+54)+B(2)*(W+108)FIRST PAS
0053	REF	6	LAST	1145	23,2464	12665 1		STORE	ZI THEN Z2 THEN Z3
0054					23,2465	77700 0		TIX,1	
0055	REF	1			23,2466	46467 0		INCOR1	
0056					23,2467	43104 0	INCOR1	TIX,2	BCN
0057	REF	1			23,2470	46445 0			Z123
0058	REF	3	LAST	594	23,2471	02706 1			DMENFLG
0059	REF	1			23,2472	46476 0			INCOR1A
0060					23,2473	77775 1		VLOAD	
0061	REF	18	LAST	919	23,2474	06424 0			ZEROVECS
0062	REF	7	LAST	1145	23,2475	02657 1		STORF	ZI +120
0063					23,2476	77201 1	INCOR1A	SETPD	VLOAD
0064					23,2477	00001 0			0
0065	REF	8	LAST	1145	23,2500	02643 1			ZI
0066					23,2501	47036 1		VSQ	RTB
0067	REF	6	LAST	593	23,2502	21537 0			TPMODE
0068					23,2503	47515 0		PDVL	VSQ
0069	REF	9	LAST	1145	23,2504	02651 1			ZI +6
0070					23,2505	76234 0		RTB	TAD
0071	REF	7	LAST	1145	23,2506	21537 0			TPMODE
0072					23,2507	47515 0		PDVL	VSQ
0073	REF	10	LAST	1145	23,2510	02657 1			ZI +120
0074					23,2511	76234 0		RTB	TAD
0075	REF	8	LAST	1145	23,2512	21537 0			TPMODE
0076					23,2513	77171 0		TAD	AXT,2
0077	REF	11	LAST	593	23,2514	02707 0			VARIANCE
0078					23,2515	00000 1			0
0079	REF	2	LAST	141	23,2516	02665 0		STORE	TRIPA
0080					23,2517	40151 0		TLOAD	BOV
0081	REF	12	LAST	1145	23,2520	02707 0			VARIANCE
0082					23,2521	46522 0			+1
0083	REF	1			23,2522	02670 1		STORE	TEMPVAR
0084					23,2523	77654 0		BZE	
0085	REF	1			23,2524	46533 0			INCOR1C
0086					23,2525	40112 1	INCOR1B	SL2	BOV
0087	REF	2	LAST	1145	23,2526	46533 0			INCOR1C
0088	REF	2	LAST	1145	23,2527	02670 1		STORE	TEMPVAR
0089					23,2530	52114 1		INCR,2	GOTO
0090					23,2531	00001 0		DEC	1
0091	REF	1			23,2532	46525 1			INCOR1B
0092					23,2533	61551 1	INCOR1C	TLOAD	ROUND
0093	REF	3	LAST	1145	23,2534	02665 0			TRIPA

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0094				23,2535	75405 1	DMP	SCRT	
0095	REF	3	LAST 1145	23,2536	02670 1		TEMPVAR	
0096				23,2537	76257 0	SL*	TAD	
0097				23,2540	57576 1		0,2	
0098	REF	4	LAST 1145	23,2541	02665 0		TRIPA	
0099				23,2542	63101 1	NORM	INCR,2	
0100	REF	18	LAST 1011	23,2543	00050 1		X2	
0101				23,2544	77775 1	DEC	-2	
0102				23,2545	77134 1	SXA,2	AXT,2	
0103	REF	2	LAST 130	23,2546	02103 1		NORMGAM	NORMALIZATION COUNT -2 FOR GAMMA
0104				23,2547	00242 0		162D	
0105				23,2550	40265 1	BDDV	SETPD	
0106	REF	6	LAST 919	23,2551	06414 0		DP1/4TH	
0107				23,2552	00001 0		0	
0108	REF	2	LAST 160	23,2553	03476 1	STORE	GAMMA	
0109				23,2554	60351 0	TLOAD	NORM	
0110	REF	5	LAST 1146	23,2555	02665 0		TRIPA	
0111	REF	30	LAST 1083	23,2556	00047 1		X1	
0112				23,2557	65345 0	DLOAD	PDDL	PD 0-1 = NORM (A)
0113	REF	7C8	LAST 1140	23,2560	00155 0		MPAC	
0114	REF	8	LAST 593	23,2561	03545 0		DELTAQ	
0115				23,2562	77701 1	NORM		
0116	REF	15	LAST 1144	23,2563	00051 0		S1	
0117				23,2564	70460 1	XSU,1	SR1	
0118	REF	16	LAST 1146	23,2565	00050 1		S1	
0119				23,2566	41471 0	DDV	PUSH	PD 0-1 = DELTAQ/A
01193				23,2567	77650 1	GOTO		
01196	REF	1		23,2570	45647 0		NEWZCOMP	
0120				23,2571	77731 1	-3 SSP		
0121	REF	15	LAST 1144	23,2572	00052 0		S2	
0122				23,2573	00066 1		54D	
0123				23,2574	60775 1	INCOR2 VLOAD	VXM*	COMPUTE OMEGA1,2,3
0124	REF	11	LAST 1145	23,2575	02643 1		ZI	
0125	REF	21	LAST 1145	23,2576	75134 0		W +162D,2	
0126				23,2577	77206 0	PUSH	VLOAD	
0127	REF	12	LAST 1146	23,2600	02651 1		ZI +6	
0128				23,2601	53303 1	VXM*	VAD	
0129	REF	22	LAST 1146	23,2602	75112 1		W +180D,2	
0130				23,2603	77206 0	PUSH	VLOAD	
0131	REF	13	LAST 1146	23,2604	02657 1		ZI +12D	
0132				23,2605	53303 1	VXM*	VAD	
0133	REF	23	LAST 1146	23,2606	75070 1		W +198D,2	
0134				23,2607	61006 0	PUSH	TIX,2	PD 2-7=OMEGA1,8-13=OMEGA2,14-19=OMEGA3
0135	REF	1		23,2610	46574 0		INCDP2	
0136				23,2611	45575 1	VLOAD	STADR	
0137	REF	2	LAST 160	23,2612	74262 1	STORE	OMEGA +12D	
0138				23,2613	45575 1	VLOAD	STADR	
0139	REF	3	LAST 1146	23,2614	74270 1	STORE	OMEGA +6	
0140				23,2615	45575 1	VLOAD	STADP	
0141	REF	4	LAST 1146	23,2616	74276 1	STORE	OMEGA	

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0142				23,2617	77214 0	BON	VLOAD	
0143	REF	4	LAST 1145	23,2620	02706 1		DMENFLG	
0144	REF	1		23,2621	46624 0		INCOR2AB	
0145	REF	19	LAST 1145	23,2622	06424 0		ZFRCVCS	
0146	REF	5	LAST 1146	23,2623	03515 0	STORE	OMEGA +12D	
0147				23,2624	66374 1	INCOR2AB	AXT,2	SSP
0148				23,2625	00022 1		18D	
0149	REF	16	LAST 1146	23,2626	00052 0		S2	
0150				23,2627	00006 1		6	
0151				23,2630	77773 1	INCOR3	VLOAD*	
0152	RFF	6	LAST 1147	23,2631	74254 1		OMEGA +18D,2	
0153				23,2632	53761 1	VXSC	VSL*	
0154				23,2633	00001 0		0	DELTAQ/A
0155				23,2634	20201 0		0,1	
0156	REF	5	LAST 1147	23,2635	12707 1	STORE	DELTAX +18D,2	
0157				23,2636	77304 0	TIX,2	VLOAD	
0158	REF	1		23,2637	46630 0		INCOR3	
0159	REF	6	LAST 1147	23,2640	02673 1		DELTAX +6	
0160				23,2641	77732 1	VSL3		
0161	REF	7	LAST 1147	23,2642	02673 1	STORE	DELTAX +6	
0162				23,2643	77650 1	GOTO		
0163	REF	3	LAST 1144	23,2644	02772 1		EGRESS	

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R0164 INCORP2 - INCORPORATES THE COMPUTED STATE VECTOR DEVIATIONS INTO THE
 R0165 ESTIMATED STATE VECTOR. THE STATE VECTOR UPDATES MAY BE FOR EITHER THE
 R0166 LEM OR THE CSM, DETERMINED BY FLAG VEHUPFLG. (ZERO = LEM) (1 = CSM)
 R0167 INPUT
 R0168 PERMANENT STATE VECTOR FOR EITHER THE LEM OR CSM
 R0169 VEHUPFLG = UPDATE VEHICLE 0=LEM 1=CSM
 R0170 W = ERROR TRANSITION MATRIX
 R0171 OELTAX = COMPUTED STATE VECTOR DEVIATIONS
 R0172 DMENFLG = SIZE OF W MATRIX (ZERO = 6X6) (1=9X9)
 R0173 GAMMA = SCALAR FOR INCORPORATION
 R0174 ZI = VECTOR USED IN INCORPORATION
 R0175 OMEGA = WEIGHTING VECTOR

R0176 OUTPUT
 R0177 UPDATED PERMANENT STATE VECTOR

R0178 CALLING SEQUENCE
 R0179 L CALL INCORP2

R0180 NORMAL EXIT
 R0181 L+1 OF CALLING SEQUENCE

0182 REF 1 23,2000 SETLOC MEAS INC1
 0183 23,2645 BANK

0184 REF 2 LAST 1144 TO 1148: 138 138* COUNT* \$\$/INCOR

0185				23,2645	45020 1	INCORP2	STQ	CALL	
0186	REF	4	LAST 1147	23,2646	02772 1			EGRESS	
0187	REF	26	LAST 791	23,2647	27412 0			INTSTALL	
0188				23,2650	74375 0		VLOAO	VXSC	CALC. GAMMA * OMEGA1,2,3
0189	REF	7	LAST 1147	23,2651	03501 0			OMEGA	
0190	REF	3	LAST 1146	23,2652	03476 1			GAMMA	
0191	REF	2	LAST 141	23,2653	26713 0		STOVL	OMEGAM1	
0192	REF	8	LAST 1148	23,2654	03507 0			OMEGA +6	
0193				23,2655	77761 1		VXSC		
0194	REF	4	LAST 1148	23,2656	03476 1			GAMMA	
0195	REF	2	LAST 141	23,2657	26721 1		STOVL	OMEGAM2	
0196	REF	9	LAST 1148	23,2660	03515 0			OMEGA +120	
0197				23,2661	77761 1		VXSC		
0198	REF	5	LAST 1148	23,2662	03476 1			GAMMA	
0199	REF	2	LAST 141	23,2663	02727 1		STORE	OMEGAM3	
0200				23,2664	77776 1		EXIT		
0201	REF	1		23,2665	3 3146 1		CAF	540D	INITIAL IX 1 SETTING FOR W MATRIX
0202	REF	1		23,2666	55'320 0		TS	WIXA	
0203	REF	1		23,2667	55'321 1		TS	WIXB	
0204	REF	220	LAST 1123	23,2670	3 4755 1		CAF	ZERO	
0205	REF	1		23,2671	55'322 1		TS	ZIXA	INITIAL IX 2 SETTING FOR Z COMPONENT
0206	REF	1		23,2672	55'323 0		TS	ZIXB	
0207	REF	105	LAST 975	23,2673	0 5353 1	FAZA	TC	PHASCHNG	

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0208				23,2674	04022 0	OCT	04022	
0209	REF	63	LAST	978	23,2675 0 5504 0	TC	UPFLAG	
0210	REF	2	LAST	719	23,2676 00236 0	ADRES	REINTFLG	
0212	REF	2	LAST	1148	23,2677 3 1321 0	CA	WIXB	START FIRST PHASE OF INCORP2
0213	REF	2	LAST	1148	23,2700 55*320 0	TS	WIXA	TO UPDATE 6 OR 9 DIM. W MATRIX IN TEMP
0214	REF	2	LAST	1148	23,2701 3 1323 1	CA	ZIXB	
0215	REF	2	LAST	1148	23,2702 55*322 1	TS	ZIXA	
0216	REF	217	LAST	1018	23,2703 0 6036 1	TC	INTPRET	
0217				23,2704 73150 1	LXA,1	LXA,2		
0218	REF	3	LAST	1149	23,2705 01320 1		WIXA	
0219	REF	3	LAST	1149	23,2706 01322 0		ZIXA	
0220				23,2707 70731 0	SSP	DLOAD*		
0221	REF	17	LAST	1146	23,2710 00051 0		S1	
0222				23,2711 00006 1		6		
0223	REF	14	LAST	1146	23,2712 75134 0		ZI,2	
0224				23,2713 60276 1	DCOMP	NORM		CALC UPPER 3X9 PARTITION OF W MATRIX
0225	REF	17	LAST	1147	23,2714 00052 0		S2	
0226				23,2715 65161 1	VXSC	XCHX,2		
0227	REF	3	LAST	1148	23,2716 02713 0		OMEGAM1	
0228	REF	18	LAST	1149	23,2717 00051 0		S2	
0229				23,2720 57144 1	LXC,2	XAD,2		
0230	REF	19	LAST	1146	23,2721 00047 1		X2	
0231	REF	3	LAST	1146	23,2722 02103 1		NORMGAM	
0232				23,2723 65057 0	VSL*	XCHX,2		
0233				23,2724 57576 1		0,2		
0234	REF	19	LAST	1149	23,2725 00051 0		S2	
0235				23,2726 77653 1	VAD*			
0236	REF	24	LAST	1146	23,2727 02467 0		W +540,1	
0237	REF	2	LAST	141	23,2730 02735 1	STORE	HOLDW	
0238				23,2731 57543 1	DLOAD*	DCOMP		CALC MIDDLE 3X9 PARTITION OF W MATRIX
0239	REF	15	LAST	1149	23,2732 75134 0		ZI,2	
0240				23,2733 74301 0	NORM	VXSC		
0241	REF	20	LAST	1149	23,2734 00052 0		S2	
0242	REF	3	LAST	1148	23,2735 02721 1		OMEGAM2	
0243				23,2736 71124 0	XCHX,2	LXC,2		
0244	REF	21	LAST	1149	23,2737 00051 0		S2	
0245	REF	20	LAST	1149	23,2740 00047 1		X2	
0246				23,2741 53674 1	XAD,2	VSL*		
0247	REF	4	LAST	1149	23,2742 02103 1		NORMGAM	
0248				23,2743 57576 1		0,2		
0249				23,2744 52724 1	XCHX,2	VAD*		
0250	REF	22	LAST	1149	23,2745 00051 0		S2	
0251	REF	25	LAST	1149	23,2746 02555 0		W +1080,1	
0252	REF	3	LAST	1149	23,2747 02743 0	STORF	HOLDW +6	
0253				23,2750 77614 1	BOFF			
0254	REF	5	LAST	1147	23,2751 02746 0		DMENFLG	BRANCH IF 6 DIMENSIONAL
0255	REF	1			23,2752 46772 1		FAZB	
0256				23,2753 57543 1	DLOAD*	DCOMP		CALC LOWER 3X9 PARTITION OF W MATRIX
0257	REF	16	LAST	1149	23,2754 75134 0		ZI,2	
0258				23,2755 74301 0	NORM	VXSC		

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0259	RFF	23	LAST	1149	23,2756	00052	0		S2	
0260	RFF	3	LAST	1148	23,2757	02727	1		OMEGA3	
0261					23,2760	71124	0	XCHX,2	LXC,2	
0262	REF	24	LAST	1150	23,2761	00051	0		S2	
0263	REF	21	LAST	1149	23,2762	00047	1		X2	
0264					23,2763	53674	1	XAD,2	VSL*	
0265	RFF	5	LAST	1149	23,2764	02103	1		NORMGAM	
0266					23,2765	57576	1		0,2	
0267					23,2766	52724	1	XCHX,2	VAD*	
0268	RFF	25	LAST	1150	23,2767	00051	0		S2	
0269	REF	26	LAST	1149	23,2770	02643	1		W +162D,1	
0270	REF	4	LAST	1149	23,2771	02751	0	STORE	HOLDW +12D	
0271					23,2772	77624	1	FAZB	CALL	
0272	REF	18	LAST	594	23,2773	11165	0		GRP2PC	
0273					23,2774	77776	1		EXIT	
0274	REF	4	LAST	1149	23,2775	3 1320	1	FAZB1	CA	START 2ND PHASE OF INCORP2 TO TRANSFER
0275	REF	1			23,2776	6 3147	0		AD	TEMP REG TO PERM W MATRIX
0276	REF	3	LAST	1149	23,2777	551321	1		TS	
0277	REF	4	LAST	1149	23,3000	3 1322	0		CA	ZIXA
0278	REF	2	LAST	234	23,3001	6 7745	0		AD	MINUS2
0279	REF	3	LAST	1149	23,3002	551323	0		TS	ZIXB
0280	RFF	218	LAST	1149	23,3003	0 6036	1		TC	INTPRFT
0281					23,3004	66350	1		LXA,1	SSP
0282	REF	5	LAST	1150	23,3005	01320	1			WIXA
0283	REF	18	LAST	1149	23,3006	00051	0			S1
0284					23,3007	00006	1			6
0285					23,3010	77775	1		VLOAD	
0286	REF	5	LAST	1150	23,3011	02735	1			HOLDW
0287	REF	27	LAST	1150	23,3012	06467	1	STORE	W +54D,1	
0288					23,3013	77775	1		VLOAD	
0289	REF	6	LAST	1150	23,3014	02743	0			HOLDW +6
0290	REF	28	LAST	1150	23,3015	06555	1	STORE	W +108D,1	
0291					23,3016	77214	0		BOFF	VLOAD
0292	REF	6	LAST	1149	23,3017	02746	0			DMENFLG
0293	REF	1			23,3020	47030	1			FAZB5
0294	REF	7	LAST	1150	23,3021	02751	0			HOLDW +12D
0295	RFF	29	LAST	1150	23,3022	06643	0		STORE	W +162D,1
0296					23,3023	52100	1	FAZB2	TIX,1	GOTO
0297					23,3024	47026	0			+2
0298	REF	1			23,3025	47036	1			FAZC
0299					23,3026	77634	0		RTB	DONE WITH W MATRIX. UPDATE STATE VECTOR
0300	REF	1			23,3027	46673	1			FAZA
0301					23,3030	43335	0	FAZB5	SLOAD	DAD
0302	REF	4	LAST	1150	23,3031	01324	0			ZIXB
0303	REF	1			23,3032	07151	0			12DD
0304					23,3033	52030	0		BHIZ	GOTO
0305	REF	2	LAST	1150	23,3034	47036	1			FAZC
0306	REF	1			23,3035	47023	0			FAZB2
0307					23,3036	77624	1	FAZC	CALL	
0308	REF	19	LAST	1150	23,3037	11165	0			GRP2PC

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0309				23,3040	53375 0	VLOAD	VAD	START 3RD PHASE OF INCORP2
0310	REF	4	LAST	593 23,3041	01701 0		X789	7TH,8TH,9TH,COMPONENT OF STATE VECTOR
0311	REF	8	LAST	1147 23,3042	02701 0		DELTAX +12D	INCORPORATION FOR X789
0312	REF	2	LAST	160 23,3043	03470 1	STORE	TX789	
0313				23,3044	47014 1	BON	RTB	
0314	REF	12	LAST	592 23,3045	00707 1		VEHUPFLG	
0315	REF	1		23,3046	47136 0		DOCSM	
0316	REF	1		23,3047	26770 0		MOVEPLFM	
0317				23,3050	77004 0	FAZAB	BOVB	AXI,2
0318	REF	2	LAST	576 23,3051	57725 0		TCDANZIG	
0319				23,3052	00000 1		0	
0320				23,3053	77014 1	BOFF	AXI,2	
0321	REF	5	LAST	725 23,3054	04344 0		MOONTHIS	
0322				23,3055	47057 0		+2	
0323				23,3056	00002 0		2	
0324				23,3057	53775 1	VLOAD	VSR*	
0325	REF	9	LAST	1151 23,3060	02665 0		DELTAX	B27 IF MOON ORBIT, B29 IF EARTH
0326				23,3061	57205 1		0 -7,2	
0327				23,3062	40055 0	VAD	BOV	
0328	REF	4	LAST	335 23,3063	01521 0		TDEL TAV	
0329	REF	1		23,3064	47076 0		FAZAB1	
0330	REF	5	LAST	1151 23,3065	25521 0	STOVL	TDEL TAV	
0331	REF	10	LAST	1151 23,3066	02673 1		DELTAX +6	B5 IF MOON ORBIT, B7 IF EARTH
0332				23,3067	53257 1	VSR*	VAD	
0333				23,3070	57202 0		0 -4,2	
0334	REF	4	LAST	335 23,3071	01527 0		TNUV	
0335				23,3072	77600 1	BOV		
0336	REF	1		23,3073	47102 1		FAZAB2	
0337	REF	5	LAST	1151 23,3074	35527 1	STCALL	TNUV	
0338	REF	1		23,3075	47111 0		FAZAB3	
0339				23,3076	53375 0	FAZAB1	VLOAD	
0340	REF	12	LAST	791 23,3077	01535 0		RCV	
0341	REF	11	LAST	1151 23,3100	02665 0		DELTAX	
0342	REF	13	LAST	1151 23,3101	01535 0	STORE	RCV	
0343				23,3102	53375 0	FAZAB2	VLOAD	
0344	REF	10	LAST	792 23,3103	01543 1		VCV	
0345	REF	12	LAST	1151 23,3104	02673 1		DELTAX +6	
0346	REF	11	LAST	1151 23,3105	01543 1	STORE	VCV	
0347				23,3106	45134 0	SXA,2	CALL	
0348	REF	3	LAST	312 23,3107	02030 0		PBODY	
0349	REF	1		23,3110	23345 1		RECTIFY	
03491				23,3111	77624 1	FAZAB3	CALL	
03492	REF	20	LAST	1150 23,3112	11165 0		GRP2PC	
0350				23,3113	47014 1	BON	RTB	
0351	REF	13	LAST	1151 23,3114	00707 1		VEHUPFLG	
0352	REF	1		23,3115	47141 0		DOCSM1	
0353	REF	2	LAST	36 23,3116	26747 1		MOVEALEM	
0354				23,3117	77624 1	CALL		
0355	REF	1		23,3120	26070 1		SVDWN2	STORE DOWNLINK STATE VECTOR
0356				23,3121	77624 1	FAZAB4	CALL	

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0357	REF	21	LAST 1151	23,3122	11165 0		GRP2 PC	PHASE CHANGE
0358				23,3123	77214 0		VLOAO	
0359	REF	7	LAST 1150	23,3124	02746 0		DMENFLG	
0360	REF	1		23,3125	47130 0		FAZAB5	6 DIMENSIONAL
0361	REF	3	LAST 1151	23,3126	03470 1		TX789	9 DIMENSIONAL
0362	REF	5	LAST 1151	23,3127	01701 0		X789	
0363				23,3130	66150 0	FAZAB5	LXA,1	
0364	REF	5	LAST 1148	23,3131	02772 1		SXA,1	
0365	REF	13	LAST 1086	23,3132	00052 0		EGRESS	
0366				23,3133	77776 1		QPRET	
0367	REF	48	LAST 841	23,3134	0 4635 0		EXIT	
0368	REF	3	LAST 621	23,3135	27427 0		TC	POSTJUMP
0369				23,3136	52034 1	DOCSM	CADR	INTWAKE
0370	REF	1		23,3137	26723 0		RTB	GOTO
0371	REF	1		23,3140	47050 1			MOVEPCSM
0372				23,3141	45034 1	DOCSM1	RTB	FAZAB
0373	REF	1		23,3142	26674 0			CALL
0374	REF	2	LAST 312	23,3143	26114 1			MCVEACSM
0375				23,3144	77650 1		GOTO	SVOWN1
0376	REF	1		23,3145	47121 0			STORE DOWNLINK STATE VECTOR
0377	REF	20	LAST 1147	23,2423		ZEROO	=	FAZAB4
0378				23,3146	00066 1	54D0	DEC	ZEROVECS
0379				23,3147	77771 0	60D	DEC	54
0380				23,3150	00014 1	120D	DEC	-6
0400	REF	1		22,2000			SETLOC	12
0401				22,3647			RENOEZ	
0402	REF	1					BANK	
							COUNT*	\$\$/INCOR
0403				22,3647	51575 1	NEWZCOMP	VLOAO	ABVAL
0404	REF	17	LAST 1149	22,3650	02643 1			Z1
0405	REF	1		22,3651	24045 0		STOVL	NORMZI
0406	REF	18	LAST 1152	22,3652	02651 1			Z1 +6
0407				22,3653	41446 1		ABVAL	PUSH
0408				22,3654	50025 0		OSU	BMN
0409	REF	2	LAST 1152	22,3655	00045 0			NORMZI
0410				22,3656	45661 1			+3
0411				22,3657	45545 1		OLOAD	STAOR
0412	REF	3	LAST 1152	22,3660	77732 1		STORE	NORMZI
0413				22,3661	51575 1		VLOAO	ABVAL
0414	REF	19	LAST 1152	22,3662	02657 1			Z1 +120
0415				22,3663	45206 1		PUSH	OSU
0416	REF	4	LAST 1152	22,3664	00045 0			NORMZI
0417				22,3665	71240 1		BMN	OLOAD
0418				22,3666	45671 0			+3
0419				22,3667	77626 0		STADR	
0420	REF	5	LAST 1152	22,3670	77732 1		STORF	NORMZI
0421				22,3671	66145 1		OLOAD	SXA,1
0422	REF	6	LAST 1152	22,3672	00045 0			NORMZI
0423	REF	7	LAST 1152	22,3673	00044 1			NORMZI
0424				22,3674	62101 0		NORM	INCR,1

LARGEST ABVAL

SAVE X1

L MEASUREMENT INCORPORATION

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E5 S3

0425	REE	31	LAST	1146	22,3675	00047 1		X1	
0426					22,3676	00002 0	DEC	2	
0427					22,3677	53775 1	VLOAD	VSL*	
0428	REF	20	LAST	1152	22,3700	02643 1		ZI	
0429					22,3701	20201 0		0,1	
0430	REF	21	LAST	1153	22,3702	26643 1	STOVL	ZI	
0431	REE	22	LAST	1153	22,3703	02651 1		ZI +6	
0432					22,3704	77657 0	VSL*		
0433					22,3705	20201 0		0,1	
0434	REE	23	LAST	1153	22,3706	26651 1	STOVL	ZI +6	
0435	REF	24	LAST	1153	22,3707	02657 1		ZI +120	
0436					22,3710	66057 0	VSL*	SXA,1	
0437					22,3711	20201 0		0,1	
0438	REE	8	LAST	1152	22,3712	00045 0		NORMZI +1	SAVE SHIFT
0439	REF	25	LAST	1153	22,3713	02657 1	STORE	ZI +120	
0440					22,3714	54150 1	LXA,1	XSU,1	
0441	REF	6	LAST	1150	22,3715	02103 1		NORMGAM	
0442	REF	9	LAST	1153	22,3716	00045 0		NORMZI +1	
0443					22,3717	77660 1	XSU,1		
0444	REE	10	LAST	1153	22,3720	00045 0		NORMZI +1	
0445					22,3721	70130 1	SXA,1	LXC,1	
0446	REE	7	LAST	1153	22,3722	02103 1		NORMGAM	
0447	REF	11	LAST	1153	22,3723	00045 0		NORMZI +1	
0448					22,3724	40270 0	XAD,1	SETPD	
0449	REF	12	LAST	1153	22,3725	00044 1		NORMZI	
0450					22,3726	00003 1		ZD	
0451					22,3727	77650 1	GOTO		
0452	REF	2	LAST	1146	22,3730	46571 0		INCR2 -3	
0453					0044		NORMZI =	360	

L CCNIC SUBROUTINES

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R0001 PROGRAM DESCRIPTION - ENTIRE CONIC SUBROUTINE LOG SECTION
R0003 MCO NO. - 0
R0005 MOD BY KRAUSE
R0007

DATE - 1 SEPTEMBER 1967
LOG SECTION - CONIC SUBROUTINES
ASSEMBLY - COLOSSUS REVISION BB

R0008 EUNCTIONAL OESCRPTION -

R0009 THE FOLLOWING SET OF SUBROUTINES SOLVE VARIOUS PROBLEMS INVOLVING THE TRAJECTORY PRODUCED BY A CENTRAL
R0011 INVERSE-SQUARE FORCE ACTING ON A POINT MASS, AS OUTLINED IN THE CMC AND LGC LUNAR LANDING MISSION GSOP, SECTION
R0013 5.5.1.2. A GENERAL USAGE POINT-OF-VIEW WAS TAKEN IN FORMULATING, MECHANIZING, AND SCALING THE SUBROUTINES,
R0015 RATHER THAN OPTIMIZING EACH FOR A PARTICULAR USE. THEREFORE, MULTIPLE USAGE CAN BE MADE OF THE SUBROUTINES
R0017 INVOLVING ANY REALISTIC SET OF CONSTRAINTS. IT SHOULD BE NOTED THAT ONLY ONE SET OF CODING IS USED, WHETHER THE
R0019 EARTH, MOON, OR ANY OTHER CELESTIAL BODY IS SPECIFIED AS THE CENTRAL BODY OF THE PROBLEM, PROVIDED ONE OBSERVES
R0021 THE INHERENT SCALE CHANGE REQUIRED IN POSITION, VELOCITY, MU, AND TIME, AS OUTLINED IN MISSION PROGRAMMING
R0023 DEFINITION MEMO NO. 10. THIS CAN BE ACCOMPLISHED BY SIMPLY ADDING TO THE MUTABLE AND INITIALIZING THE SUBROUTINE
R0025 TIMES APPROPRIATELY.
R0026 DUE TO THE UNIFORMITY OF THE EQUATIONS INVOLVED, CODING WAS MINIMIZED BY TREATING INDIVIDUAL EQUATIONS AND
R0028 BLOCKS OF EQUATIONS AS SUBROUTINES OF LOWER RANK WHENEVER POSSIBLE. AS A RESULT, THREE BY-PRODUCTS SUBROUTINES,
R0030 DIRECTLY USABLE AS INDEPENDENT SUBROUTINES, WERE GENERATED.

R0031 RESTRICTIONS -

R0032 THE ONLY LIMITATION IN THE SCOPE OF PROBLEM WHICH CAN BE SOLVED BY A PARTICULAR SUBROUTINE IS THE SCALING
R0034 LIMIT OF EACH PARAMETER AS SPECIFIED IN THE GSOP. THESE SCALING LIMITS WERE CHOSEN SO THAT ALL FEASIBLE TRAJECTORIES
R0036 COULD BE HANDLED.
R0037 SINCE THE SUBROUTINES (EXCEPT KEPLER) USE COMMON SUBROUTINES OF LOWER RANK WHICH USE ERASABLE OTHER THAN
R0039 THE PUSHLIST (DUE TO ITS LIMITED SIZE) AND COMMON INTERPRETIVE SWITCHES, THE CONIC SUBROUTINES CANNOT BE ALLOWED
R0041 TO INTERRUPT EACH OTHER. IT IS UP TO THE USER TO GUARANTEE THIS CONDITION.
R0043

L CCNIC SUBROUTINES

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R0044 PROGRAM DESCRIPTION - KEPLER SUBROUTINE
 R0046 MCO NO. -1
 R0048 MOD BY KRAUSE
 R0050 MCO NO. - 2 (AUGUST 1968) BY ROBERTSON: TO PERMIT BACKOATING BY MORE THAN ONE ORBITAL PERIOD.

DATE - 11 OCTOBER 1967

LOG SECTION - CONIC SUBROUTINES

ASSEMBLY - COLOSSUS 103 AND SUNDANCE 222

R0051 FUNCTIONAL DESCRIPTION -
 R0052 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR AND THE DESIRED TRANSFER TIME THROUGH WHICH THE STATE IS TO
 R0054 BE UPDATED ALONG A CONIC TRAJECTORY, COMPUTES THE NEW, UPDATED STATE VECTOR. THE TRAJECTORY MAY BE ANY CONIC
 R0056 SECTION - CIRCULAR, ELLIPTIC, PARABOLIC, HYPERBOLIC, OR RECTILINEAR WITH RESPECT TO THE EARTH OR THE MOON. THE
 R0058 USE OF THE SUBROUTINE CAN BE EXTENDED USING OTHER PRIMARY ROUTES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT
 R0060 INTRODUCING ANY CODING CHANGES, ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY. AN ITERA-
 R0062 TION TECHNIQUE IS UTILIZED IN THE COMPUTATION.
 R0063 IF A NEGATIVE TIME-OF-FLIGHT IS INPUT, THE PROGRAM WILL SOLVE FOR THE STATE WHICH WOULD BE PRODUCED BY
 R0065 EXTRAPOLATING THE POSITION BACKWARD IN TIME.
 R0065.1 IF THE ABSOLUTE VALUE OF THE DESIRED TRANSFER TIME EXCEEDS THE ORBITAL PERIOD, THE SUBROUTINE, THROUGH A
 R0065.3 MODULAR TECHNIQUE, WILL COMPUTE THE STATE CORRESPONDING TO THE DESIRED TIME (WHETHER POSITIVE OR NEGATIVE).
 R0066

R0067 THE RESTRICTIONS ARE -
 R0068 1. (PREVIOUS RESTRICTION ON THE NEGATIVE DESIRED TRANSFER TIME IS NOW DELETED.)
 R0071 2. THE PARAMETERS IN THE PROBLEM CANNOT EXCEED THEIR SCALING LIMITS AS SPECIFIED IN THE GSOP. IF
 R0073 ANY OF THESE LIMITS ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.
 R0075

R0076 THE NUMBER OF ITERATIONS AND, THEREFORE, THE COMPUTATION SPEED IS DEPENDENT ON THE ACCURACY OF THE
 R0078 GUESS, XKEPNEW. THE AGC COMPUTATION TIME IS APPROXIMATELY .061 SECONDS FOR INITIALIZATION, .065 SECONDS FOR THE
 R0080 FINAL COMPUTATIONS, PLUS .083 SECONDS FOR EACH ITERATION.
 R0081

R0082 REFERENCES -
 R0083 R-479, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP, SECTION 5.5, SGA
 R0085 MEMO 67-4.
 R0086

R0087 INPUT - ERASABLE INITIALIZATION REQUIRED

DESCRIPTION AND REMARKS
R0088 * SCALE FACTOR *
R0089 VARIABLE*IN POWERS OF 2*
R0090 -----*
R0091 RRECT * +29 FOR EARTH*DP INITIAL POSITION VECTOR IN METERS
R0092 * +27 FOR MOON *
R0093 VRECT * +7 FOR EARTH *DP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND
R0094 * +5 FOR MOON *
R0095 X1 (380) * NONE *INOFX REGISTER SET TO -20 OR -100 ACCORDING TO WHETHER THE EARTH OR MOON,
R0097 * *RESPECTIVELY, IS THE CENTRAL BODY
R0098 TAU. * +28 *DESIRED TRANSFER TIME IN CENTISECONDS (OP)
R0099 XKEPNEW * +17 FOR EARTH*GUESS OF X IN METERS-TO-THE-ONE-HALF FROM KEEPREP

L CCNIC SUBROUTINES

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RD101 * +16 FOR MOON *(DP)
RD102 TC * +28 *DP PREV. VALUE OF TIME IN CENTISECS FROM KEPPREP
RD103 XPREV * +17 FOR EARTH*PREVIOUS VALUE OF X IN METERS-TO-THE-ONE-HALF POWER FROM KEPPREP (DP)
RD105 * +16 FOR MOON *(DP)
RD106

RD107 SLPROUTINES CALLED -
RD108 DELTIME
RD109

RD110 CALLING SEQUENCE AND NORMAL EXIT MODES -

RD111 KEPRTN=2 GOTO MUST BE IN INTERPRETIVE MODE AND OVFINO MUST BE CLEAR
RD113 KEPRTN-1 KEPLER RETURNS WITH XPREV IN MPAC. PL IS AT D.
RD114 KEPRTN ... CONTINUE

RD115 KEPLER MUST NOT BE CALLED DIRECTLY SINCE AN INTERRUPTION OF IT WOULD DESTROY THE ERASABLES IT NEEDS TO COMPLETE
RD117 THE INTERRUPTED JOB. THEREFORE THE USER MUST CALL CSMCONIC OR LEMCONIC WHICH GUARANTEES NO INTERRUPTS AND WHICH
RD119 ALSO CALLS KEPPREP TO COMPUTE A GUESS OF XKEPNEW.
RD120

RD121 ABCRT EXIT MODES -
RD122 NONE
RD123

RD124 OUTPUT -

RD125	* SCALE FACTOR *	
RD126	VARIABLE*IN POWERS OF 2*	DESCRIPTION AND REMARKS
RD127	-----*	-----
RD128	RCV * +29 FOR EARTH*DP	TERMINAL POSITION VECTOR IN METERS
RD129	* +27 FOR MOON *	
RD130	VCV * +7 FOR EARTH *DP	TERMINAL VELOCITY VECTOR IN METERS/CENTISEC
RD131	* +5 FOR MOON *	
RD132	TC * +28	*DP TRANSFER TIME IN CENTISECS TO WHICH KEPLER CONVERGED.
RD134	XPREV * +17 FOR EARTH*DP	X IN METERS-TO-THE-ONE-HALF-POWER TO WHICH KEPLER CONVERGED.
RD136	* +16 FOR MOON *(DP)	
RD137		FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
RD138		

RD139 DEBRIS -

RD140 PARAMETERS WHICH MAY BE OF USE -

RD141 * SCALE FACTOR *

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		DESCRIPTION AND REMARKS
R0142	VARIABLE*IN POWERS OF 2*	
R0143	-----*	-----
R0144	URRECT * +1	*DP UNIT VECTOR OF INITIAL POSITION
R0145	R1 * +29 FOR EARTH*DP	MAGNITUDE OF INITIAL POSITION IN METERS
R0146	* +27 FOR MOON *	
R0147	ALPHA * -22 FOR EARTH*DP	INVERSE OF SEMIMAJOR AXIS IN 1/METERS
R0148	* -20 FOR MOON *	
R01481	TMCDULC * +28	*DP INTEGRAL NUMBER OF PERIODS IN CENTISECS. WHICH WAS SUBTRACTED FROM TAU. TO PRODUCE A
R01483	*	*TAU. OF LESS THAN ONE PERIOD.

R0149 PARAMETERS OF NO USE -
R0150 DP PARAMETERS - EPSILONI, DELX, DELT, RCNORM, XMODULO, PLUS PUSHLIST REGISTERS 0 THROUGH 39D.
R0152

L CCNIC SUBROUTINES

USFR'S PAGE NO. 5 EO S3

R0153 PROGRAM DESCRIPTION - LAMBERT SUBROUTINE
 R0155 MCD NO. - 0
 R0157 MOD BY KRAUSE
 R0159

OATF - 1 SEPTEMBER 1967
 LOG SECTION - CONIC SUBROUTINES
 ASSEMBLY - COLOSSUS REVISION 89

R0160 FUNCTIONAL DESCRIPTION -

R0161 THIS SUBROUTINE CALCULATES THE INITIAL VELOCITY REQUIRED TO TRANSFER A POINT-MASS ALONG A CONIC TRAJECTORY
 R0163 FROM AN INITIAL POSITION TO A TERMINAL POSITION IN A PRESCRIBED TIME INTERVAL. THE RESULTING TRAJECTORY MAY BE
 R0165 A SECTION OF A CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE
 R0167 SUBROUTINE CAN BE EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY
 R0169 CODING CHANGES, ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY. AN ITERATION TECHNIQUE IS
 R0171 UTILIZED IN THE COMPUTATION.
 R0172

R0173 THE RESTRICTIONS ARE -

R0174 1. RECTILINEAR TRAJECTORIES CANNOT BE COMPUTED.
 R0175 2. AN ACCURACY DEGRADATION OCCURS AS THE COSINE OF THE TRUE ANOMALY DIFFERENCE APPROACHES +1.0.
 R0177 3. THE ANGLE BETWEEN ANY POSITION VECTOR AND ITS VELOCITY VECTOR MUST BE GREATER THAN 1 DEGREE 47.5 MINUTES
 R0179 AND LESS THAN 178 DEGREES 12.5 MINUTES.
 R0180 4. NEGATIVE TRANSFER TIME IS AMBIGUOUS AND WILL RESULT IN NO SOLUTION.
 R0182 5. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE
 R0184 LIMITS ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.
 R0185 THE NUMBER OF ITERATIONS AND, THEREFORE, THE COMPUTATIONS SPEED IS DEPENDENT ON THE ACCURACY OF THE FIRST
 R0187 GUESS OF THE INDEPENDENT VARIABLE, COGA. THE AGC COMPUTATION TIME IS APPROXIMATE-
 R0189 LY .105 SECONDS FOR INITIALIZATION, .069 SECONDS FOR FINAL COMPUTATIONS, PLUS .205 SECONDS FOR EACH ITERATION.
 R0191

R0192 REFERENCES -

R0193 R-479, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP-SECTION 5.5, SGA MEMO 67-8,
 R0195 SGA MEMO 67-4.
 R0196

R0197 INPUT - ERASABLE INITIALIZATION REQUIRED

R0198 * SCALE FACTOR *

R0199 VARIABLE*IN POWERS OF 2*

R0200 -----*

DESCRIPTION AND REMARKS

R0201 R1VEC * +29 FOR EARTH*DP INITIAL POSITION VECTOR IN METERS

R0202 * +27 FOR MOON *

R0203 R2VEC * +29 FOR EARTH*DP TARGET OR TERMINAL POSITION VECTOR IN METERS

R0204 * +27 FOR MOON *

R0205 TOESIRFO* +28 *DP DESIRED TRANSFER TIME IN CENTISECONDS

R0206 X1 (38D)* NONE *INDEX REGISTER SET TO -20 OR -10D ACCORDING TO WHETHER THE EARTH OR MOON,

R0208 * *RESPECTIVELY, IS THE CENTRAL BODY

R0209 GECMSGN * NONE *SP +.5 IF DESIRED TRANSFER ANGLE IS LESS THAN 180 DEGREES, -.5 IF GREATER THAN 180 DEG.

R0211 GUESSW * NONE *AN INTERPRETER SWITCH TO BE SET IF NO GUESS OF COGA IS AVAILABLE, CLEAR IF A GUESS OF

L CCNIC SUBROUTINES

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R0213 * *COGA IS TO BE USED BY LAMBERT
 R0214 COGA * +5 *DP GUESS OF COTANGNT OF ELIGHT PATH ANGLE (MEASURED FROM VERTICAL). THIS WILL BE
 R0216 * *IGNORED IF GUESSW IS SET.
 R0217 NCRMSW * NONE *AN INTERPRETER SWITCH TO BE SET IF UN IS TO BE AN INPUT TO THE SUBROUTINE, CLEAR IE
 R0219 * *LAMBERT IS TO COMPUTE ITS OWN NORMAL (UN).
 R0220 UN * +1 *DP UNIT NORMAL TO THE DESIRED ORBIT PLANE IN THE DIRECTION OF THE RESULTING ANGULAR
 R0222 * *MOMENTUM VECTOR. THIS WILL BE IGNORED IF NORMSW IS CLEAR.
 R0224 VTARGETAG * NONE *A S.P. TAG TO BE SET TO ZERO IE LAMBERT IS TO COMPUTE THE VELOCITY AT R2VEC AS WFL AS
 R0226 * *AT R1VEC.
 R0227 ITERCTR * NONE *A S.P. COUNTER WHICH SPECIFIES THE MAXIMUM NUMBER OF ITERATIONS ALLOWABLE.
 R02271 * *(AN ITERATION MEANS A PASS THRU KEPLER EQN (DELTIME). AT LEAST ONE OF THESE MUST
 R02272 * *ALWAYS OCCUR, EVEN IF COGA CORRESPONDING TO SOLUTION WERE INPUT AS A GUESS.)
 R02273 * *TWENTY ITERATIONS ARE SUFFICIENT TO SOLVE ALL PROBLEMS INCLUDING THOSE WITHOUT GUESS.
 R02274

R0228 SUBROUTINES CALLED -
 R0229 GEOM, GETX, DELTIME, ITERATOR, LAMENTER (PART OF NEWSTATE)
 R0230

R0231 CALLING SEQUENCE AND NORMAL EXIT MODES -

R0232 L CALL MUST BE IN INTERPRETIVE MODE AND OVEIND MUST BE CLEAR
 R0234 L+1 LAMBERT RETURNS WITH PL AT 0 AND WITH VVEC IN MPAC IF VTARGETAG WAS NON-ZERO OR VTARGET
 R0236 L+2 BON IN MPAC IE VTARGETAG WAS ZERO
 R0237 L+3 SOLNSW CONTINUE IE SOLNSW CLEAR SINCE SOLUTION IS ACCEPTABLE
 R0239 L+4 LAMABORT
 R0241 IF A LAMBERT RESULT IS TO BE A FIRST GUESS FOR THE NEXT LAMBERT CALCULATION, COGA MUST BE PRESERVED AND
 R0243 GUESSW MUST BE CLEAR FOR EACH SUCCEEDING LAMBERT CALL.
 R0244

R0245 ABORT EXIT MODES -
 R0246 IF SOLNSW WAS SET UPON EXITING, EITHER LAMBERT WAS ASKED TO COMPUTE A TRANSFER TOO NEAR 0 OR 360 DEG, OR T
 R0248 WAS TOO SMALL TO PRODUCE A REALISTIC TRANSFER BETWEEN R1VEC AND R2VEC. IN EITHER CASE THE FIX MUST BE MADE
 R0250 ACCORDING TO THE NEEDS OF THE PARTICULAR USER. THE ABORT EXIT MODE MAY BE CODED AS ...
 R0252 LAMABORT DLOAD ABS A MEASURE OF PROXIMITY TO 0 OR
 R0253 1-CSTH 360 DEGREES.
 R0254 DSU BMN
 R0255 ONERIT
 R0256 CHANGER2 CHANGE R2VEC DIRECTION SLIGHTLY.
 R0257 DLOAD DAD
 R0258 TDESIRE
 R0259 SCMETIME
 R0260 STCALL TDESIRE INCREASE TDESIRE
 R0261 LAMBERT
 R0262

L CCNIC SUBROUTINES

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R0263 OUTPUT -
 R0264 * SCALE FACTOR *
 R0265 VARIABLE*IN POWERS OF 2*
 R0266 -----*-----*
 R0267 VVEC * +7 FOR EARTH *DP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND REQUIRED TO SATISFY THE BOUNDARY VALUE
 R0269 * +5 FOR MOON *PROBLEM.
 R0270 VTARGET * +7 FOR EARTH *DP RESULTANT VELOCITY VECTOR AT R2VEC IN METERS/CENTISECOND.
 R0272 * +5 FOR MOON *
 R0273 SOLNSW * NONE *INTERPRETER SWITCH WHICH IS SET IF THE SUBROUTINE CANNOT SOLVE THE PROBLEM, CLEAR IF THE
 R0275 * *SOLUTION EXISTS.
 R0276 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
 R0277

R0278 DEBRIS -
 R0279 PARAMETERS WHICH MAY BE OF USE -

R0280 * SCALE FACTOR *
 R0281 VARIABLE*IN POWERS OF 2*
 R0282 -----*-----*
 R0283 SNTH * +1 *DP SIN OF ANGLE BETWEEN R1VEC AND R2VEC
 R0284 Csth * +1 *DP COSINE OF ANGLE
 R0285 1-CSTH * +2 *DP 1-CSTH
 R0286 COCA * +5 *DP CO TAN OF INITIAL REQUIRED FLIGHT PATH ANGLE MEASURED FROM VERTICAL
 R0289 P * +4 *DP RATIO OF SEMILATUS RECTUM TO INITIAL RADIUS
 R0290 R1A * +6 *DP RATIO OF INITIAL RADIUS TO SEMIMAJOR AXIS
 R0291 R1 (32D) * +29 FOR EARTH *DP INITIAL RADIUS IN METERS
 R0292 * +27 FOR MOON *
 R0293 UR1 * +1 *DP UNIT VECTOR OF R1VEC
 R0294 U2 * +1 *DP UNIT VECTOR OF R2VEC

R0295 PARAMETERS OF NO USE
 R0296 DP PARAMETERS - EPSILONL, CSTH-RHO, IPREV, TERPLAMB, R2, RINLAMB (SP), PLUS PUSHLIST REGISTER 0 THROUGH 410
 R0298 ADDITIONAL INTERPRETIVE SWITCHES USED - INFINFLG, 360SW, SLOPFSW, ORDERSW
 R0300

L CONIC SUBROUTINES

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R0301 PROGRAM DESCRIPTION - TIME-THETA SUBROUTINE
R0303 MOD NO. - 0
R0305 MOD BY KRALSE
R0307

DATE - 1 SEPTEMBER 1967
LOG SECTION - CONIC SUBROUTINES
ASSEMBLY - COLOSSUS REVISION 88

R0308 FUNCTIONAL DESCRIPTION -

R0309 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR AND A DESIRED TRUE-ANOMALY-DIFFERENCE THROUGH WHICH THE
R0311 STATE IS TO BE UPDATED ALONG A CONIC TRAJECTORY, CALCULATES THE CORRESPONDING TIME-OF-FLIGHT AND, IN ADDITION,
R0313 PROVIDES THE OPTION OF COMPUTING THE NEW UPDATED STATE VECTOR. THE RESULTING TRAJECTORY MAY BE A SECTION OF A
R0315 CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE SUBROUTINE CAN BE
R0317 EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY CODING CHANGES,
R0319 ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY.
R0320

R0321 THE RESTRICTIONS ARE -

R0322 1. THE ANGLE BETWEEN ANY POSITION VECTOR AND ITS VELOCITY VECTOR MUST BE GREATER THAN 1 DEGREE 47.5 MINUTES
R0324 AND LESS THAN 178 DEGREES 12.5 MINUTES.
R0325 2. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE LIMITS
R0327 ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.

R0328 THE AGC COMPUTATION TIME IS APPROXIMATELY .292 SECONDS.

R0329

R0330 REFERENCES -

R0331 R-479, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP-SECTION 5.5, SGA MEMO 67-8.
R0333

R0334 INPUT - ERASABLE INITIALIZATION REQUIRED

R0335 * SCALE FACTOR *

R0336 VARIABLE*IN POWERS OF 2*

R0337 -----*

DESCRIPTION AND REMARKS

R0338 RVEC * +29 FOR EARTH*DP INITIAL POSITION VECTOR IN METERS

R0339 * +27 FOR MOON *

R0340 VVEC * +7 FOR EARTH *DP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND

R0341 * +5 FOR MOON *

R0342 SNTH * +1 *DP SINE OF TRUE-ANOMALY-DIFFERENCE THROUGH WHICH THE STATE IS TO BE UPDATED

R0344 CSH * +1 *DP COSINE OF THE ANGLE

R0345 RVSW * NONE *AN INTERPRETIVE SWITCH TO BE SET IF ONLY TIME IS TO BE AN OUTPUT, CLEAR IF THE NEW STATE

R0347 * *IS TO BE COMPUTED ALSO.

R0348 X1 (380)*NONE *INDEX REGISTER TO BE SET TO -20 OR -100 ACCORDING TO WHETHER THE EARTH OR MOON,

R0350 * *RESPECTIVELY, IS THE CENTRAL BODY.

R0351

R0352 SUBROUTINES CALLED -

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R0353 PARAM, GEOM, GETX, DFLTIME, NEWSTATE
R0354

R0355 CALLING SEQUENCE AND NORMAL EXIT MODES -

R0356 IF ONLY TIME IS DESIRED AS OUTPUT -
R0357 L SET CALL MUST BE IN INTERPRETIVE MODE AND OVFINO MUST BE CLEAR
R0359 L+1 RVSX
R0360 L+2 TIMETHET RETURN WITH PL AT 0 AND T IN MPAC
R0361 L+3 ... CONTINUE
R0362

R0363 IF THE UPDATE STATE VECTOR IS DESIRED AS WELL -
R0364 L CLEAR CALL MUST BE IN INTERPRETIVE MODE AND OVFINO MUST BE CLEAR
R0366 L+1 RVSX
R0367 L+2 TIMETHET RETURNS WITH PL AT 6. THE INITIAL POSITION VECTOR IS IN 00 OF THE PUSHLIST AND
R0369 THE INITIAL VELOCITY VECTOR IN MPAC.
R0370 L+3 STOVL NEWVVEC
R0371 L+4 STAOR
R0372 L+5 STORE NEWVVEC NEWVVEC AND NEWVVEC ARE SYMBOLIC REPRESENTATIONS OF THE USERS LOCATIONS.
R0374 L+6 ... CONTINUE
R0375

R0376 ABCRT EXIT MODES -
R0377 L CALL BCN
R0378 L+1 TIMETHET
R0379 L+2 COGAFLAG
R0380 L+3 CCGABORT RESTRICTION 1 HAS BEEN VIOLATED.
R0381 L+4 BCN IF NEITHER FLAG IS SET AND RESTRICTION 2 HAS NOT BEEN VIOLATED, THE SOLUTION IS
R0383 GOOD, SO CONTINUE
R0384 L+5 INFINFLG
R0385 L+6 IMPOSSBL NO SOLUTION EXISTS.
R0386

R0387 OUTPUT -
R0388 * SCALE FACTOR *
R0389 VARIABLE*IN POWERS OF 2*
R0390 -----*-----*
R0391 T (30D) * +28 *DP TRANSFER TIME IN CENTISECONDS
R0392 INFINFLG* NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF THE TRANSFER ANGLE REQUIRES CLOSURE THROUGH
R0394 * *INFINITY (NO SOLUTION), CLEAR IF A PHYSICAL SOLUTION IS POSSIBLE.
R0396 CCGAFLAG* NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF RESTRICTION 1 HAS BEEN VIOLATED (NO SOLUTION),
R0398 * *CLEAR IF NOT.

R0399 IN ADDITION, IF VIARGTAG IS NON-ZERO, THE FOLLOWING ARE OUTPUT -
R0400 MPAC - * +7 FOR EARTH *DP TERMINAL VELOCITY VECTOR IN METERS/CENTISEC.
R0401 MPAC +5* +5 FOR MOON *

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R0402 OD - 5D * +29 EOR EARTH*DP TERMINAL POSITION VECTOR IN METERS (PL AT 6D)
 R0403 * +27 FOR MOON *

R0404 EOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
 R0405

R0406 DEBRIS -

R0407 PARAMETERS WHICH MAY BE OF USE -

			DESCRIPTION AND REMARKS
R0408		* SCALE FACTOR *	
R0409	VARIABLE*IN POWERS OF 2*		
R0410	-----*		
R0411	R1 (32C)* +29 FOR EARTH*DP	MAGNITUDE OF INITIAL POSITION VECTOR, RVEC, IN METERS	
R0413		* +27 FOR MOON *	
R0414	R1A	* +6	*DP RATIO OF R1 TO SEMIMAJOR AXIS (NEG. FOR HYPERBOLIC TRAJECTORIES)
R0416	P	* +4	*DP RATIO OF SEMILATUS RECTUM TO R1
R0417	COCA	* +5	*DP COTAN OF ANGLE BETWEEN RVEC AND VVEC
R0419	UR1	* +1	*DP UNIT VECTOR OF RVEC
R0420	U2	* +1	*DP UNIT VECTOR OF VVEC
R0421	UN	* +1	*DP UNIT VECTOR OF UR1*U2
R0422			

R0423 PARAMETERS OF NO USE -

R0424 SP PARAMETERS - RTNT, GEOMSGN, RTNPRM, MAGVEC2=R2 (DP), PLUS PUSHLIST LOCATIONS 0-11D, 14D-21D, 24D-39D, 41D

R0426 ADDITIONAL INTERPRETIVE SWITCHES USED - NORMSW, 360SW

R0427

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R0428 PROGRAM DESCRIPTION - TIME-RADIUS SUBROUTINE
 R0430 MOD NO. -1
 R0432 MOD BY KRALSE
 R0434

DATE - 11 OCTOBER 1967
 LOG SECTION - CONIC SUBROUTINES
 ASSEMBLY - COLOSSUS REVISION 88

R0435 FUNCTIONAL DESCRIPTION -

R0436 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR AND A DESIRED RADIUS TO WHICH THE
 R0438 STATE IS TO BE UPDATED ALONG A CONIC TRAJECTORY, CALCULATES THE CORRESPONDING TIME-OF-FLIGHT AND, IN ADDITION,
 R0440 PROVIDES THE OPTION OF COMPUTING THE NEW UPDATED STATE VECTOR. THE RESULTING TRAJECTORY MAY BE A SECTION OF A
 R0442 CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE SUBROUTINE CAN BE
 R0444 EXTENDED USING OTHER PRIMARY BOOTIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY CODING CHANGES,
 R0446 ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY.
 R0447 IF THE DESIRED RADIUS IS BEYOND THE RADIUS OF APOCENTER OF THE CONIC OR BELOW THE RADIUS OF PERICENTER,
 R0449 APSESX WILL BE SET AND THE SUBROUTINE WILL RETURN THE APOCENTER OR PERICENTER SOLUTION, RESPECTIVELY.
 R0451

R0452 THE RESTRICTIONS ARE -
 R0453 1. THE ANGLE BETWEEN ANY POSITION VECTOR AND ITS VELOCITY VECTOR MUST BE GREATER THAN 1 DEGREE 47.5 MINUTES
 R0455 AND LESS THAN 178 DEGREES 12.5 MINUTES.
 R0456 2. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE LIMITS
 R0458 ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.
 R0458 3. AN ACCURACY DEGRADATION OCCURS AS THE SENSITIVITIES OF TIME AND UPDATED STATE VECTOR TO CHANGES IN
 R04583 ROESIREO INCREASE. THIS WILL OCCUR NEAR EITHER APSIS OF THE CONIC AND WHEN THE CONIC IS NEARLY CIRCULAR. IN
 R04585 PARTICULAR, IF THE CONIC IS AN EXACT CIRCLE, THE PROBLEM IS UNDEFINED AND THE SUBROUTINE WILL ABORT.
 R04587

R0459 THE AGC COMPUTATION TIME IS APPROXIMATELY .363 SECONDS
 R0460

R0461 REFERENCES -

R0462 R-479, MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP-SECTION 5.5, SGA MEMO 67-8.
 R0464

R0465 INPUT - ERASABLE INITIALIZATION REQUIRED

Variable	Description	Remarks
R0466	* SCALE FACTOR *	
R0467	VARIABLE IN POWERS OF 2*	
R0468	-----*	-----
R0469	RVEC * +29 FOR EARTH*OP INITIAL POSITION VECTOR IN METERS	
R0470	* +27 FOR MOON *	
R0471	VVEC * +7 FOR EARTH *OP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND	
R0472	* +5 FOR MOON *	
R0473	ROESIREO * +29 FOR EARTH*OP TERMINAL RADIAL DISTANCE ON CONIC TRAJECTORY FOR WHICH TRANSFER TIME IS TO BE	
R0475	* +27 FOR MOON *COMPUTED.	
R0476	SGARDOCT * NONE	*SP TAG SET TO +.5 OR -.5 ACCORDING TO WHETHER THE RADIAL VELOCITY AT ROESIREO IS TO BE
R0478	*	*POSITIVE OR NEGATIVE, RESPECTIVELY. THIS TAG REDUCES THE DOUBLE-VALUED PROBLEM TO A

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R0480 * *SINGLE-VALUED PROBLEM.
 R0481 X1 (38D)*NONE *INDEX REGISTER TO BE SET TO -2D OR -10D ACCORDING TO WHETHER THE EARTH OR MOON,
 R0483 * *RESPECTIVELY, IS THE CENTRAL BODY.
 R0484 RVSX * NONE *AN INTERPRETIVE SWITCH TO BE SET IF ONLY TIME IS TO BE AN OUTPUT, CLEAR IF THE NEW STATE
 R0486 * *IS TO BE COMPUTED ALSO.
 R0487

R0488 SUBROUTINES CALLED -
 R0489 PARAM, GEDM, GETX, DELTIME, NEWSTATE
 R0490

R0491 CALLING SEQUENCE AND NORMAL EXIT MODES -

R0492 IF ONLY TIME IS DESIRED AS OUTPUT -
 R0493 L SET CALL MUST BE IN INTERPRETIVE MODE AND OVFINO MUST BE CLEAR
 R0495 L+1 RVSX
 R0496 L+2 TIMERAD RETURN WITH PL AT 0 AND T IN MPAC
 R0497 L+3 ... CONTINUE
 R0498

R0499 IF THE UPDATE STATE VECTOR IS DESIRED AS WELL -
 R0500 L CLEAR CALL MUST BE IN INTERPRETIVE MODE AND OVFINO MUST BE CLEAR
 R0502 L+1 RVSX
 R0503 L+2 TIMERAD RETURNS WITH PL AT 6. THE INITIAL POSITION VECTOR IS IN OD OF THE PUSHLIST AND
 R0505 THE INITIAL VELOCITY VECTOR IN MPAC.
 R0506 L+3 STOVL NEWVFC
 R0507 L+4 STADR
 R0508 L+5 STORE NEWRVEC NEWVVEC AND NEWRVEC ARE SYMBOLIC REPRESENTATIONS OF THE USERS LOCATIONS.
 R0510 L+6 ... CONTINUE
 R0511

R0512 ABCRT EXIT MODES -
 R0513 L CALL BCN
 R0514 L+1 TIMERAD
 R0515 L+2 CDGAFLAG
 R0516 L+3 CGABORT RESTRICTION 1 HAS BEEN VIOLATED.
 R0517 L+4 BCN BCN
 R0520 L+5 INFNLG
 R0521 L+6 IMPOSSBL NO SOLUTION EXISTS.
 R05211 L+7 SCLNSW
 R05212 L+8 IMPOSSBL SOLUTION IS UNDEFINED SINCE CONIC IS A CIRCLE. RESTRICTION 3 HAS BEEN VIOLATED.
 R05214 L+9 ... IF ALL THREE OF THE FLAGS ARE CLEAR, A SOLUTION EXISTS, SO CONTINUE.
 R0522

R0523 OUTPUT -
 R0524 * SCALE FACTOR *

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	DESCRIPTION AND REMARKS
R0525	VARIABLE*IN POWERS OF 2*
R0526	-----*
R0527	T (30D) * +28 *DP TRANSFER TIME IN CENTISECONDS
R0528	INFINLG* NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF RDESIRED AND SGNRDOT REQUIRE CLOSURE THROUGH
R0530	* *INFINITY (NO SOLUTION), CLEAR IF A PHYSICAL SOLUTION IS POSSIBLE.
R0532	CCGAFLAG* NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF RESTRICTION 1 HAS BEEN VIOLATED (NO SOLUTION),
R0534	* *CLEAR IF NOT.
R0535	APSEW * NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF RDESIRED WAS GREATER THAN RADIUS OF APOCENTER OR
R0537	* *LESS THAN RADIUS OF PERICENTER. THE APOCENTER OR PERICENTER SOLUTION, RESPECTIVELY,
R0539	* *WILL THEN BE RETURNED. THE SWITCH IS CLEAR IF RDESIRED WAS BETWEEN PERICENTER AND
R0541	* *APOCENTER.
R05411	SOLNSW * NONE *AN INTERPRETIVE SWITCH WHICH IS SET IF THE CONIC IS SO CLOSE TO A CIRCLE THAT THE TERMIN
R05413	* *POINT IS AMBIGUOUS, VIOLATING RESTRICTION 3. IF ECCENTRICITY IS GREATER THAN 2-TO-THE-
R05415	* *MINUS-18, THE SWITCH IS CLEAR.
R0542	

R0543 IN ADDITION, IF VTARGET IS NON-ZERO, THE FOLLOWING ARE OUTPUT -

R0544 MPAC - * +7 FOR EARTH *DP TERMINAL VELOCITY VECTOR IN METERS/CENTISEC.
 R0545 MPAC +5* +5 FOR MOON *
 R0546 OD - 5D * +29 FOR EARTH*DP TERMINAL POSITION VECTOR IN METERS (PL AT 6D)
 R0547 * +27 FOR MOON *

R0548 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DEBRIS.
 R0549

R0550 DEBRIS -

R0551 PARAMETERS WHICH MAY BE OF USE -

	DESCRIPTION AND REMARKS
R0552	* SCALE FACTOR *
R0553	VARIABLE*IN POWERS OF 2*
R0554	-----*
R0555	R1 (32D)* +29 FOR EARTH*OP MAGNITUDE OF INITIAL POSITION VECTOR, RVEC, IN METERS
R0557	* +27 FOR MOON *
R0558	R1A * +6 *DP RATIO OF R1 TO SEMIMAJOR AXIS (NEG. FOR HYPERBOLIC TRAJECTORIES)
R0560	P * +4 *DP RATIO OF SEMILATUS RECTUM TO R1
R0561	COCA * +5 *DP COTAN OF ANGLE BETWEEN RVEC AND VVEC
R0563	UR1 * +1 *OP UNIT VECTOR OF RVEC
R0564	U2 * +1 *DP UNIT VECTOR OF VVEC
R0565	UN * +1 *DP UNIT VECTOR OF UR1*U2
R0566	CSTH * +1 *DP COSINE OF TRUE ANOMALY DIFFERENCE BETWEEN RVEC AND RDESIRED.
R0568	SNTH * +1 *DP SINE OF TRUE ANOMALY DIFFERENCE.
R0569	

R0570 PARAMETERS OF NO USE -

R0571 SP PARAMETERS - RINTT, GEOMSGN, RINPRM, MAGVEC2=R2 (DP), PLUS PUSHLIST LOCATIONS 0-11D, 14D-21D, 24D-39D, 41D
 R0573 ADDITIONAL INTERPRETIVE SWITCHES USED - NORMSW, 360SW
 R0574

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R0575 PROGRAM DESCRIPTION - APSIDES SUBROUTINE
 R0577 MCD NO. - 0
 R0579 MCD BY KRAUSE
 R0581

DATE - 1 SEPTEMBER 1967
 LOG SECTION - CONIC SUBROUTINES
 ASSEMBLY - COLOSSUS REVISION 88

R0582 FUNCTIONAL DESCRIPTION -

R0583 THIS SUBROUTINE, GIVEN AN INITIAL STATE VECTOR CALCULATES THE RADIUS OF PERICENTER AND OF APOCENTER AND THE
 R0585 ECCENTRICITY OF THE RESULTING CONIC TRAJECTORY, WHICH MAY BE A STRAIGHT LINE,
 R0587 CIRCLE, ELLIPSE, PARABOLA, OR HYPERBOLA WITH RESPECT TO THE EARTH OR THE MOON. THE USE OF THE SUBROUTINE CAN BE
 R0589 EXTENDED USING OTHER PRIMARY BODIES BY SIMPLE ADDITIONS TO THE MUTABLE WITHOUT INTRODUCING ANY CODING CHANGES,
 R0591 ACCEPTING THE INHERENT SCALE FACTOR CHANGES IN POSITION AND VELOCITY.
 R0592

R0593 THE RESTRICTIONS ARE -

R0594 1. IE APOCENTER IS BEYOND THE SCALING OF POSITION, THE SCALE FACTOR LIMIT (536,870,910 METERS WITH RESPECT
 R0596 TO THE EARTH OR 134,217,727.5 METERS WITH RESPECT TO THE MOON) WILL BE RETURNED.
 R0598 2. THE PARAMETERS IN THE PROBLEM MUST NOT EXCEED THEIR SCALING LIMITS SPECIFIED IN THE GSOP. IF THE LIMITS
 R0600 ARE EXCEEDED, THE RESULTING SOLUTION WILL BE MEANINGLESS.

R0601 THE AGC COMPUTATION TIME IS APPROXIMATELY .103 SECONDS.
 R0602

R0603 REFERENCES -

R0604 MISSION PROGRAMMING DEFINITION MEMO NO. 10, LUNAR LANDING MISSION GSOP-SECTION 5.5
 R0606

R0607 INPLT - ERASABLE INITIALIZATION REQUIRED

R0608 * SCALE FACTOR *

R0609 VARIABLE*IN POWERS OF 2*

DESCRIPTION AND REMARKS

R0610 *-----*

R0611 RVEC * +29 FOR EARTH*DP INITIAL POSITION VECTOR IN METERS

R0612 * +27 FOR MOON *

R0613 VVEC * +7 FOR EARTH *DP INITIAL VELOCITY VECTOR IN METERS/CENTISECOND

R0614 * +5 FOR MOON *

R0615 X1 (38D)*NCNE *INDEX REGISTER TO BE SET TO -2D OR -10D ACCORDING TO WHETHER THE EARTH OR MOON,

R0617 * *RESPECTIVELY, IS THE CENTRAL BODY.

R0618

R0619 SUBROUTINES CALLED -

R0620 PARAM, GEOM

R0621

R0622 CALLING SEQUENCE AND NORMAL EXIT MODES -

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R0623 IE ONLY TIME IS DESIRED AS OUTPUT -
 R0624 L CALL MUST BE IN INTERPRETIVE MODE AND OVEIND MUST BE CLEAR.
 R0626 L+1 APSIDES RETURNS WITH PL AT 0, RADIUS OF APOCENTER IN MPAC AND RADIUS OF PERICENTER IN OD
 R0628 L+2 STODL APOAPSE
 R0629 L+3 OD
 R0630 L+4 STORE PERIAPSE APOAPSE AND PERIAPSE ARE SYMBOLIC REPRESENTATIONS OF THE USERS LOCATIONS
 R0632 L+5 ... CONTINUE
 R0633

R0634 OUTPUT -
 R0635 * SCALE FACTOR *
 R0636 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS
 R0637 -----*-----*
 R0638 MPAC * +29 FOR EARTH*DP RADIUS OF APOCENTER IN METERS
 R0639 * +27 FOR MOON *
 R0640 OD-ID * +29 FOR EARTH*DP RADIUS OF PERICENTER IN METERS
 R0641 * +27 FOR MOON *
 R0642 ECC * +3 *DP ECCENTRICITY OF CONIC TRAJFCTORY.
 R0643 FOR OTHER OUTPUT WHICH MAY BE OF USE, SEE DERRIS.
 R0644

R0645 DEBRIS -

R0646 PARAMETERS WHICH MAY BE OF USE -

R0647 * SCALE FACTOR *
 R0648 VARIABLE*IN POWERS OF 2* DESCRIPTION AND REMARKS
 R0649 -----*-----*
 R0650 R1 (32D)* +29 FOR EARTH*DP MAGNITUDE OF INITIAL POSITION VECTOR, RVEC, IN METERS
 R0652 * +27 FOR MOON *
 R0653 R1A * +6 *DP RATIO OF R1 TO SEMIMAJOR AXIS (NEG. FOR HYPERBOLIC TRAJECTORIES)
 R0655 P * +4 *DP RATIO OF SEMILATUS RECTUM TO R1
 R0656 COGA * +5 *DP COIAN OF ANGLE BETWEEN RVEC AND VVEC
 R0658 UR1 * +1 *DP UNIT VECTOR OF RVEC
 R0659 U2 * +1 *DP UNIT VECTOR OF VVEC
 R0660 UN * +1 *DP UNIT VECTOR OF UR1*U2
 R0661 MAGVEC2 * +7 FOR EARTH *DP MAGNITUDE OF VVEC
 R0662 * +5 FOR MOON *
 R0663

R0664 PARAMETERS OF NO USE -
 R0665 SP PARAMETERS - RTNAPSE, GEOMSGN, RINPRM, PLUS PUSHLIST LOCATIONS 0-5,100-110, 140-210, 310-380.
 R0667 ADDITIONAL INTERPRETIVE SWITCHES USED - NORMSW
 R0668

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0670				12,2000				BANK			
0671	REE	1						COUNT*	\$/CONIC		
0672	REE	2	LAST	140	E5,1721			EBANK=	UR1		
0678					12,2000	71201	1	KEPLERN	DLOAD		
0679					12,2001	00001	0	SETPD	0		
0680	REF	1			12,2002	22275	1		KEPZERO		
0681	REF	2	LAST	131	12,2003	02177	1	STORE	XMODULO		
0682	REF	2	LAST	131	12,2004	32201	0	STOVL*	TMODULO		
0683	REE	3	LAST	702	12,2005	10005	0		MUTABLE,1		
0684					12,2006	24017	1	STOVL	140		
0685	REF	4	LAST	718	12,2007	01503	0		RRECT		
0686					12,2010	66256	0	UNIT	SSP		
0687	REF	3	LAST	697	12,2011	00027	1		INTERCTR		
0688					12,2012	00024	1		200		
0689	REE	2	LAST	140	12,2013	16647	0	STOVL	URRECT		
0690					12,2014	00045	0		360		
0691	REF	4	LAST	658	12,2015	24041	1	STOVL	R1		
0692	REF	5	LAST	1169	12,2016	01503	0		RRECT		
0693					12,2017	76441	1	DOT	SL1R		
0694	REF	3	LAST	507	12,2020	01511	0		VRECT		
0695					12,2021	76405	1	DMP	SL1R		
0696	REF	1			12,2022	00023	0		1/ROOTMU	1/ROOTMU (-17 OR -14)	
0697	REF	1			12,2023	24043	0	STOVL	KEPC1	C1=R.V/ROOTMU (+17 OR +16)	
0698	REF	4	LAST	1169	12,2024	01511	0		VRECT		
0699					12,2025	57236	1	VSQ	DMPR		
0700	REE	1			12,2026	00017	1		1/MU	1/MU (-34 OR -28)	
0701					12,2027	52405	1	DMP	SL3		
0702	REF	5	LAST	1169	12,2030	00041	1		R1		
0703					12,2031	61425	0	DSU	ROUND		
0704	REF	1			12,2032	10756	1		D1/64		
0705	REF	1			12,2033	00045	0	STORE	KEPC2	C2=RV.V/MU -1 (+6)	
0706					12,2034	74421	0	BDSU	SR1R		
0707	REF	2	LAST	1169	12,2035	10756	1		D1/64		
0708					12,2036	77671	1	DDV			
0709	REE	6	LAST	1169	12,2037	00041	1		R1		
0710	REF	1			12,2040	00011	1	STORE	ALPHA	ALPHA=(1-C2)/R1 (-22 OR -20)	
0711					12,2041	71244	0	BPL	DLOAD	MAXIMUM X DEPENDS ON TYPE OF CONIC	
0712	REF	1			12,2042	24051	0		1REV		
0713	REF	1			12,2043	10774	1		-50SC	-50SC (+12)	
0714					12,2044	40071	0	DDV	RCV		
0715	REF	2	LAST	1169	12,2045	00011	1		ALPHA		
0716	REE	1			12,2046	24055	1				

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0719				12,2051	55366 1	IREV	SQRT	BDDV	
0720	REF	1		12,2052	10776 0			2PISC	2PISC (+6)
0721				12,2053	77600 1				
0722	REF	3	LAST 1169	12,2054	24055 1			STOREMAX	
0723	REF	1		12,2055	00013 0	STOREMAX	STORE	XMAX	
0724				12,2056	65205 0		DMP	PDDL	
0725	REF	2	LAST 1169	12,2057	00023 0			1/RODTMU	
0726	REF	3	LAST 1169	12,2060	00011 1			ALPHA	
0727				12,2061	65301 0		NORM	PDDL	
0728	REF	32	LAST 1153	12,2062	00047 1			X1	
0729				12,2063	56257 1		SL*	DDV	
0730				12,2064	20173 0			0 -6,1	
0731				12,2065	50000 1		BOV	BMN	
0732	REF	1		12,2066	24112 0			MODDONE	
0733	REF	2	LAST 1170	12,2067	24112 0			MODCNE	MPAC=PERIOD
0734				12,2070	51525 1	PERIODCH	PDDL	ABS	OD=PERIOD
0735	REF	2	LAST 130	12,2071	02074 0			TAU.	
0736				12,2072	50025 0		DSU	BMN	
0737				12,2073	00001 0			OD	
0738	REF	3	LAST 1170	12,2074	24112 0			MODDCNE	
0739				12,2075	77765 0		SIGN		
0740	REF	3	LAST 1170	12,2076	02074 0			TAU.	
0741	REF	4	LAST 1170	12,2077	16074 0		STODL	TAU.	
0742	REF	2	LAST 1170	12,2100	00013 0			XMAX	
0743				12,2101	77615 0		DAO		
0744	REF	3	LAST 1169	12,2102	02177 1			XMODULO	
0745	REF	4	LAST 1170	12,2103	16177 1		STODL	XMODULO	
0746				12,2104	00001 0			OD	
0747				12,2105	77615 0		DAD		
0748	REF	3	LAST 1169	12,2106	02201 0			TMODULO	
0749	REF	4	LAST 1170	12,2107	16201 0		STODL	TMODULO	
0750				12,2110	77650 1		GOTO		
0751	REF	1		12,2111	24070 0			PERIODCH	
0752				12,2112	77601 0	MODDONE	SFTPD		
07525				12,2113	00001 0			0	
07526				12,2114	75345 1		DLOAD	SIGN	
07527	REF	5	LAST 1170	12,2115	02201 0			TMODULO	
07528	REF	5	LAST 1170	12,2116	02074 0			TAU.	
07529	REF	6	LAST 1170	12,2117	02201 0		STORE	TMODULO	
0753				12,2120	75345 1		DLOAD	SIGN	
07533	REF	5	LAST 1170	12,2121	02177 1			XMODULO	
07535	REF	6	LAST 1170	12,2122	02074 0			TAU.	
07537	REF	6	LAST 1170	12,2123	02177 1		STORE	XMODULO	
0754				12,2124	77621 1		BDSU		
07545	REF	2	LAST 130	12,2125	02130 1			XKEPNEW	
0755	REF	1		12,2126	00025 0		STORE	X	
07555				12,2127	53165 0		SIGN	BZE	
0756	REF	7	LAST 1170	12,2130	02074 0			TAU.	
07565	REF	1		12,2131	24311 1			BADX	
0757				12,2132	51440 0		BMN	ABS	

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07575	REF	2	LAST	1170	12,2133	24311	1			BADX	
0758					12,2134	51025	1		DSU	BPL	
07585	REF	3	LAST	1170	12,2135	00013	0			XMAX	
0759	REF	3	LAST	1171	12,2136	24311	1			BADX	
07595					12,2137	51145	0	STOR8NDS	DLOAD	RPL	
0760	REF	8	LAST	1170	12,2140	02074	0			TAU.	
07605	REF	1			12,2141	24151	1			STOREMIN	
0761					12,2142	57545	1		DLOAD	DCOMP	
07615	REF	4	LAST	1171	12,2143	00013	0			XMAX	
0762	REF	1			12,2144	14015	0		STODL	XMIN	
07625	REF	2	LAST	1169	12,2145	22275	1			KFPZERO	
0763	REF	5	LAST	1171	12,2146	00013	0		STORE	XMAX	
07635					12,2147	77650	1		GOTO		
0764	REF	1			12,2150	24154	1			DXCOMP	
07645					12,2151	77745	1	STOREMIN	DLOAD		
0765	REF	3	LAST	1171	12,2152	22275	1			KFPZERO	
07655	RFF	2	LAST	1171	12,2153	00015	0		STORE	XMIN	
0766					12,2154	57345	1	DXCOMP.	DLOAD	DMPP	
0767	RFF	9	LAST	1171	12,2155	02074	0			TAU.	
0768	RFF	1			12,2156	10767	0			BEE22	
07685					12,2157	77646	0		ABS		
0769	REF	1			12,2160	16203	1		STODL	EPSILONT	
0770	RFF	2	LAST	126	12,2161	01551	1			TC	
0771					12,2162	45254	0		BZE	DSU	
0772	RFF	1			12,2163	24165	0			NEWTC	
0773	RFF	7	LAST	1170	12,2164	02201	0			TMODULO	
0774	REF	3	LAST	1171	12,2165	15551	1	NEWTC	STODL	TC	
0775	RFF	1			12,2166	01553	0			XPREV	
0776					12,2167	45254	0		BZE	DSU	
0777	REF	1			12,2170	24172	0			XDIFF	
0778	REF	7	LAST	1170	12,2171	02177	1			XMODULO	
0779					12,2172	77621	1	XDIFF	BDSU		
0780	REF	2	LAST	1170	12,2173	00025	0			X	
0781	REF	2	LAST	140	12,2174	02643	1		STORE	DELX	
0782					12,2175	63545	0	KEPLOOP	DLOAD	DSQ	
0783	REF	3	LAST	1171	12,2176	00025	0			X	
0784					12,2177	41501	0		NORM	PUSH	
0785	REF	33	LAST	1170	12,2200	00047	1			XI	
0786					12,2201	53605	1		DMP	SRR*	
0787	REF	4	LAST	1170	12,2202	00011	1			ALPHA	
0788					12,2203	21573	0			0 -6,1	
0789	REF	1			12,2204	34031	1		STCALL	XI	
0790	REF	1			12,2205	24434	1			DELTIME	
0791					12,2206	44200	0		80V	8DSU	
0792	RFF	1			12,2207	24320	0			TIMEOVFL	
0793	REF	10	LAST	1171	12,2210	02074	0			TAU.	
0794	RFF	2	LAST	140	12,2211	02645	1		STORE	DELT	
0795					12,2212	44246	1		ABS	BDSU	
0782					12,2175	63545	0	KEPLOOP	DLOAD	DSQ	
0783	REF	3	LAST	1171	12,2176	00025	0			X	
0784					12,2177	41501	0		NORM	PUSH	
0785	REF	33	LAST	1170	12,2200	00047	1			XI	
0786					12,2201	53605	1		DMP	SRR*	
0787	REF	4	LAST	1170	12,2202	00011	1			ALPHA	
0788					12,2203	21573	0			0 -6,1	
0789	REF	1			12,2204	34031	1		STCALL	XI	
0790	REF	1			12,2205	24434	1			DELTIME	
0791					12,2206	44200	0		80V	8DSU	
0792	RFF	1			12,2207	24320	0			TIMEOVFL	
0793	REF	10	LAST	1171	12,2210	02074	0			TAU.	
0794	RFF	2	LAST	140	12,2211	02645	1		STORE	DELT	
0795					12,2212	44246	1		ABS	BDSU	

X=XKEP

00=XSQ (+34 OR +32 -N1)

PL AT 2

XI=ALPHA XSQ (+6)

UNLIKFLY

DELT=DFLINDEP

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0796	RFF	2	LAST	1171	12,2213	02203 1		EPSILON		
0797					12,2214	71244 0	BPL	DLOAD		
0798	REF	1			12,2215	24342 1		KEPCONVG		
0799	RFF	5	LAST	737	12,2216	00037 0		T		
0800					12,2217	60225 1	DSU	NORM		
0801	REF	4	LAST	1171	12,2220	01551 1		TC		
0802	REE	34	LAST	1171	12,2221	00047 1		X1		
0803					12,2222	60325 0	PDDL	NORM		
0804	REF	3	LAST	1171	12,2223	02643 1		DELX		
0805	REF	22	LAST	1150	12,2224	00050 1		X2		
0806					12,2225	41260 0	XSU,1	DMP		
0807	REF	23	LAST	1172	12,2226	00047 1		X2		
0808	REF	3	LAST	1171	12,2227	02645 1		DELT		
0809					12,2230	56257 1	SLR*	DDV		
0810					12,2231	21202 1		1,1		
0811					12,2232	41542 1	SR1	PUSH	OD=TRIAL DELX	PL AT 2
0812					12,2233	71244 0	BPL	DLOAD		
0813	REF	1			12,2234	24255 0		POSDELX		
0814	REE	4	LAST	1171	12,2235	00025 0		X		
0815	REF	6	LAST	1171	12,2236	00013 0	STORF	XMAX	MOVE MAX 8OUND IN	
0816					12,2237	45221 1	BDSU	DSU		PL AT 0
0817	REF	3	LAST	1171	12,2240	00015 0		XMIN		
0818					12,2241	51000 0	BOV	8PL		
0819	REF	1			12,2242	24247 0		NDXCHNGE		
0820	REF	2	LAST	1172	12,2243	24247 0		NDXCHNGE		
0821					12,2244	52145 0	DLOAD	GOTO		
0822					12,2245	00001 0		OD		
0823	REE	1			12,2246	24267 1		NEWDELX		
0824					12,2247	45345 1	NDXCHNGE	DLOAD		
0825	REE	4	LAST	1172	12,2250	00015 0		DSU		
0826	REF	5	LAST	1172	12,2251	00025 0		XMIN		
0827					12,2252	52075 1	DMPR	X		
0828	REE	1			12,2253	10772 1		GOTO	TO FORCE MPAC +2 TO ZERO	
0829	REF	2	LAST	1172	12,2254	24267 1		DP9/10		
0830					12,2255	77745 1	POSDELX	DLOAD		
0831	REE	6	LAST	1172	12,2256	00025 0		X		
0832	REE	5	LAST	1172	12,2257	00015 0	STORE	XMIN	MOVE MIN 8OUND IN	
0833					12,2260	45221 1	BDSU	DSU		PL AT 0
0834	REF	7	LAST	1172	12,2261	00013 0		XMAX		
0835					12,2262	50000 1	BOV	BMN		
0836	REF	1			12,2263	24303 1		PDXCHNGE		
0837	REF	2	LAST	1172	12,2264	24303 1		PDXCHNGE		
0838					12,2265	77745 1	DLOAD			
0839					12,2266	00001 0		OD		
0840	REF	4	LAST	1172	12,2267	02643 1	NEWDELX	STORE	DELX	
0841					12,2270	43254 0		BZE	DAD	

L CCN1C SUBROUTINES

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0842	REF	2	LAST	1172	12,2271	24342	1		KEPCONVG	
0843	REF	7	LAST	1172	12,2272	00025	0		X	
0844	REF	8	LAST	1173	12,2273	14025	0		STODL	X
0845	REF	6	LAST	1172	12,2274	00037	0		T	
0846	REF	5	LAST	1172	12,2275	01551	1		STORF	TC
0847					12,2276	46034	1	BRNCHCTR	RTB	RHIZ
0848	REF	1			12,2277	24657	0		CHECKCTR	
0849	REF	3	LAST	1173	12,2300	24342	1		KEPCONVG	
0850					12,2301	77650	1		GOTO	
0851	REF	1			12,2302	24175	1		KEPL COP	ITERATE
0852					12,2303	45345	1	POXCHNGE	OLOAO	OSU
0853	REF	8	LAST	1172	12,2304	00013	0			XMAX
0854	REF	9	LAST	1173	12,2305	00025	0			X
0855					12,2306	52075	1		DMPR	GOTO
0856	REF	2	LAST	1172	12,2307	10772	1			DP9/10
0857	REF	3	LAST	1172	12,2310	24267	1			NEWDELX
0858					12,2311	70545	1	BADX	DLOAD	SRI
0859	REF	9	LAST	1173	12,2312	00013	0			XMAX
0860					12,2313	77765	0		SIGN	
0861	REF	11	LAST	1171	12,2314	02074	0			TAU.
0862	REF	10	LAST	1173	12,2315	00025	0		STORF	X
0863					12,2316	77650	1		GOTO	
0864	REF	1			12,2317	24137	1			STOPBNDS
0879					12,2320	50145	1	TIMEOVFL	OLOAO	8MN
0880	REF	11	LAST	1173	12,2321	00025	0			X
08805	REF	1			12,2322	24337	0			NEGTOVFL
0881	REF	10	LAST	1173	12,2323	00013	0		STORF	XMAX
0882					12,2324	70545	1	CMNTOVFL	DLOAD	SRI
0883	REF	5	LAST	1172	12,2325	02643	1			DELX
0884	REF	6	LAST	1173	12,2326	02643	1		STORE	DELX
0885					12,2327	44254	1		BZE	BOSU
08855	REF	1			12,2330	02112	1			KEPRIN
0886	REF	12	LAST	1173	12,2331	00025	0			X
0887	REF	13	LAST	1173	12,2332	14025	0		STODL	X
0888	REF	6	LAST	1173	12,2333	01551	1			IC
0889	REF	7	LAST	1173	12,2334	00037	0		STORE	T
0890					12,2335	77650	1		GOTO	
0891	REF	1			12,2336	24276	1			BRNCHCTR
08911	REF	6	LAST	1172	12,2337	00015	0	NEGTOVFL	STORE	XMIN
08912					12,2340	77650	1		GOTO	
08913	REF	1			12,2341	24324	1			CMNTOVFL
0892					12,2342	44545	0	KEPCONVG	DLOAO	SR4R
0893	REF	7	LAST	1169	12,2343	00041	1			R1
0894					12,2344	74225	1		DSU	VXSC
0895	REF	1			12,2345	00035	1			XSDC(XI)
0896	REF	3	LAST	1169	12,2346	02647	0			URFECT

L GCNLC SUBROUTINES

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0897				12,2347	65372 1	VSL1	PDDL	OD=(R1-XSQC(XI))URRECT (+33 DR +31)
0898	REF	14	LAST 1173	12,2350	00025 0		X	
0899				12,2351	60316 0	DSQ	NORM	
0900	REF	35	LAST 1172	12,2352	00047 1		X1	
0901				12,2353	57275 0	DMPR	DMPR	
0902	REF	3	LAST 1170	12,2354	00023 0		1/RODTMU	
0903	REF	15	LAST 1174	12,2355	00025 0		X	
0904				12,2356	53605 1	DMP	SRR*	
0905	REF	1		12,2357	00033 1		S(XI)	
0906				12,2360	21572 1		0 -7,1	
0907				12,2361	77621 1	BDSU	T	
0908	REF	8	LAST 1173	12,2362	00037 0			
0909				12,2363	74352 0	SL1	VXSC	
0910	REF	5	LAST 1169	12,2364	01511 0		VRECT	
0911				12,2365	53372 1	VSL1	VAD	PL AT 0
0912				12,2366	77712 0	VSL4		
0913	REF	14	LAST 1151	12,2367	01535 0	STDRF	RCV	RCV (+29 DR +27)
0914				12,2370	60246 1	ABVAL	NORM	
0915	REF	24	LAST 1172	12,2371	00050 1		X2	
0916	REF	1		12,2372	14043 0	STDDL	RCNORM	
0917	REF	2	LAST 1171	12,2373	00031 0		X1	
0918				12,2374	45275 0	DMPR	DSU	
0919	REF	2	LAST 1174	12,2375	00033 1		S(XI)	
0920	REF	1		12,2376	10754 0		D1/128	
0921				12,2377	76405 1	DMP	SL1R	
0922	REF	1		12,2400	00021 1		RODTMU	
0923				12,2401	53605 1	DMP	SLR*	
0924	REF	16	LAST 1174	12,2402	00025 0		X	
0925				12,2403	56601 0		0 -3,2	
0926				12,2404	74271 0	DDV	VXSC	
0927	REF	2	LAST 1174	12,2405	00043 0		RCNORM	
0928	REF	4	LAST 1173	12,2406	02647 0		URRECT	
0929				12,2407	65372 1	VSL1	PDDL	OD=URRECT(XI S(XI)-1)X ROOTMU/RCV (+15
0930	REF	2	LAST 1173	12,2410	00035 1		XSQC(XI)	OR +13) PL AT 6
0931				12,2411	56257 1	SLR*	DDV	
0932				12,2412	56602 0		0 -4,2	
0933	REF	3	LAST 1174	12,2413	00043 0		RCNORM	
0934				12,2414	74221 0	BDSU	VXSC	
0935	REF	1		12,2415	10770 0		D1/256	
0936	REF	6	LAST 1174	12,2416	01511 0		VRECT	
0937				12,2417	42455 0	VAD	VSL8	PL AT 0
0938				12,2420	77626 0	STADP		
0939	REF	12	LAST 1151	12,2421	62234 0	STDDL	VCV	VCV (+7 DR +5)
0940	REF	9	LAST 1174	12,2422	00037 0		T	
0941				12,2423	77615 0	DAD		
0942	REF	8	LAST 1171	12,2424	02201 0		TMDPULO	
0943	REF	7	LAST 1173	12,2425	15551 1	STODL	TC	
0944	REF	17	LAST 1174	12,2426	00025 0		X	

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0945				12,2427	77615 0	DAD	
0946	REF	8	LAST 1171	12,2430	02177 1		XMODULO
0947	REF	2	LAST 1171	12,2431	01553 0	STORE	XPREV
0948				12,2432	77650 1	GOTO	
0949	REF	2	LAST 1173	12,2433	02112 1		KEP3TN

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					DELTIME	EXIT		MPAC=XI (+6), OD=XSQ (+34 OR +32 -N1)
0950				12,2434	77776 1	TC	PCLY	
0951	REF	4	LAST 1080	12,2435	0 7221 1	DEC	8	
0952				12,2436	00010 0	2DEC		
0953				12,2437	02525 1	2DEC	.083333334	
0953				12,2440	12526 0			
0954				12,2441	67356 0	2DEC	-.266666684	
0954				12,2442	75666 0			
0955				12,2443	15001 1	2DEC	.406349155	
0955				12,2444	23771 1			
0956				12,2445	64342 0	2DEC	-.361198675	
0956				12,2446	43674 0			
0957				12,2447	06563 1	2DEC	.210153242	
0957				12,2450	04645 1			
0958				12,2451	75173 0	2DEC	-.086221951	
0958				12,2452	52672 0			
0959				12,2453	00656 1	2DEC	.026268812	
0959				12,2454	14331 0			
0960				12,2455	77633 1	2DEC	-.006163316	
0960				12,2456	40512 0			
0961				12,2457	00023 0	2DEC	.001177342	
0961				12,2460	11210 1			
0962				12,2461	77774 0	2DEC	-.000199055	
0962				12,2462	67506 0			
0963	REF	219	LAST 1150	12,2463	0 6036 1	TC	INTPRET	
0964	REF	3	LAST 1174	12,2464	14033 1	STODL	S(XI)	
0965	REF	3	LAST 1174	12,2465	00031 0		XI	
0966				12,2466	77776 1	EXIT		
0967	REF	5	LAST 1176	12,2467	0 7221 1	TC	PCLY	
0968				12,2470	00010 0	DEC	8	
0969				12,2471	01000 0	2DEC	.031250001	
0969				12,2472	00000 1			
0970				12,2473	72525 0	2DEC	-.166666719	
0970				12,2474	52506 0			
0971				12,2475	13301 1	2DEC	.355555413	
0971				12,2476	15337 1			
0972				12,2477	62776 0	2DEC	-.406347410	
0972				12,2500	54733 1			
0973				12,2501	11176 1	2DEC	.288962094	
0973				12,2502	13267 0			
0974				12,2503	73410 0	2DEC	-.140117894	
0974				12,2504	51674 0			
0975				12,2505	01446 0	2DEC	.049247387	
0975				12,2506	33641 1			
0976				12,2507	77451 1	2DEC	-.013081923	
0976				12,2510	65233 0			
0977				12,2511	00055 1	2DEC	.002806389	
0977				12,2512	37266 1			
0978				12,2513	77767 1	2DEC	-.000529414	
0978				12,2514	52336 0			
0979	REF	220	LAST 1176	12,2515	0 6036 1	TC	INTPRET	

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0980			12,2516	53605 1	DMP	SRR*		PL AT 0
0981			12,2517	00001 0		OD		
0982			12,2520	21574 1		0 -5,1		
0983	REF	3	LAST 1174	12,2521	00035 1	STORE	XSQC(XI)	XSQC(XI) (+33 OR +31)
0984				12,2522	72405 0	DMP	SL1	
0985	REF	2	LAST 1169	12,2523	00043 0		KEPC1	
0986				12,2524	65234 1	RTB	PDDL	XCH WITH PL. OD=C1 XSQ C(XI) (+49 OR +46
0987	REF	9	LAST 1145	12,2525	21537 0		TPMODE	PL AT 0,3
0988				12,2526	53605 1	DMP	SRR*	
0989	REF	4	LAST 1176	12,2527	00033 1		S(XI)	
0990				12,2530	21574 1		0 -5,1	
0991				12,2531	72405 0	DMP	SL1	
0992	REF	2	LAST 1169	12,2532	00045 0		KEPC2	
0993				12,2533	65234 1	RTB	PDDL	3D=C2 XSQ S(XI) (+35 OR +33) PL AT 6
0994	REF	10	LAST 1177	12,2534	21537 0		TPMODE	
0995	REF	8	LAST 1173	12,2535	00041 1		R1	
0996				12,2536	76261 0	SR	TAD	PL AT 3
0997				12,2537	20607 1		6	
0998				12,2540	41301 0	NORM	DMP	TO PRESERVE SIGNIF.
0999	REF	36	LAST 1174	12,2541	00047 1		X1	
1000	REF	18	LAST 1174	12,2542	00025 0		X	
1001				12,2543	76257 0	SR*	TAD	X(C2 XSQ S(XI) +R1) (+49 OR +46) PL AT 0
1002				12,2544	20576 1		0 -3,1	
1003				12,2545	57232 0	SL4R	DMPR	
1004	REF	4	LAST 1174	12,2546	00023 0		1/ROOTMU	
1005	REF	10	LAST 1174	12,2547	00037 0	STORE	I	
1006				12,2550	77616 0	RVQ		

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1007			12,2551	71214 0	ITERATOR	BDNCLR	DLAD		
1008	REF	1	12,2552	00614 1			SLDPESW		
1009	REF	1	12,2553	24621 1			FIRSTIME		
1010	REE	1	12,2554	00037 0			DEP		
1011			12,2555	60225 1		DSU	NORM		
1012	REF	3	12,2556	02762 0			DEPREV		
1013	RFF	37	12,2557	00047 1			X1		
1014			12,2560	60325 0		PDDL	NDRM		
1015	REF	1	12,2561	00015 0			DELINDEP		
1016	RFF	25	12,2562	00050 1			X2		
1017			12,2563	41260 0		XSU,1	DMP		
1018	REF	26	12,2564	00047 1			X2		
1019	RFF	3	12,2565	02760 1			DELDEP		
1020			12,2566	56257 1		SLR*	DDV		PL UP 2
1021			12,2567	21202 1			1,1		
1022			12,2570	43142 1		SRI	BCEF		
1023	REE	1	12,2571	04351 1			ORDFRSW		
1024	REF	1	12,2572	24575 0			SGNCHECK		
1025			12,2573	75246 0		ABS	SIGN		IN CASE 2ND DERIV. CHANGED SIGN, MUST
1026	REE	4	12,2574	02760 1			DELDEP		DISREGARD IT TO FIND MIN.
1027			12,2575	51006 0		SGNCHECK	PUSH	8PL	TRIAL DELINDEP
1028	REF	1	12,2576	24633 1			PDSDEL		PL DOWN 2
1029			12,2577	43145 0		DLOAD	BON		
1030	REF	1	12,2600	02766 1			INDEP		
1031	REF	2	12,2601	04311 0			ORDFRSW		
1032	REF	1	12,2602	24604 0			MINCHECK		
1033	REF	1	12,2603	00017 1		STDRE	MAX		IF NDT 2ND DRDEP, CAN MDVE MAX ROUND IN.
1034			12,2604	45221 1		MINCHECK	BDSU	DSU	
1035	REE	1	12,2605	00011 1			MIN		
1036			12,2606	51000 0			BDV	RPL	
1037	REF	1	12,2607	24613 0			MODNGDEL		
1038	REF	2	12,2610	24613 0			MODNGDEL		
1039			12,2611	77650 1		GDT0			
1040	REF	1	12,2612	24645 0			DELCK		
1041			12,2613	45345 1		MODNGDEL	DLOAD	DSU	TRIAL DELINDEP WOULD EXCEED MIN BOUND
1042	REE	2	12,2614	00011 1			MIN		
1043	REF	2	12,2615	02766 1			INDEP		
1044			12,2616	52005 0			GOTO		
1045	REF	3	12,2617	10772 1			DP9/10		
1046	REF	1	12,2620	24647 1			NEWDEL		
1047			12,2621	41345 0		EIRSTIME	DLAD	DMP	
1048	REF	3	12,2622	00011 1			MIN		
1049	REF	1	12,2623	00051 0			TWEEKIT		DLOAD TWEEKIT(400) SENSITIVE TO CHANGE.
1050			12,2624	41325 0		PDDL	DMP		S2(410) SHOULDNT CONTAIN HI DPDER ONES

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1051	REF	2	LAST	1178	12,2625	00017	1			MAX
1052	REF	2	LAST	1178	12,2626	00051	0			TRECKIT
1053					12,2627	77625	0		DSU	
1054					12,2630	52165	1		SIGN	GOTO
1055	REF	5	LAST	1178	12,2631	02760	1			DELDFP
1056	REF	2	LAST	1178	12,2632	24575	0			SGNCHECK

1057					12,2633	43145	0	POSDEL	DLOAD	BON
1058	RFF	3	LAST	1178	12,2634	02766	1			INDEP
1059	REF	3	LAST	1178	12,2635	04311	0			ORDERSW
1060	REF	1			12,2636	24640	0			MAXCHECK
1061	REF	4	LAST	1178	12,2637	00011	1		STORE	MIN

IF NOT 2ND ORDER, CAN MOVF MIN BOUND IN.

1062					12,2640	45221	1	MAXCHECK	BDSU	DSU
1063	REF	3	LAST	1179	12,2641	00017	1			MAX
1064					12,2642	50000	1		BOV	BMN
1065	REF	1			12,2643	24651	0			MODPSDEL
1066	REF	2	LAST	1179	12,2644	24651	0			MODPSDFL
1067					12,2645	77745	1	DELOK	DLOAD	
1068					12,2646	00001	0			OD
1069	REF	2	LAST	1178	12,2647	00015	0	NEWDFL	STORE	DFLINDEP
1070					12,2650	77616	0		RVQ	

1071					12,2651	45345	1	MODPSDEL	DLOAD	DSU
1072	REF	4	LAST	1179	12,2652	00017	1			MAX
1073	REF	4	LAST	1179	12,2653	02766	1			INDEP
1074					12,2654	52005	0		DMP	GOTO
1075	REF	4	LAST	1178	12,2655	10772	1			DP9/10
1076	RFF	2	LAST	1178	12,2656	24647	1			NEWDEL

1077	REF	125	LAST	1122	12,2657	4 4753	0	CHECKCTR	CS	DNE
1078	REF	52	LAST	1103	12,2660	50 120	1		INDEX	FIXLOC
1079	REF	4	LAST	1169	12,2661	6 0026	0		AD	ITERCTR
1080	REF	53	LAST	1179	12,2662	50 120	1		INDEX	FIXLOC
1081	REF	5	LAST	1179	12,2663	54 026	1		TS	ITERCTR
1082	REF	709	LAST	1146	12,2664	54 154	0		TS	MPAC
1083	RFF	55	LAST	1089	12,2665	0 6060	1		TC	DANZ IG

L CCNIC SUBROUTINES

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1084				12,2666	44545 0	NFWSTATE	DLOAD	SR4R		
1085	REF	9	LAST 1177	12,2667	00041 1			P1		
1089				12,2670	74225 1		DSU	VXSC		
1090	REF	4	LAST 1177	12,2671	00035 1			XSQC(X1)		
1091	REF	3	LAST 1169	12,2672	02722 1			UR1		
1092				12,2673	65372 1		VSL1	PDDL	OD=(R1-XSQC(X1))UR1 (+33 OR 31)	PL AT 6
1093	REF	19	LAST 1177	12,2674	00025 0			X		
1094				12,2675	60316 0		DSQ	NORM		
1095	REF	38	LAST 1178	12,2676	00047 1			X1		
1096				12,2677	57275 0		DMPR	DMPP		
1097	REF	5	LAST 1177	12,2700	00023 0			1/ROOTMU		
1098	REF	20	LAST 1180	12,2701	00025 0			X		
1099				12,2702	53605 1		DMP	SRP*		
1100	REF	5	LAST 1177	12,2703	00033 1			S(X1)		
1101				12,2704	21572 1			0 -7,1		
1102				12,2705	77621 1		BDSU			
1103	REF	11	LAST 1177	12,2706	00037 0			T		
1104				12,2707	74352 0		SL1	VXSC		
1105	REF	10	LAST 737	12,2710	02744 1			VVEC		
1106				12,2711	53372 1		VSL1	VAD		PL AT 0
1107				12,2712	41512 1		VSL4	PUSH		
1108				12,2713	77646 0		ABVAL			
1109				12,2714	77701 1	LAMENTER	NORM			
1110	REF	39	LAST 1180	12,2715	00047 1			X1		
1111	REF	1		12,2716	16720 0		STODL	R2		
1112	REF	4	LAST 1176	12,2717	00031 0			X1		
1113				12,2720	45205 1		DMP	DSU		
1114	REF	6	LAST 1180	12,2721	00033 1			S(X1)		
1115	REF	2	LAST 1174	12,2722	10754 0			D1/128		
1116				12,2723	76405 1		DMP	SL1R		
1117	REF	2	LAST 1174	12,2724	00021 1			ROOTMU		
1118				12,2725	53605 1		DMP	SLR*		
1119	REF	21	LAST 1180	12,2726	00025 0			X		
1120				12,2727	21176 1			0 -3,1		
1121				12,2730	74271 0		DDV	VXSC		
1122	REF	2	LAST 1180	12,2731	02720 0			R2		
1123	REF	4	LAST 1180	12,2732	02722 1			UR1		
1124				12,2733	65372 1		VSL1	PDDL	6D=V2VEC PART (+15 OR 13)	PL AT 12
1125	REF	5	LAST 1180	12,2734	00035 1			XSQC(X1)		
1126				12,2735	56257 1		SLR*	DDV		
1127				12,2736	21175 1			0 -4,1		
1128	REF	3	LAST 1180	12,2737	02720 0			R2		
1129				12,2740	77621 1		BDSU			
1130	REF	2	LAST 1174	12,2741	10770 0			D1/256		
1131				12,2742	53361 0		VXSC	VAD		PL AT 6
1132	REF	11	LAST 1180	12,2743	02744 1			VVEC		
1133				12,2744	43412 1		VSL8	RVD		

R1134

L CONIC SUBROUTINES

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1135	REF	3	LAST	60	04,2000	SETLOC CONICS1	
1136					04,2750	BANK	
1137	RFE	2	LAST	60 TO	61:	16	16*
R1138	DO NOT DISTURB THE ORDER OF THESE CDS, OVERLAYS HAVE BEEN MADE.						COUNT* \$\$/CONIC
1139					04,2750	00000 1	BEE17 DEC 0
1140					04,2751	04000 0	D1/8 2DEC 1.0 B-3
1140					04,2752	00000 1	
1141					04,2753	00200 0	D1/12B 2DEC 1.0 B-7
1141					04,2754	00000 1	
1142					04,2755	00400 0	D1/64 2DEC 1.0 B-6
1142					04,2756	00000 1	
1143					04,2757	10000 0	D1/4 2DEC 1.0 B-2
1143					04,2760	00000 1	
1144					04,2761	02000 0	D1/16 2DEC 1.0 B-4
1144					04,2762	00000 1	
1145					04,2763	01000 0	D1/32 2DEC 1.0 B-5
1145					04,2764	00000 1	
1146					04,2765	00020 0	D1/1024 2DEC 1.0 B-10
1146					04,2766	00000 1	
1147					04,2767	00100 0	D1/256 2DEC 1.0 B-8
1147					04,2770	00000 1	
1148					04,2771	34631 1	DP9/10 2DEC .9
1148					04,2772	23146 0	
1149	REF	4	LAST	336	11,2274	KEPZERO	EQUALS LOCZEROS
1150					04,2773	77467 1	-50SC 2DEC -50.0 B-12
1150					04,2774	77777 0	
1151					04,2775	03110 1	2PISC 2DEC 6.2B 318530 B-6
1151					04,2776	17665 1	
1152	REF	1			04,2762	BEE19	EQUALS D1/32 -1 2DEC 1.0 B-19 {00000 01000}
1153	REF	3	LAST	1180	04,2766	BFF22	EQUALS D1/256 -1 2DEC 1.0 B-22 {00000 00100}
1154					04,2777	00000 1	ONFRIT 2DEC 1.0 B-28
1154					04,3000	00001 0	
1155					04,3001	37767 0	COGUP LIM 2DEC .999511597
1155					04,3002	37737 0	
1156					04,3003	40010 1	COGLO LIM 2DEC -.999511597
1156					04,3004	40040 1	
R1157							

L CCNIC SUBROUTINES

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1158	REF	2	LAST 1168	12,2000		SETLOC	CONICS		
1159				12,2745		BANK			
1160	REF	2	LAST 1169 TO	1181:	485 485*	COUNT*	\$/CONIC		
1161				12,2745	40220 0	TIMETHET	STQ	SETPD	PL AT 0
1162	REF	1		12,2746	02710 0			RINIT	
1163				12,2747	00001 0			0	
1164				12,2750	63375 0	VLOAD	PDVL	SETUP FOR PARAM CALL	PL AT 6
1165	REF	8	LAST 737	12,2751	02655 0			RVEC	
1166	REF	12	LAST 1180	12,2752	02744 1			VVEC	
1167				12,2753	77624 1	CALL			
1168	REF	1		12,2754	11005 1			PARAM	
1169				12,2755	45000 0	80V	CALL		PL AT 0
1170	REF	1		12,2756	24775 1			COGAOVFL	
1171	REF	1		12,2757	25000 0			GETX	
1172				12,2760	43145 0	COMMNOUT	DLOAD	BCN	
1173	REF	5	LAST 1180	12,2761	00031 0			XI	
1174	REF	1		12,2762	04310 1			INFINFLG	
1175	REF	2	LAST 1182	12,2763	02710 0			RINIT	
1176				12,2764	45014 0	CLEAR	CALL		
1177	REF	1		12,2765	04273 0			COGAFLAG	
1178	REF	2	LAST 1171	12,2766	24434 1			DELTIMF	
1179				12,2767	45014 0	80N	CALL		
1180	REF	7	LAST 737	12,2770	03706 0			RVSX	
1181	REF	3	LAST 1182	12,2771	02710 0			RINIT	
1182	REF	1		12,2772	24666 1			NFWSTATE	
1183				12,2773	77650 1	GOIO			
1184	REF	4	LAST 1182	12,2774	02710 0			RINIT	
1185				12,2775	77614 1	COGAOVFL	SETGO		
1186	REF	2	LAST 1182	12,2776	04033 0			COGAFLAG	
1187	REF	5	LAST 1182	12,2777	02710 0			RINIT	

L CCNIC SUBROUTINES

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11872				04,3005		BANK 4		
11874	REF	4	LAST 1181	04,2000		SETLOC CONICS1		
11876				04,3005		BANK		
11878	REF	3	LAST 1181 TO	1182:	29 45*	CDUNT* \$\$/CCNIC		
1188				04,3005	43020 1	STQ	CLEAR	MPAC=V1VEC, OD=R1VEC PL AT 6
1189	REF	2	LAST 140	04,3006	02753 1		RTNPRM	
1190	REF	5	LAST 783	04,3007	03665 1		NDRMSW	
11901				04,3010	77614 1	CLEAR		
11902	REF	3	LAST 1182	04,3011	04273 0		COGAFLAG	
1191				04,3012	45131 0	SSP	CALL	
1192	REF	3	LAST 697	04,3013	02673 1		GEOMSGN	
1193				04,3014	27777 0		37777	GAMMA ALWAYS LESS THAN 180DEG
1194	REF	1		04,3015	11051 0		GEOM	MPAC=SNGA (+1), OD=CSGA (+1) PL AT 2
1195				04,3016	14045 0	STDDL	36D	36D=SIN GAMMA (+1) PL AT 0
1196				04,3017	56261 1	SR	DDV	
1197				04,3020	20606 0		5	
1198				04,3021	00045 0		36D	
1199	REF	2	LAST 140	04,3022	32766 1	STDVL*	COGA	
1200	REF	4	LAST 1169	04,3023	10005 0		MUTABLE,1	
1201	REF	2	LAST 1169	04,3024	14017 1	STODL	1/MU	
1202	REF	3	LAST 140	04,3025	02720 0		MAGVEC2	
1203				04,3026	60316 0	DSQ	NORM	
1204	REF	40	LAST 1180	04,3027	00047 1		X1	
1205				04,3030	41275 1	DMPR	DMP	
1206	REF	3	LAST 1183	04,3031	00017 1		1/MU	
1207	REF	10	LAST 1180	04,3032	00041 1		R1	
1208				04,3033	77657 0	SRR*		
1209				04,3034	21576 0		0 -3,1	
1210				04,3035	44206 0	PUSH	BDSU	OD=R1 VISQ/MU (+5) PL AT 2
1211	REF	2	LAST 1181	04,3036	10764 0		01/32	
1212	REF	3	LAST 658	04,3037	16742 1	STODL	R1A	R1A (+6) PL AT 0
1213				04,3040	60205 0	DMP	NORM	
1214				04,3041	00045 0		36D	
1215	REF	41	LAST 1183	04,3042	00047 1		X1	
1216				04,3043	53605 1	DMP	SR*	
1217				04,3044	00045 0		36D	
1218				04,3045	20575 1		0 -4,1	
1219	REF	4	LAST 645	04,3046	02740 0	STDRE	P	P (+4)
1220				04,3047	77650 1	GOTO		
1221	REF	3	LAST 1183	04,3050	02753 1		RTNPRM	

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1225			04,3051	77656 1	GEOM	UNIT	
1226	REF	2 LAST 140	04,3052	16712 1		STOVL	U2
1227			04,3053	00045 0			36D
1228	REF	4 LAST 1183	04,3054	26720 0		STOVL	MACVFC2
1229			04,3055	77656 1		UNIT	
1230	REF	5 LAST 1180	04,3056	02722 1		STORE	UR1
1231			04,3057	72441 0		DOT	S11
1232	REF	3 LAST 1184	04,3060	02712 1			U2
1233			04,3061	77725 1		PDDL	
1234			04,3062	00045 0			36D
1235	REF	11 LAST 1183	04,3063	24041 1		STOVL	R1
1236	REF	6 LAST 1184	04,3064	02722 1			JR1
1237			04,3065	76435 1		VXV	VSL1
1238	REF	4 LAST 1184	04,3066	02712 1			U2
1239			04,3067	75214 1		BON	SIGN
1240	REF	6 LAST 1183	04,3070	03705 0			NORMSW
1241	REF	1	04,3071	11103 0			HAVENORM
1242	REF	4 LAST 1183	04,3072	02673 1			GEOMSGN
1243			04,3073	40056 0		UNIT	BOV
1244	REF	1	04,3074	11101 1			COLINEAR
1245	REF	4 LAST 696	04,3075	16674 0	UNITNORM	STOVL	UN
1246			04,3076	00045 0			36D
1247			04,3077	43565 0		SIGN	RVQ
1248	REF	5 LAST 1184	04,3100	02673 1			GEOMSGN
1249			04,3101	52162 0	COLINEAR	VSRI	GOTO
1250	REF	1	04,3102	11075 0			UNITNORM
1251			04,3103	75246 0	HAVENORM	ABVAL	SIGN
1252	REF	6 LAST 1184	04,3104	02673 1			GEOMSGN
1253			04,3105	77616 0		RVQ	
							MPAC=SNTH (+1), 34D=SNTH.SNTH (+2)

L CCNIC SUBROUTINES

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1254				12,3000		BANK 12		
1255	REF	3	LAST 1182	12,2000		SETLOC	CONICS	
1256				12,3000		BANK		
12565	REF	3	LAST 1182 TO	1183:	27 512*	COUNT*	\$/CCNIC	
1257				12,3000	66374 1	AXI,2	SSP	ASSUMES P (+4) IN MPAC
1258				12,3001	00003 1		3	
1259	REF	26	LAST 1150	12,3002	00052 0		S2	
1260				12,3003	00001 0		1	
1261				12,3004	77614 1	CLEAR		
1262	REF	1		12,3005	04276 0		360SW	
1263				12,3006	65366 1	SQRT	PDDL	OD=SQRT(P) PL AT 2
1264	REF	6	LAST 737	12,3007	02732 0		CSTH	
1265				12,3010	44342 1	SR1	80SU	
1266	REF	2	LAST 36	12,3011	10760 1		D1/4	
1267				12,3012	54325 1	PDDL	SRR	PL AT 4D
1268	REF	8	LAST 737	12,3013	02730 1		SNTH	
1269				12,3014	21607 0		6	
1270				12,3015	77671 1	OOV		PL AT 2
1271				12,3016	77600 1	BOV		
1272	REF	1		12,3017	25133 1		360CHECK	
1273				12,3020	41225 1	OSU	DMP	
1274	REF	3	LAST 1183	12,3021	02766 1		CNGA	PL AT 0
1275				12,3022	40132 0	SL2R	BDV	
1276	REF	2	LAST 1185	12,3023	25133 1		360CHECK	
1277				12,3024	63406 0	WLOOP	OSQ	OD=W (+5) PL AT 2
1278				12,3025	65351 0	TLOAD	PDDL	2D=WSQ (+10) PL AT 5
1279	REF	710	LAST 1179	12,3026	00155 0		MPAC	
1280	REF	4	LAST 1183	12,3027	02742 1		RIA	
1281				12,3030	76202 0	SR4	TAD	PL AT 2
1282				12,3031	75440 0	BMN	SQRT	
1283	REF	1		12,3032	25216 0		INFINITY	
1284				12,3033	43306 0	ROUND	DAD	PL AT 0D
1285				12,3034	61000 0	BDV	TIX,2	
1286	REF	1		12,3035	25131 0		RESETX2	
1287	REF	1		12,3036	25024 0		WLOOP	
1288				12,3037	40065 0	BDDV	BDV	
1289	REF	3	LAST 1180	12,3040	10754 0		D1/128	
1290	REF	2	LAST 1185	12,3041	25216 0		INFINITY	
1291				12,3042	41440 1	POLYCOEF	BMN	OD=1/W (+2) OR 16/W (+6) PL AT 2
1292	REF	3	LAST 1185	12,3043	25216 0		INFINITY	
1293				12,3044	77716 1	DSQ		
1294				12,3045	41301 0	NORM	DMP	
1295	REF	42	LAST 1183	12,3046	00047 1		X1	
1296	REF	5	LAST 1185	12,3047	02742 1		RIA	
1297				12,3050	77457 1	SRR*	EXIT	
1298				12,3051	21567 0		0 -10D,1	
1299	REF	6	LAST 1176	12,3052	0 7221 1	TC	POLY	

L CCN1C SUBROUTINES

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1300			12,3053	00005 1	DEC	5		
1301			12,3054	20000 0	2DEC	.5		
1301			12,3055	00000 1				
1302			12,3056	72525 0	20EC	-.166666770		
1302			12,3057	52471 1				
1303			12,3060	03146 1	2DEC	.100000392		
1303			12,3061	15003 0				
1304			12,3062	75556 0	2DEC	-.071401086		
1304			12,3063	45210 0				
1305			12,3064	01615 1	20EC	.055503292		
1305			12,3065	13553 0				
1306			12,3066	76371 0	2DEC	-.047264098		
1306			12,3067	63777 0				
1307			12,3070	01232 0	2DEC	.040694204		
1307			12,3071	27367 0				
1308	REF 221	LAST 1176	12,3072	0 6036 1	TC	INTPRET		
1309			12,3073	76405 1	OMP	SLIR		PL AT 00
1310			12,3074	43006 0	PUSH	BON		
1311	REF 2	LAST 1185	12,3075	04316 1		360SW		
1312	REF 1		12,3076	25203 1		TRUE 360X		
1313			12,3077	60316 0	XCOMMON DSQ	NORM		
1314	REF 43	LAST 1185	12,3100	00047 1		X1		
1315			12,3101	53605 1	DMP	SRR*		
1316	REF 6	LAST 1185	12,3102	02742 1		R1A		
1317			12,3103	21565 1		0 -120,1		
1318	REF 6	LAST 1182	12,3104	14031 0	STOOL	XI		XI (+6)
1319	REF 12	LAST 1184	12,3105	00041 1		R1		
1320			12,3106	75542 0	SR1	SQRT		
1321			12,3107	41306 1	ROUND	OMP		
1322			12,3110	77632 0	SL4R			PL AT 0
1323	REF 22	LAST 1180	12,3111	00025 0	STORE	X		X (+17 OR +16)
1324			12,3112	60316 0	DSQ	NORM		
1325	REF 44	LAST 1186	12,3113	00047 1		X1		
1326			12,3114	41325 0	PDOL	DMP		OD=XSQ (+34 OR +32 -N1)
1327	REF 5	LAST 1183	12,3115	02740 0		P		PL AT 2
1328	REF 13	LAST 1186	12,3116	00041 1		R1		
1329			12,3117	75452 0	SL3	SQRT		
1330			12,3120	56405 0	DMP	SL3R		
1331	REF 4	LAST 1185	12,3121	02766 1		COGA		
1332	REF 3	LAST 1177	12,3122	14043 0	STOOL	KEPC1		
1333	REF 7	LAST 1186	12,3123	02742 1		R1A		
1334			12,3124	43021 0	BOSU	CLEAR		
1335	REF 3	LAST 1169	12,3125	10756 1		D1/64		
1336	REF 2	LAST 1182	12,3126	04270 0		INFINFLG		
1337	REF 3	LAST 1177	12,3127	00045 0	STORE	KEPC2		
1338			12,3130	77616 0	RVQ			

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1339				12,3131	77774	0	RESETX2	AXT,2		
1340				12,3132	00003	1			3	
1341				12,3133	51001	1	360CHECK	SETPD	BPI	
1342				12,3134	00001	0			OD	
1343	REF	1		12,3135	25140	0			INVRSEQN	
1344				12,3136	77614	1		SFT		
1345	REF	3	LAST 1186	12,3137	04076	1			360SW	
1346				12,3140	75545	1	INVRSEQN	DLOAD	SCRT	
1347	REF	6	LAST 1186	12,3141	02740	0			P	
1348				12,3142	41325	0		POOL	DMP	OD=SQRT(P) (+2)
1349	REF	9	LAST 1185	12,3143	02730	1			SNTH	PL AT 2
1350	REF	5	LAST 1186	12,3144	02766	1			COGA	
1351				12,3145	65352	0		SL1	PODL	2D=SNTH COGA (+5)
1352	REF	7	LAST 1185	12,3146	02732	0			CSTH	PL AT 4
1353				12,3147	43202	0		SR4	OAD	
1354	REF	3	LAST 1183	12,3150	10764	0			D1/32	
1355				12,3151	41225	1		OSU	DMP	PL AT 2,0
1356				12,3152	55301	0		NORM	8DDV	
1357	REF	45	LAST 1186	12,3153	00047	1			X1	
1358	REF	10	LAST 1187	12,3154	02730	1			SNTH	
1359				12,3155	51457	0		SLR*	ABS	NOTE: NEAR 360 CASE TREATED DIFFERENTLY
1360				12,3156	21174	0			0 -5,1	
1361				12,3157	63406	0		PUSH	DSQ	OD=1/W (-1)
1362				12,3160	14043	0		STODL	340	PL AT 2
1363	REF	1		12,3161	10762	0			D1/16	
1364				12,3162	63406	0	1/WLOOP	PUSH	DSQ	2D=G (+4)
1365				12,3163	65234	1		RT8	PDDL	PL AT 4
1366	REF	11	LAST 1177	12,3164	21537	0			TPMODE	PL AT 7
1367	REF	8	LAST 1186	12,3165	02742	1			R1A	
1368				12,3166	40405	1		OMP	SR4	
1369				12,3167	00043	0			340	
1370				12,3170	77771	0		TAD		PL AT 4
1371				12,3171	75440	0		BMN	SCRT	
1372	REF	4	LAST 1185	12,3172	25216	0			INFINITY	
1373				12,3173	77615	0		DAD		PL AT 2
1374				12,3174	60304	0		TIX,2	NORM	
1375	REF	1		12,3175	25162	0			1/WLCOP	
1376	REF	46	LAST 1187	12,3176	00047	1			X1	
1377				12,3177	77665	1		BOOV		PL AT 0
1378				12,3200	52057	1		SLR*	SCOT	
1379				12,3201	21172	0			0 -7,1	
1380	REF	1		12,3202	25042	0			POLYCOFF	
1381				12,3203	50145	1	TRUE360X	DLOAD	BMN	
1382	REF	9	LAST 1187	12,3204	02742	1			R1A	

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1383	REF	5	LAST 1187	12,3205	25216 0		INFINITY	
1384				12,3206	60366 1	SQRT	NORM	
1385	REF	47	LAST 1187	12,3207	00047 1		X1	
1386				12,3210	53665 1	BDDV	SL#	
1387	REF	2	LAST 1170	12,3211	10776 0		2PISC	
1388				12,3212	20176 0		0 -3,1	
1389				12,3213	41425 1	DSU	PUSH	OD=2PI/SQRT(R1A) -X PL AT 0,2
1390				12,3214	77650 1	GOTO		
1391	REF	1		12,3215	25077 0		XCOMMON	
1392				12,3216	40001 1	INFINITY SETPD	80V	NO SOLUTION EXISTS SINCE CLOSURE THROUGH
1393				12,3217	00001 0		0	INFINITY IS REQUIRED
1394	REF	1		12,3220	25221 1		OVFLCLR	
1395				12,3221	43414 1	OVFLCLR SET	RVD	
1396	REF	3	LAST 1186	12,3222	04070 1		INFINFLG	

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1397				12,3223	40220 0	LAMBERT	STQ	SETPD			
1398	REF	5	LAST	140	12,3224			RTNLAMB			
1399					12,3225			DD			
1400					12,3226						
1401	REF	1			12,3227			CLEAR	VLOAD*		
1403	REF	5	LAST	1183	12,3230				SDLSW		
1404	REF	4	LAST	1183	12,3231	14017 1		STDDL	1/MU		
1405	REF	3	LAST	696	12,3232	02671 0			TOES IRED		
1406					12,3233	77675 0		DMPR			
1407	REF	1			12,3234	10763 1			BEE19		
1408	REF	2	LAST	140	12,3235	02764 0		STORE	EPSILDNL		
1409					12,3236	77214 0		SET	VLOAD		
1410	REF	2	LAST	1178	12,3237	00474 0			SLDPESW		
1411	REF	6	LAST	698	12,3240	02655 0			RIVEC		
1412					12,3241	45115 0		PDVL	CALL	OD=RIVEC (+29 OR +27)	PL AT 6
1413	REF	10	LAST	698	12,3242	02663 0			R2VEC	MPAC=R2VEC (+29 OR +27)	
1414	REF	2	LAST	1183	12,3243	11051 0			GFOM		
1415	REF	11	LAST	1187	12,3244	16730 1		STDDL	SNTH	OD=CSTH (+1)	PL AT 2
1416	REF	5	LAST	1184	12,3245	02720 0			MAGVEC2		
1417					12,3246	65301 0		NORM	PDDL		PL AT 4
1418	REF	48	LAST	1188	12,3247	00047 1			X1		
1419	REF	14	LAST	1186	12,3250	00041 1			R1		
1420					12,3251	56342 1		SR1	DDV		PL AT 2
1421					12,3252	65257 1		SL*	PDDL	OXCH WITH OD, OD=R1/R2 (+7)	PL AT 0,2
1422					12,3253	20173 0			0 -6,1		
1423					12,3254	77626 0		STADR			
1424	REF	8	LAST	1187	12,3255	75045 1		STORE	CSTH	CSTH (+1)	
1425					12,3256	44342 1		SR1	BDSU		
1426	REF	3	LAST	1185	12,3257	10760 1			D1/4		
1427	REF	2	LAST	140	12,3260	02734 0		STORE	1-CSTH	1-CSTH (+2)	
1428					12,3261	53106 0		ROUND	BZE		
1429	REF	1			12,3262	25472 1			360LAMB		
1430					12,3263	65301 0		NDRM	PDDL		PL AT 4
1431	REF	49	LAST	1189	12,3264	00047 1			X1		
1432					12,3265	00001 0			DD		
1433					12,3266	56342 1		SR1	DDV		PL AT 2
1434					12,3267	75457 0		SL*	SORT		
1435					12,3270	20176 0			0 -3,1		
1436					12,3271	54325 1		PDDL	SR	20=SQRT(2R1/R2(1-CSTH)) (+5)	PL AT 4
1437	REF	12	LAST	1189	12,3272	02730 1			SNTH		
1438					12,3273	20607 1			6		
1439					12,3274	43271 1		DDV	OAD		PL AT 2
1440	REF	3	LAST	1189	12,3275	02734 0			1-CSTH		
14401					12,3276	77626 0		STADR			
14402	REF	1			12,3277	77760 0		STORE	COGAMAX		
1441					12,3300	50000 1		BOV	8MN	IF OVFL, COGAMAX=COGUPLIM	
1442	REF	1			12,3301	25306 0			JPLIM	IF NEG, USE EVEN IF LT COGLDLM, SINCE	
14421	REF	1			12,3302	25311 0			MAXCDGA	THIS WOULD BE RESET IN LAMBLODP	
14422					12,3303	50025 0		DSU	8MN	IF COGAMAX GT COGUPLIM, COGAMAX=COGUPLIM	

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14423	REF	1		12,3304	11002 0		COGUP LIM		
14424	REF	2	LAST 1189	12,3305	25311 0		MAXCCGA		OTHERWISE OK, SO GO TO MAXCCGA
14425				12,3306	77745 1	UPLIM	DLOAD		
14426	REF	2	LAST 1190	12,3307	11002 0		COGUP LIM		COGUP LIM=.999511597 = MAX VALUE OF CGGA
14427	REF	2	LAST 1189	12,3310	00017 1		STORE	COGAMAX	NOT CAUSING OVFL IN RIA CALCULATION
1443				12,3311	77745 1	MAXCCGA	DLOAD		
1444	RFF	9	LAST 1189	12,3312	02732 0			CSTH	
1445				12,3313	45261 0		SR	DSU	PL AT 0
1446				12,3314	20607 1			6	
1447				12,3315	77626 0		STADR		
1448	REF	2	LAST 140	12,3316	61041 0		STODL	CSTH-RHO	
1449	REF	7	LAST 1184	12,3317	02673 1			GFORMSGN	
1450				12,3320	71240 1		BMN	OLOAO	
1451	REF	1		12,3321	25512 0			LOLIM	
1452	REF	3	LAST 1190	12,3322	02736 1			CSTH-RHO	
1453				12,3323	56352 0		SL1	ODV	
1454	REF	13	LAST 1189	12,3324	02730 1			SNTH	
1455				12,3325	77600 1		BOV		
1456	REF	2	LAST 1190	12,3326	25512 0			LOLIM	
1457	REF	1		12,3327	00011 1	MINCCGA	STORE	COGAMIN	COGAMIN (+5)
1458				12,3330	66214 0		BON	SSP	
1459	REF	3	LAST 697	12,3331	00715 1			GUESSW	
1460	REF	1		12,3332	25476 0			NOGUESS	
1461	REF	3	LAST 1179	12,3333	00051 0			TWEEKIT	
1462				12,3334	00001 0			00001	
1463				12,3335	77745 1		OLOAO		
1464	REF	6	LAST 1187	12,3336	02766 1			COGA	
1465				12,3337	77605 1	LAMBLOOP	DMP		
1466	RFF	14	LAST 1190	12,3340	02730 1			SNTH	
1467				12,3341	45342 0		SR1	OSU	
1468	REF	4	LAST 1190	12,3342	02736 1			CSTH-RHO	
1469				12,3343	65301 0		NORM	PODL	OD=SNTH COGA-(CSTH-RHO) (+7+C(X1)) PL=2
1470	REF	50	LAST 1189	12,3344	00047 1			X1	
1471	REF	4	LAST 1189	12,3345	02734 0			1-CSTH	
1472				12,3346	56257 1		SL*	DOV	1-CSTH (+2) PL AT 0
1473				12,3347	20170 0			0 -90,1	
1474				12,3350	53040 0		BMN	BZE	
1475	REF	1		12,3351	25426 0			NFGP	
1476	REF	2	LAST 1190	12,3352	25426 0			NEGP	
1477	REF	7	LAST 1187	12,3353	16740 0		STODL	P	P=(1-CSTH)/(SNTH COGA-(CSTH-RHO)) (+4)
1478	REF	7	LAST 1190	12,3354	02766 1			COGA	
1479				12,3355	43316 1		OSQ	OAO	
1480	REF	1		12,3356	10766 1			01/1024	
1481				12,3357	41301 0		NORM	DMP	
1482	REF	51	LAST 1190	12,3360	00047 1			X1	
1483	REF	8	LAST 1190	12,3361	02740 0			P	
1484				12,3362	44257 1		SR*	BDSU	
1485				12,3363	20571 0			0 -80,1	

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$$R_{1A} = 2 - P(1 + COGA - COGA) \quad (+6)$$

HAVE EXCEEDED THEORETICAL BOUNDS

HAVE EXCEEDED THEORETICAL BOUNDS

HAVE EXCEEDED THEORETICAL BOUNDS

HAVE EXCEEDED THEORETICAL BOUNDS

HAVE EXCEEDED THEORETICAL BOUNDS

HAVE EXCEEDED THEORETICAL BOUNDS

IMPOSSIBLE TRAJECTORY DUE TO INACCURATE
BOUND CALCULATION. TRY NEW COGA.

HIGH ENERGY TRAJECTORY RESULTED
IN OVFL OF P OR R1A, OR XI EXCEEDING 50.
THIS IS THE NEW BOUND.

IN OVFL OF P OR R1A, OR XI EXCEEDING 50.
THIS IS THE NEW BOUND.

USE DCOGA/2 AS DECREMENT

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15301 REF 3 LAST 1191 12,3441 25457 0
 1531 REF 11 LAST 1191 12,3442 02766 1
 1532 REF 12 LAST 1192 12,3443 02766 1
 1533 12,3444 77650 1
 1534 REF 2 LAST 1191 12,3445 25337 1

SUFFCHEK
 COGA
 COGA
 STORE
 GOTO
 LAMBLOOP

RESTART THIS LOOP

1535 12,3446 77745 1
 1536 REF 2 LAST 1191 12,3447 02762 0
 1537 REF 13 LAST 1191 12,3450 00037 0

BIGTIME DLOAD
 TPREV
 STORE T

1538 12,3451 71201 1
 1539 12,3452 00001 0
 1540 REF 13 LAST 1192 12,3453 02766 1
 1541 REF 3 LAST 1190 12,3454 00017 1
 1542 12,3455 77650 1
 1543 REF 1 12,3456 25435 1

LOENERGY SETPD
 DLOAD
 0
 COGA
 STORE
 GOTO
 COMMONLM

LOW ENERGY TRAJECTORY RESULTED

IN OVERFLOW OF TIME.

THIS IS THE NEW BOUND.

1544 12,3457 51545 1
 1545 REF 2 LAST 1191 12,3460 02760 1
 1546 12,3461 41325 0
 1547 REF 5 LAST 1191 12,3462 02671 0
 1548 REF 1 12,3463 10751 0
 1549 12,3464 45215 0
 1550 REF 1 12,3465 11000 1
 1551 12,3466 43044 0
 1552 REF 2 LAST 1191 12,3467 25515 1
 1553 REF 2 LAST 1189 12,3470 02434 0
 1554 REF 3 LAST 1192 12,3471 25515 1
 1555 12,3472 43001 1
 1556 12,3473 00001 0
 1557 REF 3 LAST 1192 12,3474 02434 0
 1558 REF 6 LAST 1189 12,3475 02710 0

SUFFCHEK DLOAD
 ABS
 TERRLAM8
 PDDL
 DMP
 TDES IRFD
 BFE17
 DAD
 DSU
 DNERIT
 BPL
 SETGO
 INITV
 SOLNSW
 360LAM8 SETPD
 INITV
 SETGO
 0
 SOLNSW
 RTNLAMB

PL AT 2D

PL AT 0D

LAMBERT CANNOT HANDLE CSTH=1

1559 12,3476 71331 0
 1560 REF 4 LAST 1190 12,3477 00051 0
 1561 12,3500 10000 0
 1562 REF 3 LAST 1191 12,3501 00011 1
 1563 12,3502 65342 1
 1564 REF 4 LAST 1192 12,3503 00017 1
 1565 12,3504 43342 0
 1566 12,3505 77626 0
 1567 REF 14 LAST 1192 12,3506 75011 0
 1568 REF 4 LAST 1191 12,3507 00015 0
 1569 12,3510 77650 1
 1570 REF 3 LAST 1192 12,3511 25337 1

NOGUESS SSP
 DLOAD
 TWEEKIT
 20000
 COGAMIN
 PDDL
 COGAMAX
 DAD
 STADR
 STORE
 STORE
 GOTO
 LAMBLOOP

PL AT 2

PL AT 0

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1574				12,3512	52145 0	LOLIM	DLOAD	GOTO		
1575	REF	1		12,3513	11004 0			COGLCLIM	COGLCLIM=-.999511597	
1576	REF	1		12,3514	25327 0			MINCOGA		
1577				12,3515	60345 0	INITV	DLOAD	NORM		
1578	REF	15	LAST	1189	12,3516	00041 1		R1		
1579	REF	52	LAST	1190	12,3517	00047 1		X1		
1580					12,3520	70525 1	PDDL	SR1		PL AT 2
1581	REF	10	LAST	1191	12,3521	02740 0		P		
1582					12,3522	77671 1	DDV			PL AT 0
1583					12,3523	75457 0	SL*	SQRT		
1584					12,3524	20175 0		0 -4,1		
1585					12,3525	72405 0	DMP	SL1		
1586	REF	3	LAST	1180	12,3526	00021 1		ROOTMU		
1587					12,3527	41206 0	PUSH	DMP	OD=VTAN (+7)	PL AT 2
1588	REF	15	LAST	1192	12,3530	02766 1		COGA		
1589					12,3531	74261 1	SL	VXSC		
1590					12,3532	20206 1		5		
1591	REF	7	LAST	1184	12,3533	02722 1		UR1		
1592					12,3534	77725 1	PDDL		XCH WITH OD	PL AT 0,6
1593					12,3535	76561 1	VXSC	VSL1		
1594	REF	5	LAST	1184	12,3536	02674 0		UN		
1595					12,3537	53235 0	VXV	VAD		PL AT 0
1596	REF	8	LAST	1193	12,3540	02722 1		UR1		
1597					12,3541	77772 0				
1599	REF	13	LAST	1182	12,3542	02744 1	VSL1	VVEC		
1600					12,3543	53135 0	SLOAD	8ZF		
1601	REF	5	LAST	698	12,3544	02702 0		VTARGETAG		
1602	REF	1			12,3545	25550 0		TARGETV		
1603					12,3546	77650 1	GOTO			
1604	REF	7	LAST	1192	12,3547	02710 0		RTNLAMB		
1605					12,3550	45145 0	TARGETV	DLOAD	CALL	
1606	REF	6	LAST	1189	12,3551	02720 0			MAGVEC2	
1607	REF	1			12,3552	24714 0			LAMENTER	
1608	REF	4	LAST	699	12,3553	02703 1		STORE	VTAPGET	
1609					12,3554	77650 1	GOTO			
1610	REF	8	LAST	1193	12,3555	02710 0			RTNLAMB	

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1611				12,3556	40220 0	TIMERAD	STQ	SFTPD		PL AT 0
1612	REF	1		12,3557	02710 0			RTNTR		
1613				12,3560	00001 0			Q		
1614				12,3561	63375 0		VLOAD	PDVL		PL AT 6
1615	REE	9	LAST 1182	12,3562	02655 0			PVEC		
1616	REF	14	LAST 1193	12,3563	02744 1			VVEC		
1617				12,3564	77624 1		CALL			
1618	REE	2	LAST 1192	12,3565	11005 1			PARAM		
1619				12,3566	71200 0		BOV	DLOAD		PL AT 0
1620	REE	2	LAST 1182	12,3567	24775 1			COGACVFL		
1621	REF	5	LAST 1191	12,3570	10764 0			D1/32		
1622				12,3571	41225 1		DSU	DMP		
1623	REE	11	LAST 1191	12,3572	02742 1			R1A		
1624	REF	11	LAST 1193	12,3573	02740 0			P		
1625				12,3574	41366 1		SQRT	DMP		
1626	RFF	16	LAST 1193	12,3575	02766 1			COGA		
1627				12,3576	74212 0		SL4	VXSC		
1628	REF	5	LAST 1184	12,3577	02712 1			J2		
1629				12,3600	45325 1		PDDL	DSU		PL AT 6
1630	REE	4	LAST 1186	12,3601	10756 1			D1/64		
1631	REF	12	LAST 1194	12,3602	02742 1			R1A		
1632				12,3603	52361 1		VXSC	VSU		PL AT 0
1633	REF	9	LAST 1193	12,3604	02722 1			UR1		
1634				12,3605	53512 1		VSL4	UNIT		
16345				12,3606	77600 1		BOV			
16346	REE	2	LAST 1189	12,3607	25472 1			36DLAMB	NO SOLUTION SINCE CONIC IS A CIRCLE	
1635				12,3610	60325 0		PDDL	NORM	OD=UNIT(ECC) (+3)	PL AT 6
1636	REE	2	LAST 140	12,3611	02756 1			RDES IRFD	36D=ECC (+3)	
1637	REF	53	LAST 1193	12,3612	00047 1			X1		
1638				12,3613	41325 0		PDDL	DMP		PL AT 8
1639	REF	16	LAST 1193	12,3614	00041 1			P1		
1640	REF	12	LAST 1194	12,3615	02740 0			P		
1641				12,3616	56257 1		SL*	DDV		PL AT 6
1642				12,3617	20201 0			D,1		
1643				12,3620	56225 1		DSU	DDV		
1644	REF	2	LAST 1187	12,3621	10762 0			D1/16		
1645				12,3622	00045 0			36D	36D=ECC (+3)	
1646	REE	1		12,3623	00031 0		STORE	COSF		
1647				12,3624	63400 0		BOV	DSQ		
1648	REE	1		12,3625	25665 0			BADR 2		
1649				12,3626	50021 1		BDSU	BMN		
1650	REE	4	LAST 1189	12,3627	10760 1			D1/4		
16505	REE	2	LAST 1194	12,3630	25665 0			BADR 2		
1651				12,3631	75366 0		SQRT	SIGN		
1652	REF	2	LAST 140	12,3632	02755 1			SGNRDOT		
16525				12,3633	77614 1		CLEAR			
1653	REF	1		12,3634	04272 1			APSF5W		
1654				12,3635	76561 1	TERMNVEC	VXSC	VSL1		
1655	REE	6	LAST 1193	12,3636	02674 0			UN		

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1656				12,3637	63235 0	VXV	POVL	VXCH WITH 0D	PL AT 0,6
1657				12,3640	00001 0		0D		
1658				12,3641	53361 0	VXSC	VAD		PL AT 0
1659	REF	2	LAST 1194	12,3642	00031 0		COSF		
1660				12,3643	41572 1	VSL1	PUSH	00=U2	PL AT 6
1661				12,3644	56241 0	DOT	DOV	LIMITS RESULT TO POSMAX OR NEGMAX	
1662	REF	10	LAST 1194	12,3645	02722 1		JR1		
16622	REF	1		12,3646	23702 0		DP1/4		
16624				12,3647	40142 1	SR1	BOV	SCALE BACK DOWN TO NORMAL	
16625				12,3650	25651 1		+1	CLEAR OVFLD IF SET	
1663	REF	10	LAST 1190	12,3651	26732 0	STOVL	CSTH	CSTH (+1)	
1664	REF	11	LAST 1195	12,3652	02722 1		JR1		
1665				12,3653	76435 1	VXV	VSL1		
1666				12,3654	72441 0	DOT	SL1		
1667	REF	7	LAST 1194	12,3655	02674 0		UN		
1668	RFF	15	LAST 1190	12,3656	16730 1	STODL	SNTH	SNTH (+1)	
1669	REF	13	LAST 1194	12,3657	02740 0		P		
1670				12,3660	77624 1	CALL			
1671	RFF	3	LAST 1191	12,3661	25000 0		GETX		
1672				12,3662	77614 1	CLRGD			
16725	RFF	4	LAST 1192	12,3663	02634 1		SOLNSW		
1673	RFF	1		12,3664	24760 0		COMMNOUT		

1674				12,3665	75345 1	BAOR2	OLOAO	SIGN	
16741	REF	3	LAST 337	12,3666	22273 1			LDDPHALF	
16742	REF	3	LAST 1195	12,3667	00031 0			COSF	
16743	REF	4	LAST 1195	12,3670	14031 0		STODL	COSF	
1675	REF	4	LAST 1171	12,3671	22275 1			KEPZERO	
16755				12,3672	77614 1		SETGO		
1676	RFF	2	LAST 1194	12,3673	04032 1			APSESX	
1677	REF	1		12,3674	25635 0			TERMNVEC	
1678				12,3675	40220 0	APSIOES	STQ	SETPO	PL AT 0
1679	RFF	1		12,3676	02710 0			RINAPSE	
1680				12,3677	00001 0			0D	
1681				12,3700	63375 0		VLOAD	PDVL	PL AT 6
1682	REF	10	LAST 1194	12,3701	02655 0			RVFC	
1683	REF	15	LAST 1194	12,3702	02744 1			VVEC	
1684				12,3703	77624 1		CALL		
1685	REF	3	LAST 1194	12,3704	11005 1			PARAM	
1686				12,3705	77600 1		BOV		PL AT 0
1687	RFF	1		12,3706	25707 0			GETECC	
1688				12,3707	42405 0	GETECC	DMP	SL4	
1689	REF	13	LAST 1194	12,3710	02742 1			RIA	
1690				12,3711	75421 1		ROSU	SORT	
1691	REF	5	LAST 1194	12,3712	10756 1			DI1/64	
1692	REF	3	LAST 645	12,3713	02752 0		STORF	ECC	
1693				12,3714	65215 1		DAD	PDDL	PL AT 2
1694	REF	1		12,3715	10752 0			DI1/8	

L CCNIC SUBROUTINES

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1695	REF	17	LAST	1194	12,3716	00041 1		R1		
1696					12,3717	72405 0		SL1		
1697	REF	14	LAST	1195	12,3720	02740 0		P		
1698					12,3721	77671 1				PL AT 0
1699					12,3722	60325 0				PL AT 2
1700	REF	14	LAST	1195	12,3723	02742 1		DDV		
1701	REF	54	LAST	1194	12,3724	00047 1		PDDL	NORM	OD=RP (+29 OR +27)
1702					12,3725	53725 1			R1A	
1703	REF	18	LAST	1196	12,3726	00041 1		PDDL	X1	
1704					12,3727	20174 1			SL*	PL AT 4
1705					12,3730	45271 1			R1	
1706					12,3731	50000 1		DDV	O -5,1	
1707	REF	1			12,3732	25736 1		BQV	DSU	PL AT 2,0
1708	REF	2	LAST	1196	12,3733	25736 1			BMN	
1709					12,3734	77650 1			INFINAPO	
1710	REF	2	LAST	1195	12,3735	02710 0		GOTO	INFINAPO	
1711					12,3736	52145 0	INFINAPO DLOAD		RTNAPSE	
1712	REF	1			12,3737	22306 1			GOTO	RETURNS WITH APOAPSIS IN MPAC, PERIAPSIS
1713	REF	3	LAST	1196	12,3740	02710 0			LDPOSMAX	
									RTNAPSE	THAT PL IS AT 0.

L CONIC SUBROUTINES

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1725 REF 3 LAST 711 11,2305

LDPOSMAX EQUALS LOOPMAX

OPPOSMAX IN LOW MEMORY.

R1727 ERASABLE ASSIGNMENTS

R1728 KEPLER SUBROUTINE

R1729 INPUT -

R1730 RRECT ERASE +5

R1731 VRECT ERASE +5

R1732 TAU. ERASE +1

R1733 XKEP ERASE +1

R1734 TC ERASE +1

R1735 XPREV ERASE +1

1736 0016

1/MU EQUALS 140

1737 0020

ROOTMU EQUALS 160

1738 0022

1/ROOTMU EQUALS 180

R1739 OUTPUT -

R1740 RCV ERASE +5

R1741 VCV ERASE +5

R1742 RC ERASE +1

R1743 XPREV ERASE +1

R1744 DEBRIS -

1745 0010

ALPHA EQUALS 80

1746 0012

XMAX EQUALS 100

1747 0014

XMIN EQUALS 120

1748 0024

X EQUALS 200

1749 0030

XI EQUALS 240

1750 0032

S(XI) EQUALS 260

1751 0034

XSQC(XI) EQUALS 280

1752 0036

T EQUALS 300

1753 0040

R1 EQUALS 320

1754 0042

KEPC1 EQUALS 340

1755 0044

KEPC2 EQUALS 360

R1756 DELX ERASE +1

R1757 DELT ERASE +1

R1758 URRECT ERASE +5

R1759 RCNCRM ERASE +1

R1760 XPREV EQUALS XKEP

R1761 LAMBERT SUBROUTINE

R1762 INPUT -

R1763 R1VEC ERASE +5

R1764 R2VEC ERASE +5

R1765 IDESIRED ERASE +1

R1766 GECSGN ERASE +0

R1767 GUESSW

0 IF COGA GUESS AVAILABLE, 1 IF NOT

L CCNIC SUBROUTINES

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R1768	COCA	ERASE	+1	INPUT ONLY IF GUESSW IS ZERO.
R1769	NCRMSW			0 IF UN TO BE COMPUTED, 1 IF UN INPUT
R1770	UN	ERASE	+5	ONLY USED IE NORMSW IS 1
R1771	VTARGET	ERASE	+0	
R1772	TWEEKIT	EQUALS	400	ONLY USED IE GUESSW IS 0

R1773	OUTPUT -			
R1774	VTARGET	ERASE	+5	AVAILABLE ONLY IF VTARGET IS ZERO.
R1775	VIVEC	EQUALS	MPAC	

R1776	DEBRIS -			
R1777	RTNLAMB	ERASE	+0	
R1778	U2	ERASE	+5	
R1779	MAGVEC2	ERASE	+1	
R1780	UR1	ERASE	+5	
R1781	R1	EQUALS	310	
R1782	UN	ERASE	+5	
R1783	SNTH	ERASE	+1	
R1784	CSTH	ERASE	+1	
R1785	1-CSTH	ERASE	+1	
R1786	CSTH-RHO	ERASE	+1	

1787		0016	COGAMAX	EQUALS 140	CLOBBERS 1/MU
1788		0010	COGAMIN	EQUALS 80	
1789		0014	DCOGA	EQUALS 120	

R1790	TWFFKIT	EQUALS	400	
R1791	P	ERASE	+1	
R1792	COCA	ERASE	+1	
R1793	R1A	ERASE	+1	
R1794	X	EQUALS	200	
R1795	XSC	EQUALS	220	
R1796	XI	EQUALS	240	
R1797	S(XI)	EQUALS	260	
R1798	XSQC(XI)	EQUALS	280	
R1799	T	EQUALS	300	
R1800	KEPC1	EQUALS	340	
R1801	KEPC2	EQUALS	360	
R1802	SLGPESW			
R1803	SCLNSW			
R1804	OTHERS -			

R1805	RVEC	EQUALS	RIVEC	
R1806	VVEC	ERASE	+5	
R1807	COCAELAG			
R1808	RVSW			
R1809	INFIFLG			
R1810	APSES			
R1811	360SW			
R1812	RIATT	EQUALS	RTNLAMB	
R1813	ECC	ERASE	+1	
R1814	RTNTR	EQUALS	RTNLAMB	

L CCNIC SUBROUTINES

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R1815 RTNAPSE EQUALS RTNLAMB

R1816 R2 EQUALS MAGVEC2

1817 0030 COSF EQUALS 240

R1818 RTNPRM ERASE +0

R1819 SGNRDCT ERASE +0

R1820 RDESIRED ERASE +1

R1821 ITERATOR SUBROUTINE

R1822 ORDERSW

1823 0016 MAX EQUALS 140

1824 0010 MIN EQUALS 80

R1825 INDEP ERASE +1

1826 0014 DELINDEP EQUALS 120

1827 0026 ITERCTR EQUALS 220

1828 0036 DEP EQUALS 300

R1829 DELDEP ERASE +1

R1830 DEPREV ERASE +1

1831 0050 TWEKIT EQUALS 400

R1832 MORE KEPLER

R1833 EPSILCNT ERASE +1

R1834 MORE LAMBERT

R1835 TERRLAMB EQUALS DELDEP

R1836 TPREV EQUALS DEPREV

R1837 EPSILCNL EQUALS EPSILONT +2 DOUBLE PRECISION WORD

L INTEGRATION INITIALIZATION

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R0006 1.0 INTRODUCTION

R0007
R0008

R0009 FROM A USER'S POINT OF VIEW, ORBITAL INTEGRATION IS ESSENTIALLY THE SAME AS THE 278 INTEGRATION
R0011 PROGRAM. THE SAME ENTRANCES TO THE PROGRAM WILL BE MAINTAINED, THE SAME STALLING ROUTINE WILL BE USED AND
R0013 OUTPUT WILL STILL BE VIA THE PUSHLIST. THE PRIMARY DIFFERENCES TO A USER INVOLVE THE ADDED CAPABILITY OF
R0015 TERMINATING INTEGRATION AT A SPECIFIC FINAL RADIUS AND THE DIFFERENCE IN STATE VECTOR SCALING INSIDE AND OUT-
R0017 SIDE THE LUNAR SPHERE OF INFLUENCE.

R0018

R0019 IN ORDER TO MAKE THE CSM(LEM)PREC AND CSM(LEM)CONIC ENTRANCES SIMILAR TO FLIGHT 278, THE INTEGRATION PROGRAM
R0021 WILL ITSELF SET THE FINAL RADIUS (RFINAL) TO 0 SO THAT REACHING THE DESIRED TIME ONLY WILL TERMINATE
R0023 INTEGRATION. THE DP REGISTER RFINAL MUST BE SET BY USERS OF INTEGRVS AND INTEGRV, AND MUST BE DONE AFTER THE
R0025 CALL TO INTSTALL.

R0026

R0027 WHEN THE LM IS ON THE LUNAR SURFACE (INDICATED BY LUNAR SURFACE FLAG SET) CALLS TO LEMCONIC, LEMPREC, AND
R0029 INTEGRV WITH VINFLAG = 0 WILL RESULT IN THE USE OF THE PLANETARY INERTIAL ORIENTATION SUBROUTINES TO PROVIDE
R0031 BOTH THE LMS POSITION AND VELOCITY IN THE REFERENCE COORDINATE SYSTEM.
R0032 THE PROGRAM WILL PROVIDE OUTPUT AS IF INTEGRATION WAS USED. THAT IS, THE PUSHLIST WILL BE SET AS NOTED BELOW AND
R0034 THE PERMANENT STATE VECTOR UPDATED WHEN SPECIFIED BY AN INTEGRV CALL.

R0035

R0036 USERS OF INTEGRVS DESIRING INTEGRATION (INTYPFLG = 0) SHOULD NOTE THAT THE OBLATENESS PERTURBATION COMPUTATION
R0038 IN LUNAR ORBIT IS TIME DEPENDENT. THEREFORE, THE USER SHOULD SUPPLY AN INITIAL STATE VECTOR VALID AT SOME REAL
R0040 TIME AND THE DESIRED TIME (TDOEC1) ALSO AT SOME REAL TIME. FOR CONIC ,,INTEGRATION,, THE USER MAY STILL USE ZERO
R0042 AS THE INITIAL TIME AND DELTA TIME AS THE DESIRED TIME.

R0043

R0044 2.0 GENERAL DESCRIPTION

R0045

R0046

R0047 THE INTEGRATION PROGRAM OPERATES AS A CLOSED INTERPRETIVE SUBROUTINE AND PERFORMS THESE FUNCTIONS---

R0049 1) INTEGRATES (PRECISION OR CONIC) EITHER CSM OR LM STATE VECTOR

R0050 2) INTEGRATES THE W-MATRIX

R0051 3) PERMANENT OR TEMPORARY UPDATE OF THE STATE VECTOR

R0052

R0053 THERE ARE SIX ENTRANCES TO THE INTEGRATION PROGRAM. FOUR OF THESE (CSMPREC, LEMPREC, CSMCONIC, LEMCONIC) SET
R0055 ALL THE FLAGS REQUIRED IN THE INTEGRATION PROGRAM ITSELF TO CAUSE THE PRECISION OR CONIC INTEGRATION (KEPLER) OF
R0057 THE LM OR CSM STATE VECTOR, AS THE NAMES SUGGEST. ONE ENTRANCE (INTEGRVS) PERMITS THE CALLING PROGRAM TO
R0059 PROVIDE A STATE VECTOR TO BE INTEGRATED. THE CALLING PROGRAM MUST SET THE FLAGS INDICATING (1) PRECISION OR
R0061 CONIC INTEGRATION, (2) IN OR OUT OF LUNAR SPHERE, (3) MIDCOURSE OR NOT, AND THE INTEGRATION PROGRAM COMPLETES
R0063 THE FLAG SETTING TO BYPASS W-MATRIX INTEGRATION. THE LAST ENTRANCE (INTEGRV, USED IN GENERAL BY THE
R0065 NAVIGATION PROGRAMS) PERMITS THE CALLER TO SET FIVE FLAGS (NOT MOONFLAG OR MIDFLAG) BUT NOT TO INPUT A STATE
R0067 VECTOR. ANY PROGRAM WHICH CALLS INTEGRVS OR INTEGRV MUST CALL INTSTALL BEFORE IT SETS THE INTEGRATION FLAGS
R0069 AND/OR STATE VECTOR.

R0070

R0071 THREE SETS OF 42 REGISTERS AND 2 FLAGS ARE USED FOR THE STATE VECTORS. TWO SETS, WHICH MAY NOT BE OVERLAYED, ARE
R0073 USED FOR THE PERMANENT STATE VECTORS FOR THE CSM AND LM. THE THIRD SET, WHICH MAY BE OVERLAYED WHEN INTEGRATION
R0075 IS NOT BEING DONE, IS USED IN THE COMPUTATIONS.

R0076

R0077 THE PERMANENT STATE VECTORS WILL BE PERIODICALLY UPDATED SO THAT THE VECTORS WILL NOT BE OLDER THAN 4 TIMESTEPS.
R0079 THE PERMANENT STATE VECTORS WILL ALSO BE UPDATED WHENEVER THE W-MATRIX IS INTEGRATED OR WHEN A CALLER OF INTEGRV
R0081 SETS STATEFLG (THE NAVIGATION PROGRAMS P20, P22.)

L INTEGRATION INITIALIZATION

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R0082 APPENDIX B OF THE USERS GUIDE LISTS THE STATE VECTOR QUANTITIES.

R0083

R0084 2.1 RESTARTS

R0085

R0086 PHASE CHANGES WILL BE MADE IN THE INTEGRATION PROGRAM ONLY FOR THE INTEGRV ENTRANCE (I.E., WHEN THE W-MATRIX IS

R0088 INTEGRATED OR PERMANENT STATE VECTOR IS UPDATED.) THE GROUP NUMBER USED WILL BE THAT FOR THE P20-25 PROGRAMS

R0090 (I.E., GROUP2) SINCE THE INTEGRV ENTRANCE WILL ONLY BE USED BY THESE PROGRAMS. IF A RESTART OCCURS DURING AN

R0092 INTEGRATION OF THE STATE VECTOR ONLY, THE RECOVERY WILL BE TO THE LAST PHASE IN THE CALLING PROGRAM. CALLING

R0094 PROGRAMS WHICH USE THE INTEGRV OR INTEGRVS ENTRANCE OF INTEGRATION SHOULD ENSURE THAT IF PHASE CHANGING IS DONE

R0096 THAT IT IS PRIOR TO SETTING THE INTEGRATION INPUTS IN THE PUSHLIST.

R0097 THIS IS BECAUSE THE PUSHLIST IS LOST DURING A RESTART.

R0098

R0099

R0100 2.2 SCALING

R0101

R0102 THE INTEGRATION ROUTINE WILL MAINTAIN THE PERMANENT MEMORY STATE VECTORS IN THE SCALING AND UNITS DEFINED IN

R0103 APPENDIX B OF THE USERS GUIDE. THE SCALING OF THE OUTPUT POSITION VECTOR DEPENDS ON THE ORIGIN OF THE COORDINATE

R0105 SYSTEM AT THE DESIRED INTEGRATION TIME. THE COORDINATE SYSTEM TRANSFORMATION WILL BE DONE AUTOMATICALLY ON

R0107 MULTIPLE TIMESTEP ENCKE INTEGRATION ONLY. THUS IT IS POSSIBLE TO HAVE OUTPUT FROM SUCCESSIVE INTEGRATIONS IN

R0109 DIFFERENT SCALING.

R0110 HOWEVER, RATT, VATT WILL ALWAYS BE SCALED THE SAME.

R0111

R0112 3.0 INPUT/OUTPUT

R0113

R0114

R0115 PROGRAM INPUTS ARE THE FLAGS DESCRIBED IN APPENDIX A AND THE PERMANENT STATE VECTOR QUANTITIES DESCRIBED IN AP-

R0117 PENDIX B OF THE USERS GUIDE, PLUS THE DESIRED TIME TO INTEGRATE TO IN TOEC1 (A PUSH LIST LOCATION).

R0119 FOR INTEGRVS, THE RCV, VCV, TET OF THE TEMPORARY STATE VECTOR MUST BE SET, PLUS MOONFLAG AND MIDFLAG

R0121

R0122 FOR SIMULATION THE FOLLOWING QUANTITIES MUST BE PRESET ---

R0123

R0124

R0125

R0126 RRECTCSM(LEM) - RECTIFIED POSITION VECTOR METERS 2²⁹ 2²⁷

R0127

R0128 VRRECTCSM(LEM) - RECTIFIED VELOCITY VECTOR M/CSEC 2⁷ 2⁵

R0129

R0130

R0131 TETCSM(LEM) - TIME STATE VECTOR IS VALID CSEC 2²⁸ 2²⁸

R0132

R0133 CUSTOMARILY 0, BUT NOTE LUNAR

R0134

R0135

R0136 DELTAVCSM(LEM) - POSITION DEVIATION METERS 2²² 18

R0137

R0138 0 IF ICCSM(LEM) = 0

R0139

R0140

R0141 NUVCSCM(LEM) - VELOCITY DEVIATION M/CSEC 2³ -1

R0142

R0143 0 IF TCCSM(LEM) = 0

L INTEGRATION INITIALIZATION

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R0144					29	27
R0145	RCVCSM(LEM)	- CONIC POSITION	METERS	2	2	
R0146		EQUALS RRECTCSM(LEM) IF				
R0147		TCCSM(LEM) = 0				
R0148					7	5
R0149	VCVCSM(LEM)	- CONIC VELOCITY	M/CSEC	2	2	
R0150		EQUALS VRECTCSM(LEM) IF				
R0151		TCCSM(LEM) = 0				
R0152					28	28
R0153	TCCSM(LEM)	- TIME SINCE RECTIFICATION	CSECS	2	2	
R0154		CUSTOMARILY 0				
R0155				1/2	17	16
R0156	XKEPCSM(LEM)	- ROOT OF KEPLERS EQUATION	M	2	2	
R0157		0 IF TCCSM(LEM) = 0				
R0158						
R0159	CMCONFLG	- PERMANENT FLAGS CORRESPONDING		0	0	
R0160	CMIDFLAG	TO MOONFLAG AND MIDFLAG		0,1	0,1	
R0161	LMCONFLG	C = CSM, L = LM		0	0	
R0162	LMIDFLAG			0,1	0,1	
R0163						
R0164	SURFLAG	- LUNAR SURFACE FLAG		0,1	0,1	
R0165						
R0166						
R0167						
R0168						
R0169						
R0170						
R0171						
R0172						
R0173						
R0174						
R0175						
R0176						
R0177	00	RATT POSITION	METERS	2	2	
R0178				7	7	
R0179	60	VATT VELOCITY	M/CSEC	2	2	
R0180				28	28	
R0181	120	TAT TIME		2	2	
R0182				29	27	
R0183	140	RATT1 POSITION	METERS	2	2	
R0184				7	5	
R0185	200	VATT1 VELOCITY	M/CSEC	2	2	
R0186				3	36	30
R0187	260	MU(P) MU	M /CS	2	2	
R0188						
R0189	X1	MUTABLE ENTRY		-2	-100	
R0190						
R0191	X2	COORDINT				
R0192	X2	COORDINATE SYSTEM ORIGIN		0	2	
R0193		(THIS, NOT MOONFLAG, SHOULD BE				

IN ADDITION, IF (L)CMIDFLAG IS SET, THE INITIAL INPUT VALUES FOR LUNAR
 SOLAR EPHEMERIDES SUBROUTINE AND PLANETARY INERTIAL ORIENTATION SUB-
 ROUTINE MUST BE PRESET.

OUTPUT

AFTER EVERY CALL TO INTEGRATION

				EARTH	MOON
				29	29
R0177	00	RATT POSITION	METERS	2	2
R0178				7	7
R0179	60	VATT VELOCITY	M/CSEC	2	2
R0180				28	28
R0181	120	TAT TIME		2	2
R0182				29	27
R0183	140	RATT1 POSITION	METERS	2	2
R0184				7	5
R0185	200	VATT1 VELOCITY	M/CSEC	2	2
R0186				3	36
R0187	260	MU(P) MU	M /CS	2	2
R0188					
R0189	X1	MUTABLE ENTRY		-2	-100
R0190					
R0191	X2	COORDINT			
R0192	X2	COORDINATE SYSTEM ORIGIN		0	2
R0193		(THIS, NOT MOONFLAG, SHOULD BE			

L INTEGRATION INITIALIZATION

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R0194      USED TO DETERMINE ORIGIN.)
R0195
R0196      IN ADDITION TO THE ABOVE, THE PERMANENT STATE VECTOR IS UPDATED WHENEVER
R0197      STATEFLG WAS SET AND WHENEVER A W-MATRIX IS TO BE INTEGRATED. THE PUSH
R0198      COUNTER IS SET TO 0 AND OVERFLOW IS CLEARED BEFORE RETURNING TO THE
R0199      CALLING PROGRAM.
R0200
R0201      4.0 CALLING SEQUENCES AND SAMPLE CODE
R0202      -----
R0203
R0204      A) PRECISION ORBITAL INTEGRATION. CSMPREC, LEMPREC ENTRANCES
R0205          L-X      STORE TIME TO 95T579LT5 T 95 PUS L9ST (T4531)
R0206          L        CALL
R0207          L+1      CSMPREC (OR LEMPREC)
R0208          L+2      RETURN
R0209      INPUT
R0210          TDEC1 (PD 32D) TIME TO INTEGRATE TO...CENTISECONDS SCALED 228
R0211      OUTPUT
R0212          THE DATA LISTED IN SECTION 3.0 PLUS
R0213          RQVV      POSITION VECTOR OF VEHICLE WITH RESPECT TO SECONDARY
R0214          BODY... METERS B-29 ONLY IF MIDELAG = DIMOELAG = 1
R0215      B) CONIC INTEGRATION. CSMCONIC, LEMCONIC ENTRANCES
R0216          L-X      STORE TIME IN PUSH LIST (TDEC1)
R0217          L        CALL
R0218          L+1      CSMCONIC (OR LEMCONIC)
R0219      INPUT/OUTPUT
R0220          SAME AS PRECISION INTEGRATION, EXCEPT RQVV NOT SET
R0221      C) INTEGRATE GIVEN STATE VECTOR. INTEGRVS ENTRANCE
R0222          CALL
R0223          INSTALL
R0224          VLOAD
R0225          POSITION VECTOR
R0226          STOVL RCV
R0227          VELOCITY VECTOR
R0228          STODL VCV
R0229          TIME STATE VECTOR VALID
R0230          STODL TET
R0231          FINAL RADIUS
R0232          STORE RFINAL
R0233          SET(CLEAR) SET(CLEAR)
R0234          INTYPFLAG
R0235          MOONFLAG
R0236          SET(CLEAR) DLOAD
R0237          DESIRED TIME
R0238          STCALL TDEC1
R0239          INTEGRVS
R0240      INPUT
R0241          RCV      POSITION VECTOR          METERS
R0242          VCV      VELOCITY VECTOR        M/CSEC
R0243          TET      TIME OF STATE VECTOR(MAY = 0) CSEC B-28

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L INTEGRATION INITIALIZATION

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R0244      TDEC1 TIME TO INTEGRATE TO      CSEC B-28 (PD 32D)
R0245      (MAY BE INCREMENT IE TET=0)
R0246      OUTPUT
R0247      SAME AS FOR PRECISION OR CONIC INTEGRATION,
R0248      DEPENDING ON INTYPFLG.
R0249      D) INTEGRATE STATE VECTOR. INTRV ENTRANCE
R0250      L-X STORE TIME IN PUSH LIST (TDEC1) (MAY BE DONE AFTER CALL TO INTSTALL)
R0252      L-8 CALL
R0253      L-7
R0254      L-6 SET(CLEAR) SET(CLEAR)
R0255      L-5 VINTELAG 1=CSM, 0=LM
R0256      L-4 INTYPFLAG 1=CONIC, 0=PRECISION
R0257      L-3 SET(CLEAR) SET(CLEAR)
R0258      L-2 DIMOFLAG 1=W-MATRIX, 0=NO W-MATRIX
R0259      L-1 D6OR9FLG 1=9X9, 0=6X6
R0260      L SET DLOAD
R0261      L+1 STATEFLG DESIRE PERMANENT UPDATE
R0262      L+2 FINAL RAD. OF STATE VECTOR
R0263      L+3 STCALL RFINAL
R0264      L+4 INTRV
R0265      L CALL NORMAL USE-- WILL UPDATE STATE
R0266      L+1 INTRV VECTOR IE DIMOFLAG=1.(STATEFLG IS
R0267      L+2 RETURN ALWAYS RESET IN INTEGRATION AFTER
R0268      IT IS USED.)
R0269      INPUT
R0270      TDEC1 (PD 32D) TIME TO INTEGRATE TO CSEC B-28
R0271      OUTPUT
R0272      SAME AS FOR PRECISION OR CONIC INTEGRATION
R0273      THE PROGRAM WILL SET MOONELAG, MIDEFLAG DEPENDING ON
R0274      THE PERMANENT STATE VECTOR REPRESENTATION.

```

02741				11,2311			BANK 11	
02742	REF	3	LAST 251	13,2000			SETLOC INITI	
02743				13,2604			BANK	
02744	REE	7	LAST 978	E3,1554			EBANK= RRECTCSM	
02745	REF	3	LAST 251 TO	254:	34	36*	COUNT* \$\$/INTIN	
0275	REE	106	LAST 1148	13,2604	0 5353	1	STATEINT TC PHASCHNG	
0276				13,2605	00052	0	OCT 00052	
0277	REF	10	LAST 785	13,2606	3 5017	1	CAE PRIQ5	
0278	REE	39	LAST 964	13,2607	0 5105	0	TC EINDVAC	
0279	REE	8	LAST 1204	E3,1554			EBANK= RRECTCSM	
0280	REF	2	LAST 255	13,2610	02613	1	2CADR STATINT1	
0280				13,2611	26063	0		
0281	REE	70	LAST 1127	13,2612	0 5261	1	TC TASKOVER	
0282	REF	222	LAST 1186	13,2613	0 6036	1	STATINT1 TC INTPRET	
0283				13,2614	47014	1	BON RTB	
02831	REE	2	LAST 313	13,2615	04712	1	QUITELAG	KILL INTEGRATION UNTIL NEXT POO.
02832	REF	1		13,2616	26653	0	NCINT	
0284	REE	28	LAST 974	13,2617	21462	1	LOADTIME	
0286	REF	55	LAST 971	13,2620	00041	1	STORE TDEC1	

L INTEGRATION INITIALIZATION

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0323				13,2621	77624 1	CALL	
0324	REF 27	LAST 1148		13,2622	27412 0		INTSTALL
0325				13,2623	45014 0	SET	CALL
03251	REF 4	LAST 251		13,2624	01076 1		NDDOFLAG
0326	RFF 7	LAST 594		13,2625	26644 0		SFTIFLGS
0327				13,2626	77650 1	GOTO	
0328	RFF 1			13,2627	26026 1		STATFUP
0356				13,2630	00003 1	600SFCS 2DEC	60000
0356				13,2631	25140 0		
0404				13,2632	77414 0	FNDINT	CLEAR
0405	REF 4	LAST 594		13,2633	01672 0		EXIT
0408	REF 107	LAST 1204		13,2634	0 5353 1	TC	STATFFLG
0409				13,2635	20032 1		PHASCHNG
0411				13,2636	0 0006 1	OCT	20032
0412	REF 2	LAST 254		13,2637	3 2631 1	EXTEND	
0413	REF 3	LAST 742		13,2640	0 5277 0	DCA	600SECS
0414	RFF 4	LAST 312		E3,1626		TC	LONGCALL
0415	REF 3	LAST 254		13,2641	02604 1	EBANK=	RRECTHIS
0415				13,2642	26063 0	2CADR	STATEINT
0416	REF 145	LAST 971		13,2643	0 5155 0		
0426				13,2644	43014 0	TC	ENDOFJ08
0427	REE 5	LAST 1205		13,2645	01472 1	SETIFLGS SET	CLEAR
0428	REF 14	LAST 791		13,2646	01673 1		STATFFLG
0429				13,2647	43014 0		INTYPFLG
0430	REF 12	LAST 594		13,2650	01676 1	CLEAR	CLEAR
04301	REF 8	LAST 594		13,2651	01675 1		DIMOFLEG
04302				13,2652	77616 0		D6DR9FLG
04303				13,2653	77776 1	RVQ	
04304	REF 108	LAST 1205		13,2654	0 5353 1	NOINT	FXIT
04305				13,2655	00002 0	TC	PHASCHNG
						OCT	00002
04306	REF 90	LAST 975		13,2656	0 5516 0	TC	DOWNFLAG
04307	REF 3	LAST 1204		13,2657	00221 0	ADRES	QUITFLAG
04308	REF 146	LAST 1205		13,2660	0 5155 0	TC	ENDOFJ08

R0431 ATOPCSM TRANSFERS RRECT TO RRECT +41 TO RRECTCSM TO RRECTCSM +41

R0432 CALLING SFQUENCE

R0433 L CALL

R0434 L+1 ATOPCSM

R0435 NORMAL EXIT AT L+2

0436				13,2661	47020 0	ATOPCSM	STQ	RT8
0437	REF 27	LAST 1185		13,2662	00051 0			S2
0438	REF 2	LAST 1152		13,2663	26674 0			MOVE ACSM
0439				13,2664	45014 0	SET		CALL
0440	REF 7	LAST 719		13,2665	04063 0			CMDONFLG
0441	REF 3	LAST 1152		13,2666	26114 1			SVDWN1
0442				13,2667	43014 0	80N		CLRGF

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0443	RFF	12	LAST	791	13,2670	00303	1		MOONFLAG	
0444	REF	28	LAST	1205	13,2671	00051	0		S2	
0445	REF	8	LAST	1205	13,2672	04223	0		CMOONFLG	
0446	REF	29	LAST	1206	13,2673	00051	0		S2	
0447	REF	1			13,2674	0 3036	1	MOVEACSM	TC	SETBANK
0448	REF	2	LAST	126	13,2675	55'500	1		TS	DIFECNT INITIALIZE INDEX
0449	REF	3	LAST	1206	13,2676	51'500	0		INDEX	OIFECNT
0450	RFF	6	LAST	1169	13,2677	3 1502	1		CA	RRECT
0451	REF	4	LAST	1206	13,2700	51'500	0		INDEX	DIFECNT
0452	REF	9	LAST	1204	13,2701	55'554	0		TS	RRECTCSM
0453	REF	5	LAST	1206	13,2702	11'500	1		CCS	OIFECNT
0454	REF	3	LAST	1205	13,2703	1 2675	0		TCF	MOVEACSM +1
0455	RFF	56	LAST	1179	13,2704	0 6060	1		TC	OANZIG

IS TRANSFER COMPLETE
NO-LOOP
COMPLETE- RETURN

R0456 PTOACSM TRANSFERS RRECTCSM TO RRECTCSM +41 TO RRECT TO RRECT +41

R0457 CALLING SEQUENCE

R0458 L CALL
R0459 PTOACSM

R0460 NORMAL EXIT AT L+2

0461					13,2705	43034	1	PTOACSM	RTB	BON
0462	REF	2	LAST	1152	13,2706	26723	0			MOVEPCSM
0463	REF	9	LAST	1206	13,2707	04303	0			CMOONFLG
0464	REF	1			13,2710	26716	0			SETMCON
0465					13,2711	66214	0	CLRMOON	CLEAR	SSP
0466	REF	13	LAST	1206	13,2712	00263	0			MOONFLAG
0467	REF	4	LAST	1151	13,2713	02031	1			PBODY
0468					13,2714	00000	1			0
0469					13,2715	77616	0		RVQ	
0470					13,2716	66214	0	SETMOON	SET	SSP
0471	REF	14	LAST	1206	13,2717	00063	1			MOONFLAG
0472	REF	5	LAST	1206	13,2720	02031	1			PBODY
0473					13,2721	00002	0			2
0474					13,2722	77616	0		RVQ	
0475	REF	2	LAST	1206	13,2723	0 3036	1	MOVEPCSM	TC	SETBANK
0476	REF	6	LAST	1206	13,2724	55'500	1		TS	DIFECNT
0477	REF	7	LAST	1206	13,2725	51'500	0		INDEX	OIFECNT
0478	REF	10	LAST	1206	13,2726	3 1554	1		CA	RRECTCSM
0479	RFF	8	LAST	1206	13,2727	51'500	0		INOEX	OIFECNT
0480	REF	7	LAST	1206	13,2730	55'502	0		TS	RRECT
0481	REF	9	LAST	1206	13,2731	11'500	1		CCS	DIFECNT
0482	REF	3	LAST	1206	13,2732	1 2724	0		TCF	MOVEPCSM +1
0483	REF	57	LAST	1206	13,2733	0 6060	1		TC	DANZIG

R0484 ATOPLEM TRANSFERS RRECT TO RRECT +41 TO RRECTLEM TO RRECTLEM +41

0485 13,2734 47020 0 ATOPLEM STQ RTB

L INTEGRATION INITIALIZATION

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0486	REE	30	LAST	1206	13,2735	00051 0		S2
0487	REE	3	LAST	1151	13,2736	26747 1		MOVEALEM
0488					13,2737	45014 0	SET	CALL
0489	REF	3	LAST	587	13,2740	04064 1		LMOONFLG
0490	REE	2	LAST	1151	13,2741	26070 1		SVDOWN2
0491					13,2742	43014 0	BON	CLRCO
0492	REF	15	LAST	1206	13,2743	00303 1		MOONELAG
0493	REE	31	LAST	1207	13,2744	00051 0		S2
0494	REF	4	LAST	1207	13,2745	04224 1		LMOONFLG
0495	REE	32	LAST	1207	13,2746	00051 0		S2
0496	REF	3	LAST	1206	13,2747	0 3036 1	MOVEALEM TC	SETBANK
0497	REF	10	LAST	1206	13,2750	55'500 1	TS	DIFEQCNT
0498	REE	11	LAST	1207	13,2751	51'500 0	INOEX	DIFEQCNT
0499	REF	8	LAST	1206	13,2752	3 1502 1	CA	RRECT
0500	REF	12	LAST	1207	13,2753	51'500 0	INDEX	DIFEQCNT
0501	REE	2	LAST	127	13,2754	55'626 0	TS	RRECTLEM
0502	REE	13	LAST	1207	13,2755	11'500 1	CCS	OIFEQCNT
0503	REF	4	LAST	1207	13,2756	1 2750 0	TCF	MOVEALEM +1
0504	REE	58	LAST	1206	13,2757	0 6060 1	TC	DANZIG

R0505 PTOALEM TFANSEERS RRECTLEM TO RRECTLEM +41 TO RRECT TO RRECT +41

0506					13,2760	47014 1	PTOALEM BON	RTB
0507	REE	15	LAST	844	13,2761	04307 1		SUREFLAG
0508	REF	1			13,2762	27001 0		USEPIOS
0509	REE	2	LAST	1151	13,2763	26770 0		MOVEPLEM
0510					13,2764	52014 0	BON	GOTO
0511	REE	5	LAST	1207	13,2765	04304 1		LMOONELG
0512	REF	2	LAST	1206	13,2766	26716 0		SETMOON
0513	REE	1			13,2767	26711 1		CLRMOON
0514	REE	4	LAST	1207	13,2770	0 3036 1	MOVEPLEM TC	SETBANK
0515	REE	14	LAST	1207	13,2771	55'500 1	TS	DIFEQCNT
0516	REE	15	LAST	1207	13,2772	51'500 0	INOEX	DIFEQCNT
0517	REE	3	LAST	1207	13,2773	3 1626 1	CA	RRECTLEM
0518	REF	16	LAST	1207	13,2774	51'500 0	INDEX	DIFEQCNT
0519	REF	9	LAST	1207	13,2775	55'502 0	TS	RRECT
0520	REF	17	LAST	1207	13,2776	11'500 1	CCS	DIFEQCNT
0521	REF	3	LAST	1207	13,2777	1 2771 0	TCF	MOVEPLEM +1
0522	REF	59	LAST	1207	13,3000	0 6060 1	TC	DANZIG

0523					13,3001	77201 1	USEPIOS SETPO	VLDAD
0524					13,3002	00001 0		0
0525	REF	12	LAST	1134	13,3003	02023 1		RLS
0526					13,3004	41525 0	PDDL	PUSH
0527	REF	56	LAST	1204	13,3005	00041 1		TDEC1
0528	REF	12	LAST	791	13,3006	15517 0	STODL	TET
0529	REE	1			13,3007	27736 0		5/8
0530					13,3010	77624 1	CALL	

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0531	REF	7	LAST	1130	13,3011	51504 1		RP-TO-R
0532	REF	15	LAST	1174	13,3012	25535 0	STOVL	RCV
0533	REF	2	LAST	36	13,3013	22267 1		ZUNIT
0534					13,3014	14001 0	STOOL	00
0535	REF	13	LAST	1207	13,3015	01517 0		TFT
0536					13,3016	14007 0	STODL	6D
0537	REF	2	LAST	1207	13,3017	27736 0		5/8
0538					13,3020	45014 0	SET	CALL
05381	REF	16	LAST	1207	13,3021	00063 1		MOONFLAG
0539	REF	8	LAST	1208	13,3022	51504 1		RP-TO-R
0540					13,3023	74235 0	VXV	VXSC
0541	REF	16	LAST	1208	13,3024	01535 0		RCV
0542	REF	1			13,3025	26001 1		OMEGMOON
0543	REF	13	LAST	1174	13,3026	25543 1	STOVL	VGV
0544	REF	8	LAST	1130	13,3027	22275 1		ZEROVEC
0545	REF	6	LAST	1151	13,3030	01521 0	STORE	TOELTAV
0546					13,3031	67174 1	AXT,2	SXA,2
0547					13,3032	00002 0		2
0548	REF	6	LAST	1206	13,3033	02030 0		PBOOY
0549	REF	6	LAST	1151	13,3034	35527 1	STCALL	TNUV
0550	REF	1			13,3035	27157 1		A-PCHK
0552	REF	1			13,3036	3 3042 1	SETBANK	INTBANK
0553	REF	37	LAST	1124	13,3037	54 006 0	TS	BBANK
0554	REF	1			13,3040	3 3457 1	CAF	FORTYONE
0555	REF	323	LAST	1126	13,3041	0 0002 0	TC	Q
0556	REF	11	LAST	1206	E3,1554		EBANK=	RRECTCSM
0557	REF	9	LAST	594	13,3042	26063 0	INTBANK	BBCON INTEGRV

NEEDED FOR SETTING X1 ON EXIT

R0558 SPECIAL PURPOSE ENTRIES TO ORBITAL INTEGRATION. THESE ROUTINES PROVIDE ENTRANCES TO INTEGRATION WITH
 R0560 APPROPRIATE SWITCHES SET OR CLEARED FOR THE DESIRED INTEGRATION.

R0561 CSMPREC AND LEMPREC PERFORM ORBIT INTEGRATION BY THE ENCKE METHOD TO THE TIME INDICATED IN IDEC1
 R0563 ACCELERATIONS DUE TO ORBITALITY ARE INCLUDED. NO W-MATRIX INT. IS DONE.
 R0564 THE PERMANENT STATE VECTOR IS NOT UPDATED.
 R0565 CSMCONIC AND LEMCONIC PERFORM ORBIT INTEG. BY KEPLER'S METHOD TO THE TIME INDICATED IN TOEC1
 R0567 NO DISTURBING ACCELERATIONS ARE INCLUDED. IN THE PROGRAM FOLLOW THE GIVEN
 R0568 STATE VECTOR IS RECTIFIED BEFORE SOLUTION OF KEPLER'S EQUATION

R0569 THE ROUTINES ASSUME THAT THE CSM (LEM) STATE VECTOR IN P-MEM IS VALID.
 R0570 SWITCHES SET PRIOR TO ENTRY TO THE MAIN INTEG. PROG ARE AS FOLLOWS
 R0571 CSMPREC CSMCONIC LEMPREC LEMCONIC
 R0572 VINTELAG SET SET CLEAR CLEAR
 R0573 INTYPFLG CLEAR SET CLEAR SET
 R0574 DIMOFLAG CLEAR CLEAR CLEAR CLEAR

R0575 CALLING SEQUENCE
 R0576 L-X STORE TOEC1
 R0577 L CALL (STCALL TOEC1)

L INTEGRATION INITIALIZATION

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R0578 L+1 CSMPREC (CSMCONIC, LEMPREC, LEMCONIC)

R0579 NORMAL EXIT TO L+2

R0580 SUBROUTINES CALLED

R0581 INTEGRV1

R0582 PRECOUT FOR CSMPREC AND LEMPREC

R0583 CONICOUT FOR CSMCONIC AND LEMCONIC

R0584 OUTPUT - SEE PAGE 2 OF THIS LOG SECTION

R0585 INPUT

R0586 TDEC1 TIME TO INTEGRATE TO . CSECS B-28

0587				13,3043	45020 1	CSMPREC	STQ	CALL
0588	REF	55	LAST	1196	13,3044	00046 0		X1
0589	REF	28	LAST	1205	13,3045	27412 0		INTSTALL
0590					13,3046	43130 1	SXA,1	SFT
0591	REE	2	LAST	130	13,3047	02102 0		IRETURN
0592	REF	17	LAST	594	13,3050	01474 1		VINTFLAG

0593					13,3051	43014 0	IFLAGP	SET	CLEAR
0594	REF	3	LAST	251	13,3052	01467 0			PRECIFLG
0595	REF	13	LAST	1205	13,3053	01676 1			DIMOF LG
0596					13,3054	77614 1		CLRG0	
05961	REF	15	LAST	1205	13,3055	01633 0			INTYPFLG
05962	REF	1			13,3056	27136 0			INTEGRV1
0597					13,3057	45020 1	LEMPREC	STQ	CALL
0598	REE	56	LAST	1209	13,3060	00046 0			X1
0599	REF	29	LAST	1209	13,3061	27412 0			INTSTALL
0600					13,3062	43130 1	SXA,1		CLRG0
0601	REE	3	LAST	1209	13,3063	02102 0			IRETURN
0602	REF	18	LAST	1209	13,3064	01634 1			VINTFLAG
0603	REF	1			13,3065	27051 0			IFLAGP

0604					13,3066	45020 1	CSMCONIC	STQ	CALL
0605	REF	57	LAST	1209	13,3067	00046 0			X1
0606	REF	30	LAST	1209	13,3070	27412 0			INTSTALL
0607					13,3071	43130 1	SXA,1		SFT
0608	REF	4	LAST	1209	13,3072	02102 0			IRETURN
0609	REF	19	LAST	1209	13,3073	01474 1			VINTFLAG
0610					13,3074	43014 0	IFLAGC	CLEAR	SETGO
0611	REF	14	LAST	1209	13,3075	01676 1			DIMOF LG
0612	REE	16	LAST	1209	13,3076	01433 1			INTYPELG
0613	REE	2	LAST	1209	13,3077	27136 0			INTEGRV1
0614					13,3100	45020 1	LEMCONIC	STQ	CALL
0615	REF	58	LAST	1209	13,3101	00046 0			X1
0616	REF	31	LAST	1209	13,3102	27412 0			INTSTALL
0617					13,3103	43130 1	SXA,1		CLRG0
0618	REF	5	LAST	1209	13,3104	02102 0			IRETURN

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0619	REF	20	LAST 1209	13,3105	01634 1		VINTFLAG
0620	REF	1		13,3106	27074 1		IFLAGC
0621				13,3107	66214 0	INTEGRVS SET	SSP
0622	REF	4	LAST 1209	13,3110	01467 0		PRECIFLG
0623	REF	7	LAST 1208	13,3111	02031 1		PBODY
0624				13,3112	00000 1		0
0625				13,3113	66214 0	BOF	SSP
0626	REF	17	LAST 1208	13,3114	00343 0		MCONFLAG
0627				13,3115	27120 1		+3
0628	REF	8	LAST 1210	13,3116	02031 1		PBODY
06281				13,3117	00002 0		2
0629				13,3120	77220 1	STQ	VLOAD
0630	REF	6	LAST 1209	13,3121	02102 0		IRETURN
0631	REF	9	LAST 1208	13,3122	22275 1		ZEROVEC
0632	REF	7	LAST 1208	13,3123	01521 0	STORE	TDELTAV
0633	REF	7	LAST 1208	13,3124	35527 1	STCALL	TNUV
0634	REF	2	LAST 1151	13,3125	23345 1		RECTIFY
0635				13,3126	43014 0	CLEAR	SET
0636	REF	15	LAST 1209	13,3127	01676 1		DIMOFLEG
0637	REF	1		13,3130	04062 1		NEWIFLG
06371				13,3131	77614 1	SETGO	
06372	REF	1		13,3132	04020 1		RPQFLAG
0638	REF	1		13,3133	27150 0		ALOADED

R0639 INTEGRV IS AN ENTRY TO ORBIT INTEGRATION WHICH PERMITS THE CALLER ,
R0640 NORMALLY THE NAVIGATION PROGRAM ,TO SET THE INTEG. FLAGS. THE ROUTINE
R0641 IS ENTERED AT INTEGRV1 BY CSMPREC ET.AL. AND AT ALOADED BY INTEGRVS.
R0642 THE ROUTINE SETS UP A-MEMORY IF ENTERED AT INTEGRV,1 AND SETS THE INTEG.
R0643 PROGRAM FOR PRECISION OR CONIC

R0644 THE CALLER MUST FIRST CALL INTSTALL TO CHECK IF INTEG. IS IN USE BEFORE
R0645 SETTING ANY FLAGS.
R0646 THE FLAGS WHICH SHOULD BE SET OR CLEARED ARE
R0647 VINTFLAG (IGNORED WHEN ENTERED FROM INTEGRVS)
R0648 INTYPLG
R0649 DIMOFLEG
R0650 D6OR9FLG
R0651 CALLING SEQUENCE
R0652 L-X CALL
R0653 L-Y INTSTALL
R0654 L-1 SET OR CLEAR ALL FOUR FLAGS. ALSO CAN SET STATEFLG IF DESIRED
R0655 AND DIMOFLEG IS CLEAR.
R0656 L CALL
R0657 L+1 INTEGRV
R0658 INITIALIZATION
R0659 FLAGS AS ABOVE
R0660 STORE TIME TO INTEGRATE TO IN TDEC1
R0661 OUTPUT
R0662 RATT AS
R0663 VATT DEFINED

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R0664 TAT BFFORE

0665				13,3134	77620 0	INTEGRV	STQ		
0666	REF	7	LAST 1210	13,3135	02102 0			IRETURN	
0667				13,3136	43014 0	INTEGRV1	SET	SET	
0668	REF	2	LAST 1210	13,3137	04060 0			RPQFLAG	
0669	REF	2	LAST 1210	13,3140	04062 1			NEWIFLG	
0670				13,3141	77731 1	INTEGRV2	SSP		
0671	REF	14	LAST 1152	13,3142	00053 1			QPRET	
0672	REF	2	LAST 1210	13,3143	27150 0			ALDADF0	
0673				13,3144	52014 0		BON	GOTO	
0674	REF	21	LAST 1210	13,3145	01714 1			VINTFLAG	
0675	RFF	1		13,3146	26705 1			PTOACSM	
0676	REF	2	LAST 312	13,3147	26760 1			PTCALEM	
0677				13,3150	77745 1	ALOADED	DLOAD		
0678	RFF	57	LAST 1207	13,3151	00041 1			TDECI	
0679	REF	2	LAST 120	13,3152	01116 0		STORE	TDEC	
0680				13,3153	52014 0		BOFF	GOTO	
0681	REF	17	LAST 1209	13,3154	01753 1			INTYPFLG	
0682	REF	1		13,3155	27255 0			TESTLOOP	
0683	REF	1		13,3156	27241 0			RVCON	
0684				13,3157	77414 0	A-PCHK	BOFCLR	EXIT	
0685	REF	6	LAST 1205	13,3160	01652 1			STATEFLG	
0686	REF	1		13,3161	27200 0			RECTOUT	
0687	REF	109	LAST 1205	13,3162	0 5353 1		TC	PHASCHNG	
0688				13,3163	04022 0		OCT	04022	
0689	RFF	64	LAST 1149	13,3164	0 5504 0		TC	UPFLAG	PHASE CHANGE HAS OCCURRED BETWEEN
0690	REF	3	LAST 1149	13,3165	00236 0		ADRFS	REINTFLG	INTSTALL AND INTWAKE
0692	REF	223	LAST 1204	13,3166	0 6036 1		TC	INTPRET	
0693				13,3167	77731 1		SSP		
0694	REF	15	LAST 1211	13,3170	00053 1			QPRET	
0695	REF	1		13,3171	27176 1			PHEXIT	
0696				13,3172	52014 0		BON	GOTO	
0697	REF	22	LAST 1211	13,3173	01714 1			VINTFLAG	
0698	REF	3	LAST 507	13,3174	26661 1			ATOPCSM	
0699	REF	2	LAST 36	13,3175	26734 0			ATOPLEM	
0700				13,3176	77624 1	PHEXIT	CALL		
0701	REF	22	LAST 1152	13,3177	11165 0			GRP2PC	
0702				13,3200	45001 1	RECTOUT	SETPD	CALL	
0703				13,3201	00001 0			0	
0704	REF	3	LAST 1210	13,3202	23345 1			RECTIFY	
0705				13,3203	53775 1		VLOAD	VSL*	
0706	REF	10	LAST 1207	13,3204	01503 0			RRECT	
0707				13,3205	57576 1			0,2	
0708				13,3206	53715 1		PDVL	VSL*	RATT TO PD0
0709	REF	7	LAST 1174	13,3207	01511 0			VRECT	
0710				13,3210	57576 1			0,2	
0711				13,3211	63325 0		PDDL	PDVL	VATT TO PD6 TAT TO PD12
0712	RFF	14	LAST 1208	13,3212	01517 0			TET	

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0713	REF	11	LAST 1211	13,3213	01503 0		RFECT	
0714				13,3214	64715 0	PDVL	PDDL*	
0715	REF	8	LAST 1211	13,3215	01511 0		VRECT	
0716	REF	2	LAST 696	13,3216	51770 0		MUEAPTH,2	
0717				13,3217	76006 0	PUSH	AXT,1	
0718				13,3220	77765 0	DEC	-10	
0719				13,3221	76014 0	BON	AXT,1	
0720	REF	18	LAST 1210	13,3222	00303 1		MOONFLAG	
0721				13,3223	27225 1		+2	
0722				13,3224	77775 1	DEC	-2	
0723				13,3225	40001 1	INTEXT	SETPD	
0724				13,3226	00001 0		BOV	
0725				13,3227	27230 0		0	
07251				13,3230	43014 0		+1	
07252	REF	2	LAST 334	13,3231	04676 1	CLEAR	CLEAR	
07253	REF	5	LAST 1210	13,3232	01667 1		AVEMIDSW	ALLOW UPDATE OF DOWNLINK STATE VECTOR
0726				13,3233	77535 1		PRECIFLG	
0727	REF	8	LAST 1211	13,3234	02103 1	SLOAD	EXIT	
0728	REF	712	LAST 1191	13,3235	3 0154 1		IRETURN	
0729	REF	54	LAST 1179	13,3236	50 120 1	CA	MPAC	
0730	REF	16	LAST 1211	13,3237	54 052 1	INDEX	FIXLOC	
0731	REF	4	LAST 1152	13,3240	0 3427 0	TS	QPRET	
R0732	RVCON					TC	INTWAKE	
R0733								
0734				13,3241	45345 1	RVCON	DSU	
0735	REF	3	LAST 1211	13,3242	01116 0	DLOAD	IDEC	
0736	REF	15	LAST 1211	13,3243	01517 0		TET	
0737	REF	12	LAST 1173	13,3244	36074 1	STCALL	TAU.	
0738	REF	4	LAST 1211	13,3245	23345 1		RECTIFY	
0739				13,3246	77624 1	CALL		
0740	REF	1		13,3247	22311 1		KFPPREP	
0741				13,3250	43345 1	DLOAD	DAD	
0742	REF	8	LAST 1174	13,3251	01551 1		TC	
0743	REF	16	LAST 1212	13,3252	01517 0		TET	
0744	REF	17	LAST 1212	13,3253	35517 1	STCALL	TET	
0745	REF	2	LAST 1211	13,3254	27200 0		RECTOUT	

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P07455	TESTLOOP						
0746				13,3255	43014 0	TESTLOOP BOF	CLRGD
07462	REF	4	LAST 1205	13,3256	04752 0		QUITFLAG
07463				13,3257	27262 1		+3
07464	REF	7	LAST 1211	13,3260	01632 1		STATEFLG
07465	REF	1		13,3261	27225 1		INTFXIT
07466				13,3262	73001 1	+3	STOP INTEGRATION
0747				13,3263	00013 0	SETPD	LXA,2
0748	REF	9	LAST 1210	13,3264	02030 0		100
0749				13,3265	51575 1	VLOAD	PRODY
0750	REF	17	LAST 1208	13,3266	01535 0		ABVAL
0751				13,3267	43006 0		RCV
0752	REF	1		13,3270	00262 1	PUSH	CLEAR
0753				13,3271	50023 0		RC TO 100
0754	REF	1		13,3272	55467 1	DSU*	MIDFLAG
0755				13,3273	27276 1		BMN
0756				13,3274	77614 1		MIDFLAG=0 IF P G.T. RMP
0757	REF	2	LAST 1213	13,3275	00062 0	SET	+3
0758				13,3276	41345 0		
0759				13,3277	00013 0	NORFINAL DLOAD	MIDFLAG
0760				13,3300	00043 0		DMP
0761				13,3301	55762 1	SR1R	100
0762	REF	3	LAST 1212	13,3302	51770 0		340
0763				13,3303	41366 1	SQRT	DDV*
0764	REF	1		13,3304	23676 1		MUEARTH,2
0765				13,3305	40442 1	SR3	DMP
0766				13,3306	54345 1	DLOAD	.30
0767	REF	713	LAST 1212	13,3307	00155 0		DT IS TRUNCATED TO A MULTIPLE
0768				13,3310	20220 0		MPAC
0769				13,3311	40006 0		150
0770	REF	1		13,3312	27337 0	PUSH	OF 128 CSECS.
0771				13,3313	50021 1		BOV
0772	REF	1		13,3314	27411 0	BDSU	MAXDT
0773	REF	2	LAST 1213	13,3315	27337 0		BMN
0774				13,3316	45345 1	DT/2COMP DLOAD	DT/2 MAX
0775	REF	4	LAST 1212	13,3317	01116 0		MAXDT
0776	REF	18	LAST 1212	13,3320	01517 0		DSJ
0777				13,3321	54234 0	RTB	TDFC
0778	REF	6	LAST 943	13,3322	21516 0		TET
0779				13,3323	20211 1		SL
0780	REF	2	LAST 130	13,3324	02076 1	STORE	SGNAGREF
0781				13,3325	51400 1	BOV	80
0782	REF	1		13,3326	27343 0		DT/2
0783				13,3327	50025 0		B-19
0784				13,3330	00015 0		ABS
0785	REF	1		13,3331	27347 1		GETMAXDT
0786				13,3332	75345 1	DSU	BMN
0787				13,3333	00015 0		IS TIME TO INTEG. TO GR THAN MAXTIME
0788	REF	3	LAST 1213	13,3334	02076 1	USEMAXDT DLOAD	120
							POOHCHK
							SIGN
							120
							DT/2

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0789	REF	4	LAST	1213	13,3335	36076 0	STCALL	DT/2		
0790	REF	2	LAST	1213	13,3336	27347 1		POOHCHK		
0791					13,3337	65345 0	MAXDT	DLOAD	PDDL	EXCHANGE DT/2MAX WITH COMPUTED MAX.
0792	REF	2	LAST	1213	13,3340	27411 0			OT/2MAX	
0793					13,3341	77650 1		GOTO		
0794	REF	1			13,3342	27316 0			DT/2COMP	
0795					13,3343	77634 0	GETMAXOT	RTB		
0796	REF	13	LAST	375	13,3344	21664 0			SIGNMPAC	
0797	REF	5	LAST	1214	13,3345	36076 0		STCALL	OT/2	
0798	REF	1			13,3346	27332 0			USEMAXOT	
0799					13,3347	51545 1	POOHCHK	OLOAO	A8S	
0800	REF	6	LAST	1214	13,3350	02076 1			OT/2	
0801					13,3351	50025 0		OSU	8MN	
0802	REF	1			13,3352	27407 1			DT/2MIN	
0803	REF	2	LAST	1208	13,3353	27157 1			A-PCHK	
0804					13,3354	46135 1		SLOAD	BHIZ	
0805	REF	16	LAST	837	13,3355	01012 0			MOORFG	
0806					13,3356	27361 0			+3	
0807					13,3357	77650 1		GOTO		
0808	REF	1			13,3360	23156 1			TIMESTEP	
08081					13,3361	77614 1	BON			WAS THIS CALL VIA CSM(LEM)PREC
08082	REF	6	LAST	1212	13,3362	01707 0			PRECIFLG	
08083	REF	2	LAST	1214	13,3363	23156 1			TIMFSTEP	YES
0809					13,3364	45345 1		DLOAD	DSU	
0810	REF	7	LAST	1214	13,3365	02076 1			OT/2	
0811					13,3366	00015 0			120	
0812					13,3367	43040 1		BMN	BOFCLR	
0813	REF	3	LAST	1214	13,3370	27157 1			A-PCHK	
0814	REF	3	LAST	1211	13,3371	04242 1			NEWIFLG	
0815	REF	3	LAST	1214	13,3372	23156 1			TIMFSTEP	
0816					13,3373	45345 1		DLOAD	DSU	
0817	REF	5	LAST	1213	13,3374	01116 0			TOEC	
0818	REF	19	LAST	1213	13,3375	01517 0			TET	
08181					13,3376	77640 0		8MN		NO BACKWARD INTEGRATION
08182	REF	2	LAST	1213	13,3377	27225 1			INTEXIT	
0819					13,3400	40525 1		PDDL	SR4	
0820	REF	8	LAST	1214	13,3401	02076 1			DT/2	IS 4(OT) LS(TDEC - TET)
0821					13,3402	44322 1		SR2R	80SU	NO
0822					13,3403	52040 1		BMN	GOTO	
0823	REF	3	LAST	1214	13,3404	27225 1			INTEXIT	
0824	REF	4	LAST	1214	13,3405	23156 1			TIMFSTEP	
0825					13,3406	00000 1	DT/2MIN	20EC	3 B-20	
0825					13,3407	01400 1				
0826					13,3410	14152 1	OT/2MAX	20EC	4000 E2 8-20	
0826					13,3411	00000 1				
0828					13,3412	77776 1	INTSTALL	EXIT		
0829	REF	221	LAST	1148	13,3413	3 4755 1		CAF	ZERO	
0830	REF	211	LAST	1123	13,3414	54 001 1	ALLSTALL	TS	L	
0831	REF	1			13,3415	3 0106 0		CA	PASFLAG	
0832	REF	212	LAST	1214	13,3416	50 001 0		INOEX	L	

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0833	REF	1		13,3417	7 3510 1		MASK	INT8ITAB	IS THIS STALL AREA FREE
0834				13,3420	0 0006 1		EXTEND		
0835	REF	1		13,3421	1 3466 1		BZF	OKTOGRAB	YES
0836	REF	213	LAST 1214	13,3422	50 001 0		INDEX	L	
0837	REF	1		13,3423	3 3505 1		CAF	WAKESTAL	
0838	REF	4	LAST 477	13,3424	0 5133 0		TC	JOBSLEEP	
0839				13,3425	77776 1	INTWAKFO	FXIT		
08395	REF	2	LAST 719	13,3426	1 3447 1		TCF	INTWAKE1	
0840	REF	2	LAST 1214	13,3427	4 0106 1	INTWAKE	CS	RASFLAG	IS THIS INSTALLED ROUTINE TO BE
0841	REF	1		13,3430	7 4745 1		MASK	RFINT8IT	RESTARTED
0842	REF	381	LAST 1126	13,3431	10 000 0		CCS	A	
0843	REF	3	LAST 1215	13,3432	0 3447 0		TC	INTWAKF1	NO
0844	REF	55	LAST 1212	13,3433	50 120 1		INDEX	FIXLOC	
0845	RFF	17	LAST 1212	13,3434	3 0052 0		CA	QPRET	
0848	RFF	5	LAST 897	13,3435	55 055 1		TS	TBASE2	YES, DONT RESTART WITH SOMEONE ELSE'S Q
0849	RFF	110	LAST 1211	13,3436	0 5353 1		TC	PHASCHNG	
0850				13,3437	04022 0		OCT	04022	
0851	REF	6	LAST 1215	13,3440	3 1055 0		CA	TBASE2	
0852	REF	56	LAST 1215	13,3441	50 120 1		INDEX	FIXLOC	
0853	REF	18	LAST 1215	13,3442	54 052 1		TS	QPRET	
0854	REF	2	LAST 1215	13,3443	3 4745 0		CAF	REINTBIT	
0855	REF	3	LAST 1215	13,3444	7 0106 1		MASK	RASFLAG	
0856				13,3445	0 0006 1		EXTEND		
0857	REF	1		13,3446	1 3471 1		BZF	GOBAC	DONT INTWAKE IF WE CAME HERE VIA RESTART
0858	REF	222	LAST 1214	13,3447	3 4755 1	INTWAKE1	CAF	ZERO	
0859	REF	1		13,3450	54 154 0	WAKE	TS	STALTEM	INDEX OF ANY STALL USER
0860	REF	2	LAST 1215	13,3451	50 154 1	WAKE1	INDEX	STALTFM	
0861	RFF	2	LAST 1215	13,3452	3 3505 1		CAF	WAKESTAL	
0862				13,3453	0 0004 0		INHINT		
0863	REF	5	LAST 478	13,3454	0 5137 1		TC	JOBWAKE	
0864	REF	22	LAST 1106	13,3455	10 064 1		CCS	LOCCTR	
0865	RFF	1		13,3456	1 3451 0		TCF	WAKF1	MAY BE MORE TO WAKE UP
0866				13,3457	00051 0	FORTYONE	DEC	41	
0867	RFF	3	LAST 1215	13,3460	50 154 1		INDEX	STALTFM	
0868	RFF	2	LAST 1215	13,3461	4 3510 1		CS	INT8ITAB	
0869	REF	4	LAST 1215	13,3462	7 0106 1		MASK	RASFLAG	
0870	REF	5	LAST 1215	13,3463	54 106 1		TS	RASFLAG	RELEASE STALL AREA
0871				13,3464	0 0003 1		RELINT		
0872	RFF	2	LAST 1215	13,3465	1 3471 1		TCE	GOBAC	
0873	REF	214	LAST 1215	13,3466	50 001 0	OKTOGRAB	INDEX	L	NO, WAIT UNTIL AVAILABLE
0874	REF	2	LAST 231	13,3467	3 4736 1		CAF	INTFLBIT	
0875	REF	6	LAST 1215	13,3470	26 106 1		ADS	RASFLAG	
0876	REF	224	LAST 1211	13,3471	0 6036 1	GOBAC	TC	INTPRFT	
0877				13,3472	77616 0		RVQ		

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0878				13,3473	77776	1	ERASTAL1	EXIT	
0879	RFF	126	LAST	1179	13,3474	3 4753	1	CAF	ONE
0880	REF	1			13,3475	1 3414	1	TCF	ALLSTALL
0881					13,3476	77776	1	ERASTAL2	EXIT
0882	REF	78	LAST	1126	13,3477	3 4752	0	CAF	TWO
0883	REF	2	LAST	1216	13,3500	1 3414	1	TCF	ALLSTALL
0884	REF	127	LAST	1216	13,3501	3 4753	1	ERASWAK1	CAF
0885	RFF	1			13,3502	1 3450	1	TCF	WAKF
0886	REF	79	LAST	1216	13,3503	3 4752	0	ERASWAK2	CAF
0887	REF	2	LAST	1216	13,3504	1 3450	1	TCF	WAKE
0888	REF	32	LAST	1209	13,3505	27413	1	WAKESTAL	CADR
0889	REF	1			13,3506	27474	0	CADR	INTSTALL +1
0890	REF	1			13,3507	27477	0	CADR	ERASTAL1 +1
0891	REF	714	LAST	1213	0154			STALTEM	ERASTAL2 +1
0892					13,3510	20100	1	EQUALS	MPAC
0893					13,3511	10040	1	INTBITAB	OCT
0894					13,3512	04020	1	OCT	20100
								OCT	10040
								OCT	04020

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P0895 AVETOMID

R0896 THIS ROUTINE PERFORMS THE TRANSITION FROM A THRUSTING PHASE TO THE COAST
 R0897 PHASE BY INITIALIZING THIS VEHICLES PERMANENT STATE VECTOR WITH THE
 R0898 VALUES LEFT BY THE AVERAGE ROUTINE IN RN,VN,PIPTIME.

R0899 BEFORE THIS IS DONE THE W-MATRIX, IF ITS VALID (ORWFLAG OR RENDWFLG IS
 R0900 SET) IS INTEGRATED FORWARD TO PIPTIME WITH THE PRE-THRUST STATE VECTOR.

R0901 IN ADDITION, THE OTHER VEHICLE IS INTEGRATED (PERMANENT) TO PIPTIME.

R0902 FINALLY TRKMKCNT IS ZEROED

0903 REF 4 LAST 1204 13,2000 SETLOC INTINIT
 0904 13,3513 BANK

0905 REF 4 LAST 1204 TO 1217: 455 491* COUNT* \$\$/INTIN
 0906 13,3513 43020 1 AVETOMID STQ BON

0907 REF 6 LAST 1152 13,3514 02772 1 EGRESS

0908 REF 11 LAST 844 13,3515 02716 0 RENDWFLG

0909 REF 1 13,3516 27562 0 INT/W

W-MATRIX VALID ,GO INTEGRATE IT

0910 13,3517 77614 1 BON

0911 REF 1 13,3520 01711 1 ORBWFLAG

0912 REF 2 LAST 1217 13,3521 27562 0 INT/W

W-MATRIX VALID ,GO INTEGRATE IT

0913 13,3522 45145 0 OTHERS DLOAD CALL

GET SET FOR OTHER VEHICLE INTEGRATION
 DESIRED TIME

0914 REF 19 LAST 900 13,3523 01235 1 PIPTIME

0915 REF 33 LAST 1216 13,3524 27412 0 INSTALL

0916 13,3525 45014 0 SET CALL

0917 REF 23 LAST 1211 13,3526 01474 1 VINIFLAG

CM
 SETS UP NONE W-MAT. PERMANENT INTEG.

0918 REF 8 LAST 1205 13,3527 26644 0 SETIFLGS

0923 REF 58 LAST 1211 13,3530 34041 0 STCALL

0924 REF 10 LAST 1208 13,3531 27134 1 TDEC1

INTEGRV

0925 13,3532 45174 1 AXT,2 CALL

NOW MOVE PROPERLY SCALE RN,UN AS WELL AS
 PIPTIME TO INTEGRATION ERASABLES.

0926 13,3533 00002 0 2

0927 RFF 34 LAST 1217 13,3534 27412 0 INSTALL

0928 13,3535 77014 1 BON AXT,2

0929 REF 6 LAST 1151 13,3536 04304 1 MOONTHIS

0930 13,3537 27541 1 +2

0931 13,3540 00000 1 0

0932 13,3541 53775 1 VLOAD VSR*

0933 REF 13 LAST 882 13,3542 01221 1 RN

0934 13,3543 57176 0 0,2

0935 REF 12 LAST 1212 13,3544 01503 0 STORE RRECT

0936 REF 18 LAST 1213 13,3545 15535 0 STOOL RCV

0937 REF 20 LAST 1217 13,3546 01235 1 PIPTIME

0938 REF 20 LAST 1214 13,3547 25517 0 STOVL TET

0939 RFF 10 LAST 882 13,3550 01227 1 VN

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0940			13,3551	45057 1	VSR*	CALL	
0941			13,3552	57176 0		0,2	
0942	REF	3	LAST 718	13,3553	23361 1	MINIRECT	FINISH SETTING UP STATE VECTOR
0943				13,3554	66234 1	RTB	SSP
0944	REF	1		13,3555	26747 1		MOVATHIS
0945	REF	11	LAST 839	13,3556	03461 1		PUT TEMP STATE VECTOR INTO PERMANENT
0946				13,3557	00000 1		IRKMKCNT
0947				13,3560	77650 1	GOTO	0
0948	REF	2	LAST 1152	13,3561	47130 0		FAZAB5
0949				13,3562	45145 0	INT/W	DLOAD
0950	REF	21	LAST 1217	13,3563	01235 1		CALL
0951	REF	35	LAST 1217	13,3564	27412 0		PIPTIME
0952				13,3565	43014 0		INTEGRATE W THRU BURN
0953	REF	16	LAST 1210	13,3566	01476 0	SET	INSTALL
0954	REF	3	LAST 1212	13,3567	04476 0		SFT
0955				13,3570	43014 0		DIMOFLEG
0956	REF	9	LAST 1205	13,3571	01475 0	SET	DO W-MATRIX
0957	REF	24	LAST 1217	13,3572	01674 0		SO WONT CLOBBER RN,VN,PIPTIME
0964	REF	59	LAST 1217	13,3573	34041 0	SET	AVEMIDSW
0965	REF	11	LAST 1217	13,3574	27134 1	STCALL	CLEAR
0966				13,3575	77650 1		D6OR9FLG
0967	REF	1		13,3576	27522 1	GOTO	9X9 FOR LM
							LM
							VINTFLAG
							TDEC1
							INTEGRV
							OTHERS
							NOW GO DO THE OTHER VEHICLE

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P0968 MIDTOAV1

R0969 THIS ROUTINE INTEGRATES (PRECISION) TO THE TIME SPECIFIED IN TDEC1.
 R0970 IF, AT THE END OF AN INTEGRATION TIME STEP, CURRENT TIME PLUS A DELTA
 R0971 TIME (SEE TIMEDELT.....BASED ON THE COMPUTATION TIME FOR ONE TIME STEP)
 R0972 IS GREATER THAN THE DESIRED TIME, ALARM 1703 IS SET AND THE INTEGRATION
 R0973 IS DONE TO THE CURRENT TIME.
 R0974 RETURN IS IN BASIC TO THE RETURN ADDRESS PLUS ONE.

R0975 IF THE INTEGRATION IS FINISHED TO THE DESIRED TIME, RETURN IS IN BASIC
 R0976 TO THE RETURN ADDRESS

R0977 IN EITHER CASE, BEFORE RETURNING, THE EXTRAPOLATED STATE VECTOR IS TRAN
 R0978 FFERRED FROM R,VATT TO R,VN1-PIPTIME1 IS SET TO THE FINISHING INTEGRA-
 R0979 TION TIME AND MPAC IS SET TO THE DELTA TIME---
 R0980 TAT MINUS CURRENT TIME.

R0981 MIDTOAV2

R0982 THIS ROUTINE INTEGRATES THIS VEHICLES STATE VECTOR TO THE CURRENT TIME.
 R0983 NO INPUTS ARE REQUIRED OF THE CALLER. RETURN IS IN BASIC TO THE RETURN
 R0984 ADDRESS WITH THE ABOVE TRANSFERS TO R,VN1-PIPTIME1-AND MPAC DONE

0985	REF	2	LAST	167	E7,1743			EBANK=	IRETURN1	
0986					13,3577	43020	1	MIDTOAV2	STQ	CLRGD
0987	REF	3	LAST	1219	13,3600	03743	1			IRETURN1
0988	REF	1			13,3601	04634	1			MIDIFLAG
0989	REF	1			13,3602	27616	0			ENTMID2
0990					13,3603	43020	1	MIDTOAV1	STQ	SET
0991	REF	4	LAST	1219	13,3604	03743	1			IRETURN1
0992	REF	2	LAST	1219	13,3605	04474	1			MIDIFLAG
0993					13,3606	43234	0		RTB	DAO
0994	REF	29	LAST	1204	13,3607	21462	1			LOADTIME
0995	REF	1			13,3610	27720	1			TIMEDELT
0996					13,3611	51021	0		BDSU	BPL
0997	REF	60	LAST	1218	13,3612	00041	1			TDEC1
0998	REF	1			13,3613	27622	1			ENTMID1
0999					13,3614	77624	1		CALL	Y55
1000	REF	1			13,3615	27706	0			NOTIME
										NO, SET ALARM, SWITCH TO MIDTOAV2
1001					13,3616	43234	0	ENTMID2	RTB	OAD
1002	REF	30	LAST	1219	13,3617	21462	1			LOADTIME
1003	REF	2	LAST	1219	13,3620	27720	1			TIMEDELT
1004	REF	61	LAST	1219	13,3621	00041	1		STORE	TDEC1
1005					13,3622	77624	1	ENTMID1	CALL	
1006	REF	36	LAST	1218	13,3623	27412	0			INTSTALL
1007					13,3624	45014	0		CLEAR	CALL

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1008	RFF	17	LAST	1218	13,3625	01676 1		DIMOF	NO W-MATRIX
1009	REF	1			13,3626	26066 0		THISVINT	
1010					13,3627	43014 0	CLEAR	SET	
1011	REF	18	LAST	1211	13,3630	01673 1		INTYPFLG	
1012	REF	1			13,3631	04475 0		MIOAVFLG	LET INTEG. KNOW THE CALL IS FOR MIDTOAV.
1013					13,3632	77624 1	CALL		
1014	REF	12	LAST	1218	13,3633	27134 1		INTEGRV	GO INTEGRATE
1015					13,3634	77214 0	CLEAR	VLOAO	
1016	REF	2	LAST	1220	13,3635	04675 1		MIOAVFLG	
1017	REF	37	LAST	971	13,3636	00001 0		RATT	
1018	REF	9	LAST	882	13,3637	27543 0	STOVL	RNI	
1019	REF	25	LAST	952	13,3640	00007 0		VATT	
1020	REF	8	LAST	882	13,3641	17551 0	STOVL	VNI	
1021	REF	15	LAST	790	13,3642	00015 0		TAT	
1022	REF	13	LAST	893	13,3643	03557 0	STORE	PIPTIME1	
10221					13,3644	66134 1	SXA,2	SXA,1	
10222	REF	17	LAST	881	13,3645	03376 0		RTX2	
10223	REF	12	LAST	773	13,3646	03375 0		RTX1	
1023					13,3647	77776 1	EXIT		
1024					13,3650	0 0004 0	INHINT		
1025					13,3651	0 0006 1	EXTEND		
1026	REF	29	LAST	986	13,3652	4 0025 1	DCS	TIME2	
1027	REF	715	LAST	1216	13,3653	20 155 1	DAS	MPAC	
1028	REF	14	LAST	1052	13,3654	0 7256 1	TC	TPAGREF	
1029	REF	5	LAST	1219	13,3655	3 1743 0	CA	IRETURN1	
1030	REF	17	LAST	896	13,3656	0 4640 1	TC	BANK JUMP	
1031					13,3657	47014 1	CKMID2	RT8	
1032	REF	3	LAST	1219	13,3660	04754 0		MIDFLAG	
1033	REF	1			13,3661	27676 0		MID2	
1034	REF	31	LAST	1219	13,3662	21462 1		LOADTIME	
1035					13,3663	44215 1	DAD	BDSU	
1036	REF	3	LAST	1219	13,3664	27720 1		TIMEDELT	
1037	REF	6	LAST	1214	13,3665	01116 0		TOEC	
1038					13,3666	45044 0	BPL	CALL	
1039	REF	2	LAST	1211	13,3667	27255 0		TESTLOOP	YES
1040	RFF	2	LAST	1219	13,3670	27706 0		NOTIME	
1041					13,3671	43234 0	TIMEINC	RTB	
1042	REF	32	LAST	1220	13,3672	21462 1		OAO	
1043	REF	4	LAST	1220	13,3673	27720 1		LOAO TIME	
1044	RFF	7	LAST	1220	13,3674	35116 1		TIMEDELT	
1045	REF	3	LAST	1220	13,3675	27255 0	STCALL	TOEC	
								TESTLOOP	
1046					13,3676	45345 1	MID2	OLOAD	
1047	REF	8	LAST	1220	13,3677	01116 0		OSU	
1048	REF	21	LAST	1217	13,3700	01517 0		TOEC	
1049					13,3701	45246 0		TET	
1050	REF	1			13,3702	27716 1	ABS	OSU	
								3CSECS	

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1051				13,3703	52040	1		BMN	GOTO	
1052	REF	4	LAST 1214	13,3704	27157	1			A-PCHK	
1053	REF	1		13,3705	27671	1			TIME INC	
1054				13,3706	77414	0	NOTIME	CLEAR	EXIT	TOO LATE
1055	REE	4	LAST 1220	13,3707	04674	0			MIDIFLAG	
1056	REF	6	LAST 1220	13,3710	251743	0		INCR	IRETURN1	SET ERROR EXIT (CALLOC +2)
1057	REE	40	LAST 978	13,3711	0 5567	0		TC	ALARM	INSUFFICIENT TIME FOR INTEGRATION --
1058				13,3712	01703	1		OCT	1703	TIG WILL BE SLIPPED...
1059	REF	225	LAST 1215	13,3713	0 6036	1		TC	INTPRET	
1060				13,3714	77616	0		RVQ		
1061				13,3715	00000	1	3CSECS	2DEC	3	
1061				13,3716	00003	1				
1062				13,3717	00000	1	TIMEDEL	2DEC	1000	
1062				13,3720	01750	1				
1063				27,3332				BANK	27	
1064	REF	1		04,2000				SETLOC	UPDATE2	
1065				04,3106				BANK		
1066	REF	1		1167				EBANK=	INTWAKUQ	
1067	REE	1						COUNT*	\$/INTIN	
1068	REF	1		1167			INTWAKUQ =	INTWAKIQ		TEMPORARY UNTIL NAME OF INTWAKIQ IS CHNG
1069				04,3106	0 0003	1	INTWAKEU	RELINT		
1070				04,3107	0 0006	1		EXTEND		
1071	REF	2	LAST 1221	04,3110	23167	0		QXCH	INTWAKUQ	SAVE Q FOR RETURN
1072	REF	226	LAST 1221	04,3111	0 6036	1		TC	INTPRET	
1073				04,3112	53135	0		SLOAD	BZE	IS THIS A CSM/LEM STATE VECTOR UPDATE
1074	REE	3	LAST 227	04,3113	01502	1			UPSVFLAG	REQUEST. IE NOT GO TO INTWAKUP.
1075	REF	1		04,3114	11153	0			INTWAKUP	
1076				04,3115	77775	1		VLOAD		MOVE RRECT(6) AND VRECT(6) INTO
1077	REF	13	LAST 1217	04,3116	01503	0			RRECT	RCV(6) AND VCV(6) RESPECTIVELY.
1078	REF	19	LAST 1217	04,3117	25535	0		STOVL	RCV	
1079	REE	9	LAST 1212	04,3120	01511	0			VRECT	NOW GO TO 'RECTIEY +13D' TO
1080				04,3121	77624	1		CALL		STORE VRECT INTO VCV AND ZERO OUT
1081	REF	5	LAST 1212	04,3122	23362	1			RECTIEY +13D	TDLTAV(6),TNUV(6),TC(2) AND XKFP(2)
1082				04,3123	51535	0		SLOAD	ABS	COMPARE ABSOLUTE VALUE OF 'UPSVFLAG'
1083	REF	4	LAST 1221	04,3124	01502	1			UPSVFLAG	TO 'UPDATE MOON STATE VECTOR CODE'
1084				04,3125	53025	0		DSU	BZE	TO DETERMINE WHETHER THE STATE VECTOR TO
1085	REE	1		04,3126	11164	1			UPMNSVCD	BE UPDATED IS IN THE EARTH OR LUNAR
1086	REE	1		04,3127	11134	1			INTWAKEM	SPHERE OF INFLUENCE.....
1087				04,3130	43174	1		AXT,2	CLRGD	EARTH SPHERE OF INFLUENCE.
1088				04,3131	00000	1		DEC	0	
1089	REF	19	LAST 1212	04,3132	00223	1			MOONFLAG	

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1090	REF	1		04,3133	11137 1		INTWAKFC		
1091				04,3134	43174 1	INTWAKEM	AXT,2	SET	LUNAR SPHERE OF INFLUENCE.
1092				04,3135	00002 0		DEC	2	
1093	REF	20	LAST 1221	04,3136	00063 1			MOONFLAG	
1094				04,3137	50135 0	INTWAKEC	SLOAD	BMN	COMMON CODING AFTER X2 INITIALIZED AND
A1095									MOONFLAG SET (OR CLEARED).
1096	REF	5	LAST 1221	04,3140	01502 1			UPSVFLAG	IS THIS A REQUEST FOR A LEM OR CSM
1097	REF	1		04,3141	11147 0			INTWAKLM	STATE VECTOR UPDATE.....
1098				04,3142	77624 1		CALL		UPDATE CSM STATE VECTOR
1099	REF	4	LAST 1211	04,3143	26661 1			ATDPCSM	
1100				04,3144	52014 0		CLEAR	GOTO	
1101	REF	2	LAST 1217	04,3145	01671 0			ORBWFLAG	
1102	REF	1		04,3146	11151 1			INTWAKEX	
1103				04,3147	77624 1	INTWAKLM	CALL		UPDATE LM STATE VECTOR
1104	REF	3	LAST 1211	04,3150	26734 0			ATOPLEM	
1105				04,3151	77614 1	INTWAKEX	CLEAR		
1106	REF	12	LAST 1217	04,3152	02676 1			RENDWFLG	
1107				04,3153	45131 0	INTWAKUP	SSP	CALL	REMOVE :UPDATE STATE VECTOR INDICATOR:
1108	REF	6	LAST 1222	04,3154	01502 1			UPSVFLAG	
1109				04,3155	00000 1			0	
1110	REF	2	LAST 507	04,3156	27425 1			INTWAKEO	RELEASE :GRAB: OF ORBIT INTEG
1111				04,3157	77776 1		EXIT		
1112	REF	111	LAST 1215	04,3160	0 5353 1		TC	PHASCHNG	
1113				04,3161	04026 1		OCT	04026	
1114	REF	3	LAST 1221	04,3162	0 1167 0		TC	INTWAKUQ	
1115				04,3163	00002 0	UPMNSVCD	OCT	2	
1116				04,3164	00000 1		OCT	0	
1117				04,3165	77420 1	GRP2PC	STQ	EXIT	
1118	REF	2	LAST 141	04,3166	02711 1			GRP2SVQ	
1119	REF	112	LAST 1222	04,3167	0 5353 1		TC	PHASCHNG	
1120				04,3170	04022 0		OCT	04022	
1121	REF	227	LAST 1221	04,3171	0 6036 1		TC	INTPRET	
1122				04,3172	77650 1		GOTO		
1123	REF	3	LAST 1222	04,3173	02711 1			GRP2SVQ	

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REF	1	DELETE	13,3721	BANK 13
REF	1	DELETE	11,2000	SETLOC ORBITAL
REF	1	DELETE	11,2311	BANK COUNT* \$\$/OPBIT
0007	REF	10	LAST 1213	11,2311 40354 1 KEPPREP LXA,2 SETPD
0008				11,2312 02030 0 PBDY
0009				11,2313 00001 0
0010				11,2314 75543 1 DLOAD* SQRT SQRT(MU) (+18 OR +15) 0D PL 2D
0011	REF	4	LAST 1213	11,2315 51770 0 MUEARTH,2
0012				11,2316 53515 0 UNIT PL 8D
0013	REF	20	LAST 1221	11,2317 01535 0 RCV
0014				11,2320 60325 0 PDDL NORM
0015				11,2321 00045 0 36D
0016	REF	59	LAST 1209	11,2322 00047 1 X1
0017				11,2323 77715 1 PDVL
0018				11,2324 65241 0 DOT PDDL F*SQRT(MU)(+7 OR+5) 4D PL 6D
0019	REF	14	LAST 1208	11,2325 01543 1 VCV
0020	REF	13	LAST 1212	11,2326 02074 0 TAU. (+28)
0021				11,2327 60225 1 DSU NORM
0022	REF	9	LAST 1212	11,2330 01551 1 TC
0023	REF	19	LAST 1150	11,2331 00051 0 S1
0024				11,2332 77742 0 SR1
0025				11,2333 65271 0 DDV PDDL
0026				11,2334 00003 1 2D
0027				11,2335 41405 0 DMP PUSH FS(+6 +N1-N2) 6D PL 8D
0028				11,2336 00005 1 4D
0029				11,2337 65316 0 DSQ PDDL (FS)SQ(+12 +2(N1-N2)) 8D PL 10D
0030				11,2340 00005 1 4D
0031				11,2341 64716 0 DSQ PDDL* SSQ/MU(-20R +2(N1-N2)) 10D PL 12D
0032	REF	5	LAST 1223	11,2342 51770 0 MUEARTH,2
0033				11,2343 40442 1 SR3 SR4
0034				11,2344 47515 0 PDVL VSQ PREALIGN MU (+43 OR +37) 12D PL 14D
0035	REF	15	LAST 1223	11,2345 01543 1 VCV
0036				11,2346 44205 0 DMP BDSU PL 12D
0037				11,2347 00045 0 36D
0038				11,2350 41271 0 DDV DMP
0039				11,2351 00003 1 2D
0040				11,2352 53605 1 DMP SL* -(1/R-ALPHA)(+12 +3N1-2N2)
0041	REF	1		11,2353 23720 0 DP2/3
0042				11,2354 20176 0 0 -3,1
0043				11,2355 43260 1 XSU,1 DAD 10L(1/R-ALPHA)(+13 +2(N1-N2))
0044	REF	20	LAST 1223	11,2356 00050 1 S1 2(FS)SQ - ETCETRA PL 8D
0045				11,2357 45257 0 SL* X1 = N2-N1
0046				11,2360 20211 1 DSU -FS+2(FS)SQ ETC (+6 +N1-N2) PL 6D
0047				11,2361 41205 0 DMP 8D,1
0048				11,2362 00001 0 DMP
0049				11,2363 00005 1 OD
0050				11,2364 53657 0 SL* SL*

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0051				11,2365	20211 1		8D,1	
0052				11,2366	20201 0		0,1	S(-FS(1-2FS)-1/6...)(+17 OR +16)
0053				11,2367	65215 1	DAD	PDDL	PL 6D
0054	REF	2	LAST	140	11,2370	01553 0	XKEP	
0055					11,2371	53605 1	DMP	SL*
0056					11,2372	00001 0	OD	S(+17 OR +16)
0057					11,2373	20202 0	1,1	
0058					11,2374	43204 0	BOVB	DAD
0059	REF	3	LAST	1151	11,2375	57725 0		TCDANZIG
0060					11,2376	77626 0	STADR	
0061	REF	3	LAST	1170	11,2377	75647 0	STORE	XKEPNEW
0062					11,2400	74020 0	STQ	AXC,1
0063	REF	3	LAST	1175	11,2401	02112 1		KEPRTN
0064					11,2402	00012 1	DEC	10
0065					11,2403	74014 1	BON	AXC,1
0066	REF	21	LAST	1222	11,2404	00303 1		MOONFLAG
0067	REF	1			11,2405	24000 1		KEPLERN
0068					11,2406	00002 0	DEC	2
0069					11,2407	77650 1	GOTO	
0070	REF	2	LAST	1224	11,2410	24000 1		KEPLERN

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0071			11,2411	66350 1	FBR3	LXA,1	SSP
0072	REF	18	LAST 1207	11,2412	01500 0		DIFECNT
0073	REF	21	LAST 1223	11,2413	00051 0		S1
0074			11,2414	77762 1		DEC	-13
0075			11,2415	54345 1		DLOAD	SR
0076	REF	9	LAST 1214	11,2416	02076 1		DT/2
0077			11,2417	20612 0			90
0078			11,2420	61500 0		TIx,1	ROUND
0079			11,2421	22422 0			+1
0080			11,2422	43206 1		PUSH	DAD
0081	REF	10	LAST 1223	11,2423	01551 1		TC
0082	REF	14	LAST 1223	11,2424	16074 0	STODL	TAU.
0083			11,2425	77615 0		DAD	
0084	REF	22	LAST 1220	11,2426	01517 0		TET
0085	REF	23	LAST 1225	11,2427	35517 1	STCALL	TET
0086	REF	2	LAST 1212	11,2430	22311 1		KEPPREP

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P0087 AGC ROUTINE TO COMPUTE ACCELERATION COMPONENTS.

0088				11,2431	73150 1	ACCOMP	LXA,1	LXA,2
0089	REF	11	LAST 1223	11,2432	02030 0			PBODY
0090	REF	12	LAST 1226	11,2433	02030 0			PBODY
0091				11,2434	77775 1		VLOAD	
0092	REF	10	LAST 1210	11,2435	22275 1			ZEROVEC
0093	REF	2	LAST 130	11,2436	26062 1		STOVL	FV
0094	REF	19	LAST 1131	11,2437	02032 1			ALPHAV
0095				11,2440	53257 1		VSL*	VAD
0096				11,2441	57605 0			0 -7,2
0097	REF	21	LAST 1223	11,2442	01535 0			RCV
0098	REF	2	LAST 130	11,2443	02040 1		STORE	BETAV
0099				11,2444	65014 1		BOE	XCHX,2
0100	REF	18	LAST 1220	11,2445	01756 1			DIMOEELAG
0101				11,2446	22453 0			+5
0102	REF	19	LAST 1225	11,2447	01500 0			DIFEECNT
0103	REF	8	LAST 131	11,2450	12132 1		STORE	VECTAB,2
0104				11,2451	77724 0		XCHX,2	
0105	REF	20	LAST 1226	11,2452	01500 0			DIFEECNT
0106				11,2453	53575 0		VLOAD	UNIT
0107	REF	20	LAST 1226	11,2454	02032 1			ALPHAV
0108	REF	21	LAST 1226	11,2455	16032 1		STOVL	ALPHAV
0109				11,2456	00045 0			36D
0110	REF	4	LAST 1129	11,2457	02070 1		STORE	ALPHAM
0111				11,2460	77624 1		CALL	
0112	REF	1		11,2461	22563 1			GAMCOMP
0113				11,2462	66175 1		VLOAD	SXA,1
0114	REF	3	LAST 1226	11,2463	02040 1			BETAV
0115	REF	33	LAST 1207	11,2464	00051 0			S2
0116	REF	22	LAST 1226	11,2465	16032 1		STOVL	ALPHAV
0117	REF	2	LAST 130	11,2466	02072 0			BETAM
0118	REF	5	LAST 1226	11,2467	02070 1		STORE	ALPHAM
0119				11,2470	71214 0		BOF	DLOAD
0120	REF	3	LAST 1213	11,2471	00342 1			MIDFLAG
0121	REF	1		11,2472	22726 1			OBLATE
0122	REF	24	LAST 1225	11,2473	01517 0			TET
0123				11,2474	77624 1		CALL	
0124	REF	3	LAST 980	11,2475	33663 1			LSPOS
0125				11,2476	72174 0		AXT,2	LXA,1
0126				11,2477	00002 0			2
0127	REF	34	LAST 1226	11,2500	00051 0			S2
0128				11,2501	77614 1		BOF	
0129	REF	22	LAST 1224	11,2502	00343 0			MOONELAG
0130				11,2503	22506 1			+3
0131				11,2504	77076 0		VCOMP	AXT,2
0132				11,2505	00000 1			0
0133	REF	4	LAST 1226	11,2506	02040 1		STORE	BETAV
0134	REF	3	LAST 131	11,2507	26105 1		STOVL	RPQV

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0135				11,2510	00003 1		2D
0136	REF	2	LAST 130	11,2511	02122 1	STORE	RPSV
0137				11,2512	45335 0	SLOAD	DSU
0138	REF	17	LAST 1214	11,2513	01012 0		MOOREG
0139	REF	1		11,2514	23722 1		OCT27
0140				11,2515	43030 0	BHIZ	BOF
0141				11,2516	22521 1		+3
0142	REF	19	LAST 1226	11,2517	01756 1		OIMOFAG
0143	REF	1		11,2520	22535 1		GETRPSV
0144				11,2521	74375 0	VLOAD	VXSC
0145	REF	23	LAST 1226	11,2522	02032 1		ALPHAV
0146	REF	6	LAST 1226	11,2523	02070 1		ALPHAM
0147				11,2524	52257 0	VSR*	VSU
0148				11,2525	57175 0		1,2
0149	REF	5	LAST 1226	11,2526	02040 1		BETAV
0150				11,2527	77724 0	XCHX,2	
0151	REF	21	LAST 1226	11,2530	01500 0		OIFEQCNT
0152	REF	9	LAST 1226	11,2531	12140 1	STORE	VECTAB +6,2
0154	REF	7	LAST 131	11,2532	02114 1	STORE	RCVV
0155				11,2533	77724 0	XCHX,2	
0156	REF	22	LAST 1227	11,2534	01500 0		DIFEQCNT
0157				11,2535	62175 0	GETRPSV	VLOAD INCR,1
0158	REF	4	LAST 1226	11,2536	02105 1		RPQV
0159				11,2537	00004 0		4
0160				11,2540	43014 0	CLEAR	BOF
0161	REF	3	LAST 1211	11,2541	04260 1		RPOFLAG
0162	REF	23	LAST 1226	11,2542	00343 0		MOONFLAG
0163				11,2543	22550 1		+5
0164				11,2544	53261 1	VSR	VAD
0165				11,2545	20612 0		9D
0166	REF	3	LAST 1227	11,2546	02122 1		RPSV
0167	REF	4	LAST 1227	11,2547	02122 1	STORE	RPSV
0168				11,2550	77624 1	CALL	
0169	REF	2	LAST 1226	11,2551	22563 1		GAMCOMP
0170				11,2552	62174 1	AXT,2	INCR,1
0171				11,2553	00004 0		4
0172				11,2554	00004 0		4
0173				11,2555	77775 1	VLOAD	
0174	REF	5	LAST 1227	11,2556	02122 1		RPSV
0175	REF	6	LAST 1227	11,2557	36040 0	STCALL	BETAV
0176	REF	3	LAST 1227	11,2560	22563 1		GAMCOMP
0177				11,2561	77650 1	GOTO	
0178	REF	2	LAST 1226	11,2562	22726 1		OBLATE
0179				11,2563	74575 0	GAMCOMP	VLOAD
0180	REF	7	LAST 1227	11,2564	02040 1		BETAV
0181				11,2565	40236 1	VSQ	SETPO
0182				11,2566	00001 0		0
0183				11,2567	61501 1	NORM	ROUND
0184				11,2570	00040 0		310
0185				11,2571	60325 0	POOL	NORM

NORMED B SQUARED TO PD LIST

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0186	REF	7	LAST 1227	11,2572	02070 1	ALPHAM	NORMALIZE (LESS ONE) LENGTH OF ALPHA
0187				11,2573	00041 1	32D	SAVING NORM SCALE FACTOR IN X1
0188				11,2574	63342 1	SR1 PDVL	
0189	REF	8	LAST 1227	11,2575	02040 1	BETAV	C(POL+2) = ALMOST NORMED ALPHA
0190				11,2576	77656 1	UNIT	
0191	REF	9	LAST 1228	11,2577	16040 1	STODL BETAV	
0192				11,2600	00045 0	360	
0193	REF	3	LAST 1226	11,2601	02072 0	STORE BETAM	
0194				11,2602	55301 0	NORM BDOV	FORM NORMALIZED QUOTIENT ALPHAM/BETAM
0195				11,2603	00042 1	33D	
0196				11,2604	41562 0	SR1R PUSH	C(PDL+2) = ALMOST NORMALIZED RHO.
0197				11,2605	77743 1	DLOAD*	
0198	REF	1		11,2606	27734 1	ASCALE,1	
0199	REF	22	LAST 1225	11,2607	00051 0	STORE S1	
0200				11,2610	57124 1	XCHX,2	XAD,2
0201	REF	23	LAST 1228	11,2611	00050 1	S1	
0202				11,2612	00040 0	32D	
0203				11,2613	71264 1	XSU,2 DLOAD	
0204				11,2614	00041 1	33D	
0205				11,2615	00003 1	2D	
0206				11,2616	65057 0	SR* XCHX,2	
0207				11,2617	57177 1	0 -1,2	
0208	REF	24	LAST 1228	11,2620	00050 1	S1	
0209				11,2621	74406 0	PUSH SR1R	RHO/4 TO 40
0210				11,2622	50315 0	POVL OOT	
0211	REF	24	LAST 1227	11,2623	02032 1	ALPHAV	
0212	REF	10	LAST 1228	11,2624	02040 1	BETAV	
0213				11,2625	44372 1	SL1R BDSU	(RHO/4) - 2(ALPHAV/2.BETAV/2)
0214				11,2626	57206 1	PUSH OMPR	TO PDL+6
0215				11,2627	00005 1	4	
02155				11,2630	77752 1	SL1	
0216				11,2631	43206 1	PUSH OAD	
0217	REF	1		11,2632	23702 0	DQUARTER	
0218				11,2633	75406 1	PUSH SCRT	
0219				11,2634	41475 1	OMPR PUSH	
0220				11,2635	00013 0	1CD	
0221				11,2636	43352 1	SL1 DAO	
0222	REF	2	LAST 1228	11,2637	23702 0	DQUARTER	
0223				11,2640	43325 1	PDDL DAD	(1/4)+2((Q+1)/4) TO PD+140
0224				11,2641	00013 0	100	
0225	REF	3	LAST 935	11,2642	22273 1	HALFDP	
0226				11,2643	72475 1	OMPR SL1	
0227				11,2644	00011 1	8D	
0228				11,2645	56215 1	OAD ODV	
0229	REF	1		11,2646	23674 0	THREE/P	
0230				11,2647	00017 1	14D	
0231				11,2650	74275 1	OMPR VXSC	
0232				11,2651	00007 0	6	
0233	REF	11	LAST 1228	11,2652	02040 1	BETAV	
0234				11,2653	64515 1	POVL VSR3	(G/2)(C(PD+4))R/2 TO PD+160

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0235	REF	25	LAST	1228	11,2654	02032	1		ALPHAV	
0236					11,2655	41455	0		PUSH	A12 + C(PD+16D) TO PD+16D
0237					11,2656	41345	0		DLOAD	DMP
0238					11,2657	00001	0			0
0239					11,2660	00015	0			12D
0240					11,2661	61501	1		NORM	ROUND
0241					11,2662	00037	0			30D
0242					11,2663	40665	0		BDDV	DMP*
0243					11,2664	00003	1			2
0244	REF	6	LAST	1223	11,2665	51770	0			MUEARTH,2
0245					11,2666	74276	1		DCOMP	VXSC
0246					11,2667	57124	1		XCHX,2	XAD,2
0247	REF	25	LAST	1228	11,2670	00050	1			S1
0248	REF	35	LAST	1226	11,2671	00051	0			S2
0249					11,2672	55064	0		XSU,2	XSU,2
0250					11,2673	00036	1			30D
0251					11,2674	00037	0			31D
02513					11,2675	77600	1		BQV	CLEAR OVIND
02516					11,2676	22677	1			+1
0252					11,2677	65057	0		VSR*	XCHX,2
0253					11,2700	57177	1			2 -1,2
0254	REF	26	LAST	1229	11,2701	00050	1			S1
0255					11,2702	77655	1		VAD	
0256	REF	3	LAST	1226	11,2703	02062	1			FV
0257	REF	4	LAST	1229	11,2704	02062	1		STORE	FV
025805					11,2705	43400	1		BNV	RVC
02581					11,2706	22707	1			+1
025815					11,2707	54345	1	GOBAQUE	DLOAD	SR
02582	REF	2	LAST	130	11,2710	02100	1			H
025825					11,2711	20612	0			9D
02583					11,2712	44206	0		PUSH	8DSU
025835	REF	11	LAST	1225	11,2713	01551	1			TC
02584	REF	15	LAST	1225	11,2714	16074	0		STODL	TAJ.
025845	REF	25	LAST	1226	11,2715	01517	0			TET
02585					11,2716	45425	0		DSU	STADR
025855	REF	26	LAST	1229	11,2717	42260	0		STCALL	TET
02586	REF	3	LAST	1225	11,2720	22311	1			KEPPREP
025865					11,2721	77624	1		CALL	
02587	REF	6	LAST	1221	11,2722	23345	1			RECTIFY
025875					11,2723	77614	1		SETGO	
02588	REF	4	LAST	1227	11,2724	04020	1			RPQFLAG
025885	REF	4	LAST	1220	11,2725	27255	0			TESTLOOP

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P0259 THE OBLATE ROUTINE COMPUTES THE ACCELERATION DUE TO OBLATENESS. IT USES THE UNIT OF THE VEHICLE
 R0261 POSITION VECTOR FOUND IN ALPHAV AND THE DISTANCE TO THE CENTER IN ALPHAM. THIS IS ADDED TO THE SUM OF THE
 R0263 DISTURBING ACCELERATIONS IN FV AND THE PROPER DIFEQ STAGE IS CALLED VIA X1.

0265			11,2726	71354 0	OBLATE	LXA,2	DLOAD	
0266	REF	13	LAST 1226	11,2727	02030 0		PBODY	
0267	REF	8	LAST 1228	11,2730	02070 1		ALPHAM	
0268			11,2731	44601 0		SETPD	DSU*	
0269			11,2732	00001 0			0	
0270	REF	1		11,2733	50027 1		RDE,2	
0271			11,2734	43044 0		8PL	BOF	GET URPV
0272	REF	1		11,2735	23136 1		NBRANCH	
0273	REF	24	LAST 1227	11,2736	00343 0		MOONFLAG	
0274	REF	1		11,2737	23145 0		COSPHIE	
0275			11,2740	65375 0		VLOAD	PDDL	
0276	REF	26	LAST 1229	11,2741	02032 1		ALPHAV	
0277	REF	27	LAST 1229	11,2742	01517 0		TET	
0278			11,2743	45125 0		PDDL	CALL	
0279	REF	1		11,2744	23672 0		3/5	
0280	REF	5	LAST 1128	11,2745	51531 1		R-TO-RP	
0284	REF	1		11,2746	00017 1		STORE	URPV
0285			11,2747	47375 0		VLOAD	VXX	
0286	REF	3	LAST 1137	11,2750	02013 1		504LM	
0287	REF	3	LAST 1208	11,2751	22267 1		ZUNIT	
0288			11,2752	61255 1		VAD	VXM	
0289	REF	4	LAST 1230	11,2753	22267 1		ZUNIT	
0290	REF	8	LAST 1140	11,2754	00025 0		MMATRIX	
0291			11,2755	77656 1		UNIT		POSSIBLY UNNECESSARY
0292	REF	1		11,2756	00025 0	COMTERM	STORE	UZ
0293			11,2757	57345 1			DLOAD	DMPR
0294	REF	1		11,2760	00023 0			COSPHI/2
0295	REF	1		11,2761	23704 0			3/32
0296			11,2762	63525 0		PDDL	DSQ	P2/64 TO PD0
0297	REF	2	LAST 1230	11,2763	00023 0			COSPHI/2
0298			11,2764	45275 0		DMPR	DSU	
0299	REF	1		11,2765	23706 1			15/16
0300	REF	1		11,2766	23700 1			3/64
0301			11,2767	57206 1		PUSH	DMPR	P3/32 TO PD2
0302	REF	3	LAST 1230	11,2770	00023 0			COSPHI/2
0303			11,2771	76405 1		DMP	SLIP	
0304	REF	1		11,2772	23712 1			7/12
0305			11,2773	57325 1		PDDL	DMPR	
0306			11,2774	00001 0			0	
0307	REF	1		11,2775	23720 0			2/3
0308			11,2776	41421 0		BDSU	PUSH	P4/128 TO PD4
0309			11,2777	57275 0		DMPR	DMPR	
0310	REF	4	LAST 1230	11,3000	00023 0			COSPHI/2
0311	REF	1		11,3001	23714 1			9/16
0312			11,3002	57325 1		PDDL	DMPR	
0313			11,3003	00003 1			2	
0314	REF	1		11,3004	23716 0			5/128

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0315			11,3005	77621 1	BDSU		
0316			11,3006	77603 1	DMP*		
0317	REF	1	11,3007	51764 0		J4REQ/J3,2	
0318			11,3010	43271 1	DDV	DAD	-3
0319	REF	9	11,3011	02070 1		ALPHAM	((P5/256)3 2 /R+P4/32) /R+P3/8)ALPHAV
0320			11,3012	00005 1		4	4 3
0321			11,3013	56273 1	DMPR*	DDV	
0322	REF	1	11,3014	51760 1		2J3RE/J2,2	
0323	REF	10	11,3015	02070 1		ALPHAM	
0324			11,3016	74215 1	DAD	VXSC	
0325			11,3017	00003 1		2	
0326	REF	27	11,3020	02032 1		ALPHAV	
0327	REF	1	11,3021	14033 1	STOOL	TVEC	
0328			11,3022	70403 1	DMP*	SRI	
0329	REF	2	11,3023	51764 0		J4REQ/J3,2	
0330			11,3024	43271 1	DDV	DAD	
0331	REF	11	11,3025	02070 1		ALPHAM	-3
0332			11,3026	50473 1	DMPR*	SR3	
0333	REF	2	11,3027	51760 1		2J3RE/J2,2	3 4
0334			11,3030	43271 1	DDV	DAD	
0335	REF	12	11,3031	02070 1		ALPHAM	
0336			11,3032	76561 1	VXSC	VSL1	
0337	REF	2	11,3033	00025 0		UZ	
0338			11,3034	77645 0	BVSU		
0339	REF	2	11,3035	00033 1		TVFC	
0340	REF	3	11,3036	14033 1	STOOL	TVEC	
0341	REF	13	11,3037	02070 1		ALPHAM	
0342			11,3040	63501 0	NORM	DSQ	
0343	REF	60	11,3041	00047 1		X1	
0344			11,3042	60316 0	DSQ	NORM	
0345	REF	27	11,3043	00051 0		S1	4
0346			11,3044	54606 0	PUSH	BDDV*	NORMED R TO OD
0347	REF	1	11,3045	51754 0		J2REQSQ,2	
0348			11,3046	77761 1	VXSC		
0349	REF	4	11,3047	00033 1		TVFC	
0350	REF	5	11,3050	00033 1	STORE	TVEC	
0351			11,3051	56070 0	XAD,1	XAD,1	
0352	REF	61	11,3052	00046 0		X1	
0353	REF	62	11,3053	00046 0		X1	
0354			11,3054	43070 1	XAD,1	ROF	
0355	REF	28	11,3055	00050 1		S1	
0356	REF	25	11,3056	00343 0		MOONFLAG	
0357	REF	1	11,3057	23126 0		NBRANCH1	
0358			11,3060	63545 0	DLOAD	DSQ	2
0359	REF	2	11,3061	00017 1		URPV	X B-2 TO 2D
0360			11,3062	63525 0	PDDL	DSQ	
0361	REF	3	11,3063	00021 1		JRPV +2	2 2
0362			11,3064	65215 1	DAD	PDDL	Y +X B-2 TO 2D
0363			11,3065	00003 1		2D	
0364			11,3066	45352 1	SL1	DSU	

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0365			11,3067	00003 1		2D	
0366			11,3070	41525 0	PDDL	PUSH	X -Y 8-2 TO 4D COSPHI 2 TO 6D
0367	REF	5	LAST 1230	11,3071	00023 0	COSPHI/2	
0368			11,3072	65361 0	VXSC	PDDL	2COSPHI(UZ) 8-3 TO 6D
0369	REE	3	LAST 1231	11,3073	00025 0	UZ	
0370			11,3074	45316 1	DSQ	DSU	
0371	REF	2	LAST 1230	11,3075	23672 0	3/5	2 2
0372			11,3076	52405 1	DMP	SL3	(X -Y)((5COS (PHI)-3)UR 2COS(PHI)UZ)
0373	REF	3	LAST 1208	11,3077	27736 0	5/8	
0374			11,3100	52361 1	VXSC	VSU	B-3 TO 4D
0375	REF	28	LAST 1231	11,3101	02032 1	ALPHAV	
0376			11,3102	72561 0	VXSC	VSL2	
0377			11,3103	77725 1	PDDL		
0378	REE	4	LAST 1231	11,3104	00017 1	JRPV	
0379			11,3105	63205 0	DMP	PDLV	XY B-2 TO 10D
0380	REE	5	LAST 1232	11,3106	00021 1	JRPV +2	
0381	REE	29	LAST 1232	11,3107	02032 1	ALPHAV	
0382			11,3110	74235 0	VXV	VXSC	
0383	REE	4	LAST 1232	11,3111	00025 0	UZ	
0384			11,3112	53332 0	VSL3	VAD	4XY(UR X UZ) + D(4D) 8-3
0385			11,3113	77725 1	PDDL		
0386			11,3114	41301 0	NORM	DMP	
03861	REE	27	LAST 1178	11,3115	00050 1	X2	
0387			11,3116	00001 0		0D	3J22R2MU/(X +Y)R
03871			11,3117	74265 0	8DDV	VXSC	
0388	REF	1		11,3120	26025 1	3J22R2MU	
0389			11,3121	53257 1	VSL*	VAD	
0390			11,3122	57605 0		0 -7,2	
0391	REE	6	LAST 1231	11,3123	00033 1	TVEC	
03911			11,3124	77754 1	LXA,2		
03912	REF	14	LAST 1230	11,3125	02030 0	PBODY	
03913			11,3126	77600 1	N8RANCH1	80V	
03916			11,3127	23130 1		+1	
0392			11,3130	53257 1	VSL*	VAD	
0393			11,3131	20153 1		0 -22D,1	
0394	REF	5	LAST 1229	11,3132	02062 1	FV	
0395	REF	6	LAST 1232	11,3133	02062 1	STORF	FV
03953			11,3134	77600 1	80V		
03956	REF	1		11,3135	22707 1	G08AQUE	
0396			11,3136	72135 0	N8RANCH	SLOAD	
0397	REF	23	LAST 1227	11,3137	01501 1	LXA,1	
0398	REF	716	LAST 1220	11,3140	00154 1	DIFEQCNT	
0399			11,3141	73205 1		MPAC	
0400	REF	1		11,3142	27740 1	DMP	CGOTO
0401	REF	717	LAST 1232	11,3143	00155 0	-1/12	
0402	REF	1		11,3144	23153 1	MPAC	
0403			11,3145	77745 1	COSPHIE	DLOAD	DIFEQTA8
0404	REF	30	LAST 1232	11,3146	02036 0		ALPHAV +4
0405	REE	6	LAST 1232	11,3147	24023 0	STOVL	COSPHI/2
0406	REE	5	LAST 1230	11,3150	22267 1		ZUNIT

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0407						11,3151	77650	0		GOTO																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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0444				11,3233	77640 0	BMN	
0445	REE	1		11,3234	23237 0		INTGRATE
04453				11,3235	77624 1	CALLRECT	CALL
04456	REF	7	LAST 1229	11,3236	23345 1		RECTIFY
0446				11,3237	77775 1	INTGRATE	VLOAD
0447	REF	9	LAST 1233	11,3240	01527 0		TNUV
0448	REE	1		11,3241	25135 1		STOVL
0449	REF	9	LAST 1233	11,3242	01521 0		TOELTAV
0450	REF	2	LAST 120	11,3243	01127 1	STORE	YV
0451				11,3244	77614 1	CLEAR	
0452	REF	1		11,3245	00261 1		JSWITCH
0453				11,3246	66375 0	DIFEQO	VLOAD
0454	REF	3	LAST 1234	11,3247	01127 1		SSP
0455	REE	24	LAST 1232	11,3250	01501 1		YV
0456				11,3251	00000 1		DIFEQCNT
0457	REF	31	LAST 1232	11,3252	16032 1		0
0458	REF	3	LAST 1132	11,3253	22275 1	STOOL	ALPHAV
0459	REF	3	LAST 1229	11,3254	02100 1		OPZERO
0460				11,3255	52014 0	STORE	H
0461	REF	2	LAST 1234	11,3256	00301 0	BON	GOTO
0462	REF	1		11,3257	23611 0		JSWITCH
0463	REF	1		11,3260	22431 1		DOW..
0464				11,3261	52175 0	EARS PH	ACCOMP
04641	REF	6	LAST 1233	11,3262	02105 1		GOTO
04642	REF	1		11,3263	23202 0		RPQV
04643				11,3264	60545 0	LUNSPH	INLUNCHK
04644				11,3265	00013 0		SR2
04645				11,3266	50025 0		100
04646	REF	2	LAST 1233	11,3267	27744 0	OSU	BMN
04647	REF	3	LAST 1233	11,3270	23207 0		RSPHERE
04648				11,3271	71214 0	BOF	RECTEST
04649	REF	6	LAST 1233	11,3272	04340 1		DLOAD
0465	REF	2	LAST 1233	11,3273	23301 1		RPQFLAG
04651	REF	29	LAST 1233	11,3274	01517 0		DOSWITCH
04652				11,3275	77624 1		TET
0466	REF	2	LAST 499	11,3276	33663 1	CALL	
0467				11,3277	77676 0		LUNPOS
0468	REF	7	LAST 1234	11,3300	02105 1	VCOMP	
0469				11,3301	77624 1	STORE	RPQV
0470	REF	1		11,3302	23305 0	DOSWITCH	CALL
0471				11,3303	77650 1		ORIGCHNG
0472	REF	2	LAST 1234	11,3304	23237 0		GOTO
0473				11,3305	45020 1		INTGRATE
0474	REF	3	LAST 130	11,3306	02112 1	ORIGCHNG	STQ
0475	REF	8	LAST 1234	11,3307	23345 1		CALL
0476				11,3310	53775 1		ORIGEX
0477	REE	24	LAST 1233	11,3311	01535 0		RECTIEY
0478				11,3312	57576 1	VLOAD	VSL*
0479				11,3313	53651 0		RCV
0480	REE	8	LAST 1234	11,3314	02105 1	VSU	0,2
							VSL*
							RPQV

START H AT ZERO. GOES 0(DELTA/2)DELTA.

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0481				11,3315	57574 0		2,2
0482	REF	14	LAST 1221	11,3316	01503 0	STORE	RRECT
0483	REF	25	LAST 1234	11,3317	15535 0	STODL	RCV
0484	REF	30	LAST 1234	11,3320	01517 0		TET
0485				11,3321	77624 1	CALL	
0486	REF	1		11,3322	33774 0		LUNVEL
0487				11,3323	57414 1	BOF	VCOMP
0488	REF	27	LAST 1233	11,3324	00343 0		MOONFLAG
0489				11,3325	23326 1		+1
0490				11,3326	53715 1	PDVL	VSL*
0491	REF	17	LAST 1233	11,3327	01543 1		VCV
0492				11,3330	57576 1		0,2
0493				11,3331	77651 0	VSU	
0494				11,3332	77657 0	VSL*	
0495				11,3333	57574 0		0 +2,2
0496	REF	10	LAST 1221	11,3334	01511 0	STORE	VRECT
0497	REF	18	LAST 1235	11,3335	01543 1	STORE	VCV
0498				11,3336	67154 0	LXA,2	SXA,2
0499	REF	4	LAST 1234	11,3337	02112 1		ORIGEX
0500	REF	19	LAST 1215	11,3340	00052 0		QPRET
0501				11,3341	52014 0	BON	GOTO
0502	REF	28	LAST 1235	11,3342	00303 1		MOONFLAG
0503	REF	2	LAST 1207	11,3343	26711 1		CLRMCON
0504	REF	3	LAST 1207	11,3344	26716 0		SETMCON

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P0505 THE RECTIFY SUBROUTINE IS CALLED BY THE INTEGRATION PROGRAM AND OCCASIONALLY BY THE MEASUREMENT INCORPORATION
 R0507 ROUTINES TO ESTABLISH A NEW CONIC.

0508				11,3345	77354 0	RECTIFY	LXA,2	VLOAD
0509	REF	16	LAST 1233	11,3346	02030 0			PRODY
0510	RFF	10	LAST 1234	11,3347	01521 0			TDEL TAV
0511				11,3350	53257 1		VSL*	VAD
0512				11,3351	57605 0			0 -7,2
0513	REF	26	LAST 1235	11,3352	01535 0			RCV
0514	REF	15	LAST 1235	11,3353	01503 0		STORE	RRECT
0515	REF	27	LAST 1236	11,3354	25535 0		STOVL	RCV
0516	REF	10	LAST 1234	11,3355	01527 0			TNUV
0517				11,3356	53257 1		VSL*	VAD
0518				11,3357	57602 1			0 -4,2
0519	REF	19	LAST 1235	11,3360	01543 1			VCV
0520	REF	11	LAST 1235	11,3361	01511 0	MINIRECT	STORE	VRECT
0521	REF	20	LAST 1236	11,3362	25543 1		STOVL	VCV
0522	REF	11	LAST 1226	11,3363	22275 1			ZERC VEC
0523	REF	11	LAST 1236	11,3364	01521 0		STORE	TDEL TAV
0524	REF	11	LAST 1236	11,3365	15527 0		STOVL	TNUV
0525	REF	12	LAST 1236	11,3366	22275 1			ZEROVFC
0526	REF	12	LAST 1229	11,3367	01551 1		STORE	TC
0527	REF	3	LAST 1224	11,3370	01553 0		STORE	XKEP
0528				11,3371	77616 0			RVQ

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P0529 THE THREE DIFEQ ROUTINES - DIFEQ+0, DIFEQ+12, AND D1EEQ+24 - ARE ENTERED TO PROCESS THE CONTRIBUTIONS AT THE
 R0531 BEGINNING, MIDDLE, AND END OF THE TIMESTEP, RESPECTIVELY. THE UPDATING IS DONE BY THE NYSTROM METHOD.

0533				11,3372	64575 1	DIFEQ+0	VLOAD	VSR3	
0534	REF	7	LAST	1232	11,3373	02062 1		FV	
0535	REF	2	LAST	130	11,3374	36046 0		STCALL	PHIV
0536	REF	1			11,3375	23552 1			DIFEQCOM
0537					11,3376	74575 0	DIFEQ+1	VLOAD	VSR1
0538	REF	8	LAST	1237	11,3377	02062 1		FV	
0539					11,3400	53206 0		PUSH	VAO
0540	REF	3	LAST	1237	11,3401	02046 1			PHIV
0541	REF	2	LAST	130	11,3402	26054 1		STOVL	PSIV
0542					11,3403	53362 0		VSR1	VAD
0543	REF	4	LAST	1237	11,3404	02046 1			PHIV
0544	REF	5	LAST	1237	11,3405	36046 0		STCALL	PHIV
0545	REF	2	LAST	1237	11,3406	23552 1			DIFEQCOM
0546					11,3407	57345 1	DIFEQ+2	DLOAD	DMPR
0547	REF	4	LAST	1234	11,3410	02100 1			H
0548	REF	2	LAST	1223	11,3411	23720 0			DP2/3
0549					11,3412	74206 0		PUSH	VXSC
0550	REF	6	LAST	1237	11,3413	02046 1			PHIV
0551					11,3414	53372 1		VSL1	VAD
0552	REF	2	LAST	1234	11,3415	01135 1			ZV
0553					11,3416	53361 0		VXSC	VAD
0554	REF	5	LAST	1237	11,3417	02100 1			H
0555	REF	4	LAST	1234	11,3420	01127 1			YV
0556	REF	5	LAST	1237	11,3421	25127 1		STOVL	YV
0557	REF	9	LAST	1237	11,3422	02062 1			FV
0558					11,3423	53322 1		VSR3	VAO
0559	REF	3	LAST	1237	11,3424	02054 1			PSIV
0560					11,3425	76561 1		VXSC	VSL1
0561					11,3426	77655 1		VAO	
0562	REF	3	LAST	1237	11,3427	01135 1			ZV
0564	REF	4	LAST	1237	11,3430	01135 1		STORE	ZV
0565					11,3431	45014 0		BOEF	CALL
0566	REF	3	LAST	1234	11,3432	00341 1			JSWITCH
0567	REF	1			11,3433	23503 0			ENDSTATE
0568	REF	23	LAST	1211	11,3434	11165 0			GPP2PC
0569					11,3435	77354 0		LXA,2	VLOAD
0570	REF	2	LAST	120	11,3436	01117 1			COLREG
0571	REF	5	LAST	1237	11,3437	01135 1			ZV
0572					11,3440	77732 1		VSL3	
0573	REF	30	LAST	1150	11,3441	12467 1		STORE	W +540,2
0574					11,3442	77775 1		VLOAD	
0575	REF	6	LAST	1237	11,3443	01127 1			YV
0576					11,3444	40132 0		VSL3	BCV
0577	REF	1			11,3445	23575 1			#MATENO
0578	REF	31	LAST	1237	11,3446	12401 1		STORE	W,2
0579					11,3447	77624 1		CALL	
0580	REF	24	LAST	1237	11,3450	11165 0			GRP2PC

ADJUST W-POSITION FOR STORAGE

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0581				11,3451	66354 0	LXA,2	SSP	
0582	REF	3	LAST 1237	11,3452	01117 1		COLREG	
0583	REF	36	LAST 1229	11,3453	00052 0		S2	
0584				11,3454	00000 1		0	
0585				11,3455	67114 1	INCR,2	SXA,2	
0586				11,3456	00006 1		6	
0587	REF	7	LAST 1237	11,3457	01126 0		YV	
0588				11,3460	45104 0	TIX,2	CALL	
0589	REF	1		11,3461	23546 1		RELOADSV	
0590	REF	25	LAST 1237	11,3462	11165 0		GRP2PC	
0591				11,3463	67154 0	LXA,2	SXA,2	
0592	REF	8	LAST 1238	11,3464	01126 0		YV	
0593	REF	4	LAST 1238	11,3465	01117 1		COLREG	
0594				11,3466	77624 1	NEXTCOL	CALL	
0595	REF	26	LAST 1238	11,3467	11165 0		GRP2PC	
0596				11,3470	76754 0	LXA,2	VLOAD*	
0597	REF	5	LAST 1238	11,3471	01117 1		COLREG	
0598	REF	32	LAST 1237	11,3472	75376 1		0,2	
0599				11,3473	77722 0	VSR3		ADJUST W-POSITION FOR INTEGRATION
0600	REF	9	LAST 1238	11,3474	01127 1	STORE	YV	
0601				11,3475	76173 0	VLOAD*	AXT,1	
0602	REF	33	LAST 1238	11,3476	75310 1		W +540,2	
0603				11,3477	00000 1		0	
0604				11,3500	77722 0	VSR3		ADJUST W-VELOCITY FOR INTEGRATION
0605	REF	6	LAST 1237	11,3501	35135 0	STCALL	ZV	
0606	REF	1		11,3502	23246 0		DIFFEQ	
0607				11,3503	77200 0	ENDSTATE	BOV	
06071	REF	2	LAST 1232	11,3504	22707 1		VLOAD	
0608	REF	7	LAST 1238	11,3505	01135 1		GORBAQUE	
0609	REF	12	LAST 1236	11,3506	25527 0		ZV	
0610	REF	10	LAST 1238	11,3507	01127 1	STOVL	TNUV	
0611	REF	12	LAST 1236	11,3510	01521 0		YV	
0612				11,3511	43014 0	STORE	TDELTAV	
06121	REF	3	LAST 1220	11,3512	04715 0	BON	ROFF	
06122	REF	1		11,3513	27657 0		MIDAVELG	
0613	REF	20	LAST 1227	11,3514	01756 1		CKMID2	CHECK FOR MID2 BEFORE GOING TO TIMEINC
0614	REF	5	LAST 1229	11,3515	27255 0		DIMOFLEG	
06141				11,3516	77776 1		TESTLOOP	
0615	REF	113	LAST 1222	11,3517	0 5353 1	EXIT		
0616				11,3520	04022 0	TC	PHASCHNG	
0617	REF	65	LAST 1211	11,3521	0 5504 0	OCT	04022	PHASE 1
0618	REF	4	LAST 1211	11,3522	00236 0	TC	UPFLAG	PHASE CHANGE HAS OCCURRED BETWEEN
0620	REF	228	LAST 1222	11,3523	0 6036 1	ADRES	REINTFLG	INTSTALL AND INTWAKE
0621				11,3524	77731 1	TC	INTPRET	
06215	REF	20	LAST 1235	11,3525	00053 1	SSP		
0622	REF	1		11,3526	23533 0		QPRFT	
0623				11,3527	52014 0		AMOVED	
0624	REF	25	LAST 1218	11,3530	01714 1	BON	GOTO	
							VINTFLAG	

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0625	REF	5	LAST	1222	11,3531	26661	1		ATOPCSM	
0626	REF	4	LAST	1222	11,3532	26734	0		ATOPLEM	
0627					11,3533	66214	0	MOVED	SFT	SSP
0628	REF	4	LAST	1237	11,3534	00061	0		JSWITCH	
0629	REF	6	LAST	1238	11,3535	01120	0		COLREG	
0630					11,3536	77741	0		DEC	-30
0631					11,3537	66214	0		BOFF	SSP
0632	REF	10	LAST	1218	11,3540	01755	1			D63R9FLG
0633	REF	1			11,3541	23466	1			NEXTCOL
0634	REF	7	LAST	1239	11,3542	01120	0			COLREG
0635					11,3543	77717	0		DEC	-48
0636					11,3544	77650	1		GOTO	
0637	REF	2	LAST	1239	11,3545	23466	1			NEXTCOL
0638					11,3546	77745	1	RELOADSV	OLOAD	RELOAD TEMPORARY STATE VECTOR
0639	REF	9	LAST	1220	11,3547	01116	0		TOEC	FROM PERMANENT IN CASE OF
0640	REF	62	LAST	1219	11,3550	34041	0		STCALL	TOEC1
0641	REF	1			11,3551	27141	0			INTEGRV2
0642					11,3552	43345	1	DIFEQCOM	OLOAD	BY STARTING AT INTEGRV2.
0643	REF	11	LAST	1233	11,3553	02076	1			DT/2
0644	REF	6	LAST	1237	11,3554	02100	1			H
0645					11,3555	66110	1		INCR,1	SXA,1
0646					11,3556	77763	0		DEC	-12
0647	REF	25	LAST	1234	11,3557	01500	0			DIFEQCNT
0648	REF	7	LAST	1239	11,3560	02100	1		STORE	4
0649					11,3561	74561	0		VXSC	VSR1
0650	REF	10	LAST	1237	11,3562	02062	1			FV
0651					11,3563	74255	0		VAD	VXSC
0652	REF	8	LAST	1238	11,3564	01135	1			ZV
0653	REF	8	LAST	1239	11,3565	02100	1			H
0654					11,3566	77655	1		VAD	
0655	REF	11	LAST	1238	11,3567	01127	1			YV
0656	REF	32	LAST	1234	11,3570	02032	1		STORE	ALPHAV
0657					11,3571	52014	0		BON	GOTO
0658	REF	5	LAST	1239	11,3572	00301	0			JSWITCH
0659	REF	2	LAST	1234	11,3573	23611	0			DDW..
0660	REF	1			11,3574	22411	0			FRR3
0661					11,3575	43014	0	WMATEND	CLEAR	CLEAR
0662	REF	21	LAST	1238	11,3576	01676	1			DIMOFLEG
0663	REF	3	LAST	1222	11,3577	01671	0			ORBWFLAG
06631					11,3600	77614	1		CLEAR	
06632	REF	13	LAST	1222	11,3601	02676	1			RENDWFLG
0664					11,3602	77414	0		SFT	EXIT
0665	REF	8	LAST	1213	11,3603	01472	1			STATEFLG
0666	REF	41	LAST	1221	11,3604	05567	0		TC	ALARM
0667					11,3605	00421	0		OCT	421
0668	REF	229	LAST	1238	11,3606	06036	1		TC	INTPRET

DONT INTEGRATE W THIS TIME
INVALIDATE W

PICK UP STATE VECTOR UPDATE

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0669				11,3607	77650 1	GOTO		
0670	REF	6	LAST 1238	11,3610	27255 0	TESTLOOP	FINISH INTEGRATING STATE VECTOR	

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P0671 ORBITAL ROUTINE FOR EXTRAPOLATION OF THE W MATRIX. IT COMPUTES THE SECOND DERIVATIVE OF EACH COLUMN POSITION
R0673 VECTOR OF THE MATRIX AND CALLS THE NYSTROM INTEGRATION ROUTINES TO SOLVETHE DIFFERENTIAL EQUATIONS. THE PROGRAM
R0675 USES A TABLE OF VEHICLE POSITION VECTORS COMPUTED DURING THE INTEGRATION OF THE VEHICLES POSITION AND VELOCITY.

0677      11,3611  70754 0 DOW.. LXA,2 DLOAD*
0678 REE 17 LAST 1236 11,3612 02030 0 P800Y
0679 REE 7 LAST 1229 11,3613 51770 0 MUEARTH,2
0680 REF 4 LAST 1228 11,3614 36072 1 STCALL BETAM
0681 REE 1 11,3615 23637 1 DOW..1
0682 REF 11 LAST 1239 11,3616 02062 1 STORE FV
0683 11,3617 62014 0 BOF INCR,1
0684 REF 5 LAST 1233 11,3620 00342 1 MIOELAG
0685 REF 2 LAST 1230 11,3621 23136 1 NBRANCH
0686 11,3622 77771 0 DEC -6
0687 11,3623 70744 1 LXC,2 DLOAD*
0688 REF 18 LAST 1241 11,3624 02030 0 PRODY
0689 REE 8 LAST 1241 11,3625 51772 1 MUEARTH -2,2
0690 REF 5 LAST 1241 11,3626 36072 1 STCALL BETAM
0691 REF 2 LAST 1241 11,3627 23637 1 DOW..1
0692 11,3630 50414 0 BON VSP6
0693 REE 29 LAST 1235 11,3631 00303 1 MOONFLAG
0694 11,3632 23633 0 +1
0695 11,3633 77655 1 VAD
0696 REF 12 LAST 1241 11,3634 02062 1 FV
0697 REF 13 LAST 1241 11,3635 36062 0 STCALL FV
0698 REF 3 LAST 1241 11,3636 23136 1 NBRANCH
0699 11,3637 60575 0 DOW..1 VLOAD VSR4
0700 REF 33 LAST 1239 11,3640 02032 1 ALPHAV
0701 11,3641 53513 0 POVL* UNIT
0702 REF 10 LAST 1227 11,3642 02132 0 VECTA8,1
0703 11,3643 46315 1 PDVL VPRCJ
0704 REF 34 LAST 1241 11,3644 02032 1 ALPHAV
0705 11,3645 52361 1 VXSC VSU
0706 REF 5 LAST 1233 11,3646 23710 0 3/4
0707 11,3647 60325 0 PODL NORM
0708 11,3650 00045 0 34D
0709 REF 37 LAST 1238 11,3651 00052 0 S2
0710 11,3652 63406 0 PUSH OSQ
0711 11,3653 77605 1 DMP
0712 11,3654 65301 0 NORM PDDI
0713 11,3655 00043 0 34D
0714 REE 6 LAST 1241 11,3656 02072 0 BETAM
0715 11,3657 56342 1 SR1 DDV
0716 11,3660 77761 1 VXSC
0717 11,3661 57154 0 LXA,2 XAD,2
0718 REF 38 LAST 1241 11,3662 00051 0 S2
0719 REE 39 LAST 1241 11,3663 00051 0 S2
0720 11,3664 57074 0 XAO,2 XAO,2
0721 REF 40 LAST 1241 11,3665 00051 0 S2
0722 11,3666 00042 1 34D
0723 11,3667 43457 0 VSL* RVQ

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0724			11,3670	57606 0		0 -80,2
0725	REF	1	11,2000		SETLOC	DRBITAL1
0726			11,3671		BANK	
0727			11,3671	04631 1	3/5	2DEC .6 8-2
0727			11,3672	23146 0		
0728			11,3673	14000 1	THREE/8	2DEC .375
0728			11,3674	00000 1		
0729			11,3675	02314 0	.3D	2DEC .3 8-2
0729			11,3676	31463 1		
0730			11,3677	01400 1	3/64	2DEC 3 8-6
0730			11,3700	00000 1		
0731			11,3701	10000 0	DP1/4	2DEC .25
0731			11,3702	00000 1		
0732	REF	2	LAST 1195	11,3701	QUARTER	EQUALS DP1/4
0733	REF	3	LAST 1242	11,3701	PDS1/4	EQUALS DP1/4
0734				11,3703	03000 1	3/32
0734				11,3704	00000 1	2DEC 3 8-5
0735				11,3705	36000 1	15/16
0735				11,3706	00000 1	2DEC 15. 8 -4
0736				11,3707	30000 1	3/4
0736				11,3710	00000 1	2DEC 3.0 8 -2
0737				11,3711	22525 0	7/12
0737				11,3712	12525 0	2DEC .5833333333
0738				11,3713	22000 1	9/16
0738				11,3714	00000 1	2DEC 9 8 -4
0739				11,3715	01200 1	5/128
0739				11,3716	00000 1	2DEC 5 8-7
0740	REF	13	LAST 1236	11,2274	DPZERO	EQUALS ZERDVEC
0741				11,3717	25252 0	DP2/3
0741				11,3720	25253 1	2DEC .6666666667
0742	REF	3	LAST 1237	11,3717	2/3	EQUALS DP2/3
07455				11,3721	00027 1	OCT27 OCT 27
R0746	LM504	IS	TEMPDRARY			
07462				13,3721		BANK 13
07463	REF	2	LAST 61	13,2000		SETLOC DRBITAL2
07464				13,3721		BANK
R0747	IT IS VITAL THAT THE	FOLLOWING	CONSTANTS NOT BE	SHUFFLED		
0748				13,3721	77764 1	DEC -11
0749				13,3722	77775 1	DEC -2
0750				13,3723	77766 0	DEC -9
0751				13,3724	77771 0	DEC -6
0752				13,3725	77775 1	DEC -2
0753				13,3726	77775 1	DEC -2
0754				13,3727	00000 1	DEC 0
0755				13,3730	77763 0	DEC -12
0756				13,3731	77766 0	DEC -9
0757				13,3732	77773 1	DEC -4
0758				13,3733	77770 1	ASCALE DEC -7
0759				13,3734	77771 0	DEC -6

L ORBITAL INTEGRATION

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0770	13,3735	24000	1	5/8	2DEC	5	8-3
0770	13,3736	00000	1				
0771	13,3737	74631	0	-1/12	2DEC	-	.1
0771	13,3740	63145	1				
0773	13,3741	00243	1	RECRATIO	2DEC	.	.01
0773	13,3742	32703	1				
0774	13,3743	03654	0	RSPHERE	2DEC	64373.76	E3 8-29
0774	13,3744	21000	1				
0775	13,3745	03654	0	RDM	2DEC	16093.44	E3 8-27
0775	13,3746	21000	1				
0776	13,3747	04627	0	RDE	2DEC	80467.20	E3 8-29
0776	13,3750	25200	1				
0777	0000			RATT	EQUALS	0D	
0778	0006			VATT	EQUALS	6D	
0779	0014			IAT	EQUALS	12D	
0780	0016			RATT1	EQUALS	14D	
0781	0024			VATT1	EQUALS	20D	
0782	0032			MU(P)	EQUALS	26D	
0783	0040			TDEC1	EQUALS	32D	
0784	0016			URPV	EQUALS	14D	
0785	REF 6 LAST 1232	0022		COSPHI/2	EQUALS	URPV +4	
0786		0024		UZ	EQUALS	20D	
0787		0032		TVEC	EQUALS	26D	

L INELIGHT ALIGNMENT ROUTINES

USER'S PAGE NO. 1 EO S3

0001				22,3731	BANK 22
0002	REF	2	LAST 338	23,2000	SETLOC INFLIGHT
0003				23,3151	BANK

0004	RFF	22	LAST 970	E5,1642	EBANK= XSM
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R0005 CALCGT A COMPUTES THE GYRO TORQUE ANGLES REQUIRED TO BRING THE STABLE MEMBER INTO THE DESIRED ORIENTATION.

R0007 THE INPUT IS THE DESIRED STABLE MEMBER COORDINATES REFERRED TO PRESENT STABLE MEMBER COORDINATES. THE THREE HALF-UNIT VECTORS ARE STORED AT XDC, YDC, AND ZDC.

R0010 THE OUTPUTS ARE THE THREE GYRO TORQUING ANGLES TO BE APPLIED TO THE Y, Z, AND X GYROS AND ARE STORED DP AT IGC, MGC, AND OGC RESPECTIVELY.

0013	REF	1				COUNT* \$\$/INFLT	
0014				23,3151	71220 1	ITA	DLOAD
0015	REF	41	LAST 1241	23,3152	00051 0		S2
0016	REF	6	LAST 970	23,3153	02665 0		XDC
0017				23,3154	65325 0	PDDL	PDDL
0018	REF	17	LAST 1142	23,3155	06424 0		H16ZEROS
0019	REF	7	LAST 1244	23,3156	02671 0		XDC +4
0020				23,3157	55476 1	DCOMP	VDEF
0021				23,3160	77656 1	UNIT	
0022	REF	1		23,3161	14027 1	STOOL	ZPRIME
0023	REF	2	LAST 1244	23,3162	00027 1		ZPRIME
0024				23,3163	77742 0	SR1	
0025	REF	12	LAST 1132	23,3164	14023 0	STOOL	SINTH
0026	REF	3	LAST 1244	23,3165	00033 1		ZPRIME +4
0027				23,3166	77742 0	SR1	
0028	REF	11	LAST 1132	23,3167	34021 0	STCALL	COSTH
0029	REF	4	LAST 336	23,3170	47222 0		ARCTRIG
0030	REF	2	LAST 138	23,3171	16742 1	STOOL	IGC
0031	REF	8	LAST 1244	23,3172	02667 1		XDC +2
0032				23,3173	77742 0	SR1	
0033	REF	13	LAST 1244	23,3174	14023 0	STOOL	SINTH
0034	REF	4	LAST 1244	23,3175	00027 1		ZPRIME
0035				23,3176	65205 0	DMP	PDDL
0036	REF	9	LAST 1244	23,3177	02671 0		XDC +4
0037	RFF	5	LAST 1244	23,3200	00033 1		ZPRIME +4
0038				23,3201	45205 1	OMP	DSU
0039	REF	10	LAST 1244	23,3202	02665 0		XDC
0040				23,3203	77626 0	STADP	
0041	REF	12	LAST 1244	23,3204	43756 1	STCALL	COSTH
0042	REF	5	LAST 1244	23,3205	47222 0		ARCTRIG

PUSHDOWN 00-03,160-270,340-370

XDC = (XD1 XD2 XD3)

YDC = (YD1 YD2 YD3)

ZDC = (ZD1 ZD2 ZD3)

ZP = UNIT(-XD3 0 XD1) = (ZP1 ZP2 ZP3)

SIN(IGC) = ZP1

COS(IGC) = ZP3

Y GYRO TORQUING ANGLE FRACTION OF REV.

SIN(MGC) = XD2

PD00 = (ZP1)(XD3)

MPAC = (ZP3)(XD1)

COS(MGC) = MPAC - PD00

L INFLIGHT ALIGNMENT ROUTINES

USER'S PAGE NO. 2 F5 S3

0043	REF	2	LAST	139	23,3206	26744	1
0044	REF	6	LAST	1244	23,3207	00027	1
0045					23,3210	77641	1
0046	REF	4	LAST	929	23,3211	02701	0
0047	REF	13	LAST	1244	23,3212	24021	1
0048	REF	7	LAST	1245	23,3213	00027	1
0049					23,3214	77641	1
0050	REF	4	LAST	929	23,3215	02673	1
0051	REF	14	LAST	1244	23,3216	34023	1
0052	REF	6	LAST	1244	23,3217	47222	0
0053	REF	14	LAST	968	23,3220	36740	1
0054	REF	42	LAST	1244	23,3221	00051	0

STOVL MGC
ZPRIME

Z GYRO TORQUING ANGLE FRACTION OF REV.

DOT

STOVL ZDC
COSTH
ZPRIME

 $\cos(\text{OGC}) = ZP \cdot ZDC$

DOT

YDC
STCALL SINTH
ARCTRG

 $\sin(\text{OGC}) = ZP \cdot YDC$

STCALL OGC
S2

X GYRO TORQUING ANGLE FRACTION OF REV.

L INFLIGHT ALIGNMENT ROUTINES

USER'S PAGE NO. 3 E5 S3

R0055 ARCTRIG COMPUTES AN ANGLE GIVEN THE SINE AND COSINE OF THIS ANGLE.

R0056 THE INPUTS ARE SIN/4 AND COS/4 STORED DP AT SINTH AND COSTH.

R0057 THE OUTPUT IS THE CALCULATED ANGLE BETWEEN +.5 AND -.5 REVOLUTIONS AND STORED AT THETA. THE OUTPUT IS ALSO
R0059 AVAILABLE AT MPAC.

0060				23,3222	51545 1	ARCTRIG	DLOAD	ABS	PUSHDOWN	16D-21D
0061	REF	15	LAST 1245	23,3223	00023 0			SINTH		
0062				23,3224	50025 0		OSU	BMN		
0063	REF	1		23,3225	07440 0			QTSN45	ABS(SIN/4) - SIN(45)/4	
0064	REF	1		23,3226	47235 0			TRIG1	IF (-45,45) OR (135,-135)	
0065				23,3227	72545 0		OLOAD	SL1	(45,135) OR (-135,-45)	
0066	REF	14	LAST 1245	23,3230	00021 1			COSTH		
0067				23,3231	75326 1		ACOS	SIGN		
0068	REF	16	LAST 1246	23,3232	00023 0			SINTH		
0069	REF	7	LAST 1132	23,3233	00025 0		STORE	THETA	X = ARCCOS(COS) WITH SIGN(SIN)	
0070				23,3234	77616 0		RVQ			
0071				23,3235	72545 0	TRIG1	DLOAD	SL1	(-45,45) OR (135,-135)	
0072	REF	17	LAST 1246	23,3236	00023 0			SINTH		
0073				23,3237	77736 0		ASIN			
0074	REF	8	LAST 1246	23,3240	14025 0		STODL	THETA	X = ARCSIN(SIN) WITH SIGN(SIN)	
0075	REF	15	LAST 1246	23,3241	00021 1			COSTH		
0076				23,3242	77640 0		BMN			
0077	REF	1		23,3243	47246 1			TRIG2	IF (135,-135)	
0078				23,3244	43545 1		OLOAD	RVQ		
0079	REF	9	LAST 1246	23,3245	00025 0			THETA	X = ARCSIN(SIN) (-45,45)	
0080				23,3246	75345 1	TRIG2	DLOAD	SIGN	(135,-135)	
0081	REF	6	LAST 1141	23,3247	06422 0			HIDPHALF		
0082	REF	18	LAST 1246	23,3250	00023 0			SINTH		
0083				23,3251	77625 0		DSU			
0084	REF	10	LAST 1246	23,3252	00025 0			THETA		
0085	REF	11	LAST 1246	23,3253	00025 0		STORE	THETA	X = .5 WITH SIGN(SIN) - ARCSIN(SIN)	
0086				23,3254	77616 0		RVQ		(+) - (+) OR (-) - (-)	

L INFLIGHT ALIGNMENT ROUTINES

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R0087 SMNB, NBSM, AND AXISROT, WHICH USED TO APPEAR HERE, HAVE BEEN
R0088 COMBINED IN A ROUTINE CALLED AX*SR*T, WHICH APPEARS AMONG THE POWERED
R0089 FLIGHT SUBROUTINES.

L INFLIGHT ALIGNMENT ROUTINES

USER'S PAGE NO. 5 E5 S3

R0090 CALCGA COMPUTES THE CDU DRIVING ANGLES REQUIRED TO BRING THE STABLE MEMBER INTO THE DESIRED ORIENTATION.

R0092 THE INPUTS ARE 1) THE NAVIGATION BASE COORDINATES REFERRED TO ANY COORDINATE SYSTEM. THE THREE HALF-UNIT
 R0094 VECTORS ARE STORED AT XNB, YNB, AND ZNB. 2) THE DESIRED STABLE MEMBER COORDINATES REFERRED TO THE SAME
 R0096 COORDINATE SYSTEM ARE STORED AT XSM, YSM, AND ZSM.

R0097 THE OUTPUTS ARE THE THREE CDU DRIVING ANGLES AND ARE STORED SP AT THETAD, THETAD +1, AND THETAD +2.

0099				23,3255	77601 0	CALCGA	SETPD		PUSHDOWN 00-05, 160-210, 340-370
0100				23,3256	00001 0			0	
0101				23,3257	47375 0		VLOAD	VXV	
0102	REF	9	LAST	965	23,3260	02665 0		XNB	XNB = OGA (OUTER GIMBAL AXIS)
0103	REF	2	LAST	138	23,3261	02651 1		YSM	YSM = IGA (INNER GIMBAL AXIS)
0104					23,3262	41456 0	UNIT	PUSH	PDO = UNIT(OGA X IGA) = MGA
0105				23,3263	44041 1		DOT	ITA	
0106	REF	6	LAST	976	23,3264	02701 0		ZNB	
0107	REF	43	LAST	1245	23,3265	00051 0		S2	
0108	REF	16	LAST	1246	23,3266	24021 1	STOVL	COSTH	COS(OG) = MGA . ZNB
0109					23,3267	00001 0		0	
0110					23,3270	77641 1	DOT		
0111	REF	6	LAST	976	23,3271	02673 1		YNB	
0112	REF	19	LAST	1246	23,3272	34023 1	STCALL	SINTH	SIN(OG) = MGA . YNB
0113	REF	7	LAST	1245	23,3273	47222 0		ARCTRIG	
0114	REF	15	LAST	1245	23,3274	26740 0	STOVL	OGC	
0115					23,3275	00001 0		0	
0116				23,3276	50235 0		VXV	DOT	PROVISION FOR MG ANGLE OF 90 DEGREES
0117	REF	10	LAST	1248	23,3277	02665 0		XNB	
0118	REF	3	LAST	1248	23,3300	02651 1		YSM	
0119					23,3301	77752 1	SLI		
0120	REF	17	LAST	1248	23,3302	24021 1	STOVL	COSTH	COS(MG) = IGA . (MGA X OGA)
0121	REF	4	LAST	1248	23,3303	02651 1		YSM	
0122					23,3304	77641 1	DOT		
0123	REF	11	LAST	1248	23,3305	02665 0		XNB	
0124	REF	20	LAST	1248	23,3306	34023 1	STCALL	SINTH	SIN(MG) = IGA . OGA
0125	REF	8	LAST	1248	23,3307	47222 0		ARCTRIG	
0126	REF	3	LAST	1245	23,3310	02744 1	STORE	MGC	
0127				23,3311	45246 0		ABS	DSU	
0128	REF	1			23,3312	07442 1		.166...	
0129					23,3313	77644 1	BPL		
0130	REF	1			23,3314	47335 1		GIMLOCK1	IF ANGLE GREATER THAN 60 DEGREES
0131				23,3315	50375 0	CALCGA1	VLOAD	DOT	
0132	REF	2	LAST	138	23,3316	02657 1		ZSM	
0133					23,3317	00001 0		0	
0134	REF	18	LAST	1248	23,3320	24021 1	STOVL	COSTH	COS(IG) = ZSM . MGA
0135	REF	23	LAST	1244	23,3321	02643 1		XSM	

L INFLIGHT ALIGNMENT ROUTINES

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0136				23,3322	45441 1	DOT	STADP	
0137	REF	21	LAST 1248	23,3323	43754 0	STCALL	SINTH	SIN(IG) = XSM . MGA
0138	REF	9	LAST 1248	23,3324	47222 0		ARCIRIG	
0139	REF	3	LAST 1244	23,3325	26742 1	STOVL	IGC	
0140	REF	16	LAST 1248	23,3326	02740 0		JGC	
0141				23,3327	43034 1	RTB	BONCLR	
01415	REF	4	LAST 495	23,3330	21524 1		VISTO2S	
0142	REF	1		23,3331	00200 0		CPHIFLAG	
01425	REF	44	LAST 1248	23,3332	00051 0		S2	
0143	REF	20	LAST 965	23,3333	34322 0	STCALL	THETAD	
0144	REF	45	LAST 1249	23,3334	00051 0		S2	
0145				23,3335	77776 1	GIMLOCK1	EXIT	
0146	REF	42	LAST 1239	23,3336	0 5567 0	TC	ALARM	
0147				23,3337	00401 1	OCT	00401	
0148	REF	66	LAST 1238	23,3340	0 5504 0	TC	UPFLAG	GIMBAL LOCK HAS OCCURED
0149	REF	2	LAST 387	23,3341	00056 1	ADRES	GLCKFAIL	
0150	REF	230	LAST 1239	23,3342	0 6036 1	TC	INTPRET	
0151				23,3343	77650 1	GOTO		
0152	REF	1		23,3344	47315 0		CALCGA1	

L INFLIGHT ALIGNMENT ROUTINES

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R0153 AXISGEN COMPUTES THE COORDINATES OF ONE COORDINATE SYSTEM REFERRED TO ANOTHER COORDINATE SYSTEM.

R0155 THE INPUTS ARE 1) THE STAR1 VECTOR REFERRED TO COORDINATE SYSTEM A STORED AT STARAO. 2) THE STAR2 VECTOR
 R0157 REFERRED TO COORDINATE SYSTEM A STORED AT STARAO +6. 3) THE STAR1 VECTOR REFERRED TO COORDINATE SYSTEM 8 STORED
 R0159 AT LOCATION 6 OF THE VAC AREA. 4) THE STAR2 VECTOR REFERRED TO COORDINATE SYSTEM 8 STORED AT LOCATION 120 OF
 R0161 THE VAC AREA.

R0162 THE OUTPUT DEFINES COORDINATE SYSTEM A REFERRED TO COORDINATE SYSTEM B. THE THREE HALF-UNIT VECTORS ARE STORED
 R0164 AT LOCATIONS XDC, XDC +6, XDC +120, AND STARAO, STARAO +6, STARAO +120.

0165				23,3345	66370 0	AXISGEN	AXT,1	SSP		PUSHDOWN	00-300,340-370
0166	REF	32	LAST 968	23,3346	02714 1			STARAO +6			
0167	REF	29	LAST 1231	23,3347	00051 0			S1			
0168	REF	33	LAST 1250	23,3350	02700 1			STARAO -6			
0169				23,3351	77601 0		SETPO				
0170				23,3352	00001 0			0			
0171				23,3353	46773 0	AXISGEN1	VLOAD*	VXV*	06D	UA = S1	
0172	REF	34	LAST 1250	23,3354	02723 0			STARAO +120,1		STARAO +000	UB = S1
0173	REF	35	LAST 1250	23,3355	02731 0			STARAO +180,1			
0174				23,3356	77656 1		UNIT		12D	VA = UNIT(S1 X S2)	
0175	REF	36	LAST 1250	23,3357	06731 1		STORE	STARAO +180,1		STARAO +06D	VB = UNIT(S1 X S2)
0176				23,3360	77773 1		VLOAD*				
0177	REF	37	LAST 1250	23,3361	02723 0			STARAO +120,1			
0178				23,3362	76433 1		VXV*	VSL1			
0179	REF	38	LAST 1250	23,3363	02731 0			STARAO +180,1	18D	WA = UA X VA	
0180	REF	39	LAST 1250	23,3364	06737 1		STORE	STARAO +240,1		STARAO +120	W8 = U8 X VB
0181				23,3365	77700 0		TIX,1				
0182	REF	1		23,3366	47353 1			AXISGEN1			
0183				23,3367	66160 0		AXC,1	SXA,1			
0184				23,3370	00006 1			6			
0185				23,3371	00036 1			30D			
0186				23,3372	66370 0		AXT,1	SSP			
0187				23,3373	00022 1			18D			
0188	REF	30	LAST 1250	23,3374	00051 0			S1			
0189				23,3375	00006 1			6			
0190				23,3376	66374 1		AXT,2	SSP			
0191				23,3377	00006 1			6			
0192	REF	46	LAST 1249	23,3400	00052 0			S2			
0193				23,3401	00002 0			2			
0194				23,3402	76720 0	AXISGEN2	XCHX,1	VLOAD*			
0195				23,3403	00036 1			30D		X1=-6 X2=+6	X1=-6 X2=+4 X1=-6 X2=+2
0196				23,3404	00001 0			0,1			

L INFLIGHT ALIGNMENT ROUTINES

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0197			23,3405	62757 0	VXSC*	PDVL*	J=(UA)(UB1)	J=(UA)(UB2)	J=(UA)(UB3)
0198	REF 40	LAST 1250	23,3406	75062 1		STAPAD +6,2			
0199			23,3407	00007 0		6,1			
0200			23,3410	77757 1	VXSC*				
0201	REF 41	LAST 1251	23,3411	75054 1		STARAD +120,2			
0202			23,3412	30031 0	STOVL*	24D	K=(VA)(VB1)	J=(VA)(VB2)	J=(VA)(VB3)
0203			23,3413	00015 0		12D,1			
0204			23,3414	53357 0	VXSC*	VAD			
0205	REF 42	LAST 1251	23,3415	75046 1		STAPAD +180,2	L=(WA)(WB1)	J=(WA)(WB2)	J=(WA)(WB3)
0206			23,3416	76455 1	VAD	VSL1			
0207			23,3417	00031 0		24D			
0208			23,3420	53520 0	XCHX,1	UNIT			
0209			23,3421	00036 1		30D			
0210	REF 11	LAST 1244	23,3422	06707 1	STORE	XDC +18D,1	XDC = L+J+K	YDC = L+J+K	ZDC = L+J+K
0211			23,3423	77700 0	TIX,1				
0212	REF 1		23,3424	47425 1		AXISGEN3			
0213			23,3425	77704 1	AXISGEN3	TIX,2			
0214	REF 1		23,3426	47402 1		AXISGEN2			
0215			23,3427	77775 1	VLOAD				
0216	REF 12	LAST 1251	23,3430	02665 0		XDC			
0217	REF 43	LAST 1251	23,3431	26707 0	STOVL	STARAD			
0218	REF 5	LAST 1245	23,3432	02673 1		YFC			
0219	REF 44	LAST 1251	23,3433	26715 0	STOVL	STARAD +6			
0220	REF 5	LAST 1245	23,3434	02701 0		ZDC			
0221	REF 45	LAST 1251	23,3435	02723 0	STORE	STARAD +12D			
0222			23,3436	77616 0	RVQ				

L INFLIGHT ALIGNMENT ROUTINES

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0281	23,3437	05520 0	QTSN45	2DEC	.1768
0281	23,3440	26075 1			
0282	23,3441	05252 1	.166...	2DEC	.1666666667
0282	23,3442	25253 1			

L INFLIGHT ALIGNMENT ROUTINES

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L POWERED FLIGHT SUBROUTINES

USER'S PAGE NO. 1 F0 S3

0001 14,3711
0002 REF 1 23,2000
0003 23,3443

BANK 14
SETLOC POWFLITE
BANK

SAME FBANK AS THE FINDCUD SUB-PROGRAM

0004 REF 1 0142
0005 REF 1

EBANK= DEXDEX
COUNT# 55/PCWFL

R0006 CDUTRIG, CDUTRIG1, CDUTRIG2, AND CD*TR*GS ALL COMPUTE THE SINES AND
R0007 COSINES OF THREE 2'S COMPLEMENT ANGLES AND PLACE THE RESULT, DOUBLE
R0008 PRECISION, IN THE SAME ORDER AS THE INPUTS, AT SINCDU AND COSCDU. AN
R0009 ADDITIONAL OUTPUT IS THE 1'S COMPLEMENT ANGLES AT CDUSPOT. THESE
R0010 ROUTINES GO OUT OF THEIR WAY TO LEAVE THE MPAC AREA AS THEY FIND IT,
R0011 EXCEPT FOR THE GENERALLY UNIMPORTANT MPAC +2. THEY DIFFER ONLY IN
R0012 WHERE THEY GET THE ANGLES, AND IN METHOD OF CALLING.

R0013 CDUTRIG (AND CDUTRIG1, WHICH CAN BE CALLED IN BASIC) COMPUTE THE
R0014 SINES AND COSINES FROM THE CURRENT CONTENTS OF THE CDU REGISTERS.
R0015 THE CONTENTS OF CDUTEMP, ETC., ARE NOT TOUCHED SO THAT THEY MAY
R0016 CONTINUE TO FORM A CONSISTENT SET WITH THE LATEST PIPA READINGS.

R0017 CDUTRIG1 IS LIKE CDUTRIG EXCEPT THAT IT CAN BE CALLED IN BASIC.

R0018 CD*TR*GS FINDS CDU VALUES IN CDUSPOT PATHER THAN IN CDUTEMP. THIS
R0019 ALLOWS USERS TO MAKE TRANSFORMATIONS USING ARBITRARY ANGLES, OR REAL
R0020 ANGLES IN AN ORDER OTHER THAN X Y Z. A CALL TO THIS ROUTINE IS
R0021 NECESSARY IN PREPARATION FOR A CALL TO AX*SP*T IN EITHER OF ITS TWO
R0022 MODES (SMNB OR NBSM). SINCE AX*SR*T EXPECTS TO FIND THE SINES AND
R0023 COSINES IN THE ORDER Y Z X THE ANGLES MUST HAVE BEEN PLACED IN CDUSPOT
R0024 IN THIS ORDER. CD*TR*GS NEED NOT BE REPEATED WHEN AX*SR*T IS CALLED
R0025 MORE THAN ONCE, PROVIDED THE ANGLES HAVE NOT CHANGED. NOTE THAT SINCE
R0026 IT CLOBBERS BUF2 (IN THE SINE AND COSINE ROUTINES) CD*TR*GS CANNOT BE
R0027 CALLED USING BANKCALL. SORRY.

R0028 CD*TR*G IS LIKE CD*TR*GS EXCEPT THAT IT CAN BE CALLED IN
R0029 INTERPRETIVE.

0030		23,3443	77776	1	CDUTRIG	EXIT	
0031	RFF 1	23,3444	0 3453	0	TC	CDUTRIGS	
0032	REF 231 LAST 1249	23,3445	0 6036	1	TC	INTPRET	
0033		23,3446	77616	0	RVQ		

0034		23,3447	77776	1	CD*TR*G	EXIT	
0035	REF 1	23,3450	0 3461	1	TC	CD*TR*GS	
0036	REF 232 LAST 1254	23,3451	0 6036	1	TC	INTPRET	
0037		23,3452	77616	0	RVQ		

0038	RFF 17 LAST 945	23,3453	3 0032	0	CDUTRIGS	CA	CDUX
0039	REF 26 LAST 965	23,3454	54 772	1	TS	CDUSPOT	+4
0040	RFF 8 LAST 945	23,3455	3 0033	1	CA	CDUY	
0041	REF 27 LAST 1254	23,3456	54 766	1	TS	CDUSPOT	

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0042	REF	11	LAST	945	23,3457	3 0034 0	CA	CDUZ	
0043	REF	28	LAST	1254	23,3460	54 770 0	TS	CDUSPDT +2	
0044					23,3461	0 0006 1	CD*TR*GS	EXTEND	
0045	REF	26	LAST	921	23,3462	22 142 0	QXCH	TEM2	
0046	REF	24	LAST	1072	23,3463	3 4751 0	CAF	FOUR	
0047	REF	22	LAST	1042	23,3464	7 6241 1	TR*GL**P	MASK SIX	MAKE IT EVEN AND SMALLER
0048	REF	13	LAST	921	23,3465	54 143 0	TS	TEM3	
0049	REF	14	LAST	1255	23,3466	50 143 1	INDEX	TEM3	
0050	REF	29	LAST	1255	23,3467	3 0766 0	CA	CDUSPOT	
0051	REF	718	LAST	1232	23,3470	52 155 1	DXCH	MPAC	STDRING 2'S CDMP ANGLE, LOADING MPAC
0052	REF	65	LAST	1068	23,3471	52 127 1	DXCH	VBJF +4	STORING MPAC FOR LATER RESTORATION
0053	REF	5	LAST	824	23,3472	0 4713 0	TC	USPRCADR	
0054	REF	13	LAST	581	23,3473	21465 0	CADR	CDULOGIC	
0055					23,3474	0 0006 1	EXTEND		
0056	REF	719	LAST	1255	23,3475	3 0155 0	DCA	MPAC	
0057	REF	15	LAST	1255	23,3476	50 143 1	INDEX	TEM3	
0058	REF	30	LAST	1255	23,3477	52 767 0	DXCH	CDUSPDT	STORING 1'S COMPLEMENT ANGLE
0059	REF	6	LAST	1255	23,3500	0 4713 0	TC	USPRCADR	
0060	REF	2	LAST	1008	23,3501	01517 0	CADR	COSINE	
0061	REF	720	LAST	1255	23,3502	52 155 1	DXCH	MPAC	
0062	REF	16	LAST	1255	23,3503	50 143 1	INDEX	TEM3	
0063	REF	4	LAST	116	23,3504	52 745 0	DXCH	CCSCDU	STORING COSINE
0064					23,3505	0 0006 1	EXTEND		
0065	REF	17	LAST	1255	23,3506	5 0143 1	INDEX	TEM3	
0066	REF	31	LAST	1255	23,3507	3 0767 1	DCA	CDUSPDT	LOADING 1'S COMPLEMENT ANGLE
0067	REF	7	LAST	1255	23,3510	0 4713 0	TC	USPRCADR	
0068	REF	2	LAST	1008	23,3511	01531 1	CADR	SINE +1	SINE +1 EXPECTS ARGUMENT IN A AND L
0069	REF	66	LAST	1255	23,3512	52 127 1	DXCH	VBJF +4	BRINGING UP PRIOR MPAC TO BE RESTORED
0070	REF	721	LAST	1255	23,3513	52 155 1	DXCH	MPAC	
0071	REF	18	LAST	1255	23,3514	50 143 1	INDEX	TEM3	
0072	REF	4	LAST	116	23,3515	52 737 0	DXCH	SINCDU	
0073	REF	19	LAST	1255	23,3516	10 143 0	CCS	TEM3	
0074	REF	1			23,3517	1 3464 0	TCF	TR*GL**P	
0075	REF	27	LAST	1255	23,3520	0 0142 0	TC	TEM2	

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P0076 *****

R0078 QUICTRIG, INTENDED FOR GUIDANCE CYCLE USE WHERE TIME IS CRITICAL, IS A MUCH FASTER VERSION OF CD*TR*GS.
 R0080 QUICTRIG COMPUTES AND STORES THE SINES AND COSINES OF THE 2'S COMPLEMENT ANGLES AT COUSPOT, COUSPOT +2,
 R0082 AND COUSPOT +4. UNLIKE CD*TR*GS, QUICTRIG DOES NOT LEAVE THE 1'S COMPLEMENT VERSIONS OF THE ANGLES IN
 R0084 COUSPOT. QUICTRIG'S EXECUTION TIME IS 4.1 MS; THIS IS 10 TIMES AS FAST AS CD*TR*GS. QUICTRIG MAY BE
 R0086 CALLED FROM INTERPRETIVE AS AN RTB OP-CODE, OR FROM BASIC VIA BANKCALL OR IBNKCALL.

0090				23,3521	0 0004 0	QUICTRIG	INHINT		INHINT SINCE DAP USES THE SAME TEMPS
00901				23,3522	0 0006 1		EXTEND		
00902	REF	38	LAST	902	23,3523	22 061 0	QXCH	ITEMP1	
0091	REF	25	LAST	1255	23,3524	3 4751 0	CAF	EQR	
0092	REE	23	LAST	1255	23,3525	7 6241 1	+4	MASK	SIX
0093	REF	14	LAST	902	23,3526	54 062 1	TS	ITEMP2	
0094	REF	15	LAST	1256	23,3527	50 062 0	INDEX	ITEMP2	
0095	REE	32	LAST	1255	23,3530	3 0766 0	CA	COUSPOT	
0096	REE	5	LAST	613	23,3531	0 5033 1	TC	SPSIN	
0097				23,3532	0 0006 1		EXTEND		
0098	REE	75	LAST	1127	23,3533	7 4736 0	MP	BIT14	SCALE DOWN TO MATCH INTERPRETER OUTPUTS
0099	REF	16	LAST	1256	23,3534	50 062 0	INOEX	ITEMP2	
0100	REF	5	LAST	1255	23,3535	52 737 0	DXCH	SINCDU	
0101	REF	17	LAST	1256	23,3536	50 062 0	INDEX	ITEMP2	
0102	REE	33	LAST	1256	23,3537	3 0766 0	CA	COUSPOT	
0103	REF	5	LAST	613	23,3540	0 5032 0	TC	SPCOS	
0104				23,3541	0 0006 1		EXTEND		
0105	REF	76	LAST	1256	23,3542	7 4736 0	MP	BIT14	
0106	REF	18	LAST	1256	23,3543	50 062 0	INDEX	ITEMP2	
0107	REE	5	LAST	1255	23,3544	52 745 0	DXCH	COSCDU	
0108	REE	19	LAST	1256	23,3545	10 062 1	CCS	ITEMP2	
0109	REF	5	LAST	911	23,3546	1 3525 1	TCF	QUICTRIG +4	
01091	REE	39	LAST	1256	23,3547	3 0061 0	CA	ITEMP1	
0110				23,3550	0 0003 1		RELINT		
01101	REF	382	LAST	1215	23,3551	0 0000 1	TC	A	

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R0111 *****

R0113 THESE INTERFACE ROUTINES MAKE IT POSSIBLE TO CALL AX*SR*T, ETC., IN
R0114 INTERPRETIVE. LATER, WHERE POSSIBLE, THEY WILL BE ELIMINATED.

R0127 THESE INTERFACE ROUTINES ARE PERMANENT. ALL RESTORE USER'S EBANK
R0128 SFTTING. ALL ARE STRICT INTERPRETIVE SUBROUTINES, CALLED USING "CALL",
R0129 RETURNING VIA QPRET. ALL EXPECT AND RETURN THE VECTOR TO BE TRANSFOR-
R0130 MED INTERPRETER-STYLE IN MPAC; COMPONENTS AT MPAC, MPAC +3, AND MPAC +5.

R0131 TRG*SMNB AND TRG*NBSM BOTH EXPECT TO SEE THE 2'S COMPLEMENT ANGLES
R0132 AT COUSPOT (ORDER Y Z X, AT COUSPOT, COUSPOT +2, AND COUSPOT +4; DDD
R0133 LOCATIONS NEED NOT BE ZEROED). TRG*NBSM DOES THE NB TO SM TRANSFOR-
R0134 MATION; TRG*SMNB, VICE VERSA.

R0135 CDU*NBSM DOES ITS TRANSFORMATION USING THE PRESENT CONTENTS OF
R0136 THE CDU COUNTERS. OTHERWISE IT IS LIKE TRG*NBSM.

R01361 CDU*SMNB IS THE COMPLEMENT OF COU*NBSM.

01362				23,3552	77776	1	CDU*SMNB	EXIT	
01363	REF	2	LAST 1254	23,3553	0 3453	0		TC	COUTRIGS
01364	REF	1		23,3554	1 3557	1		TCF	C*MM*N1

0137				23,3555	77776	1	TRG*SMNB	EXIT	
0138	REF	2	LAST 1254	23,3556	0 3461	1		TC	CD*TR*GS
0139	REF	4	LAST 1065	23,3557	0 7531	1	C*MM*N1	TC	MPACVBUF
0140	REF	32	LAST 1094	23,3560	4 6244	1		CS	THREE
0141	REF	2	LAST 612	23,3561	0 3601	0	C*MM*N2	TC	AX*SR*T
0142	REF	233	LAST 1254	23,3562	0 6036	1		TC	INTPRET
0143				23,3563	43575	1		VLOAD	RVQ
0144	REF	67	LAST 1255	23,3564	00123	1			VBUF

AX*SR*T EXPECTS VECTOR IN VBUF
SIGNAL FOR SM TO NB TRANSFORMATION

0145				23,3565	77776	1	CDU*NBSM	EXIT	
0146	REF	3	LAST 1257	23,3566	0 3453	0		TC	COUTRIGS
0147	REF	1		23,3567	1 3572	0		TCF	C*MM*N3

0148				23,3570	77776	1	TRG*NBSM	EXIT	
0149	REF	3	LAST 1257	23,3571	0 3461	1		TC	CO*TR*GS
0150	REF	5	LAST 1257	23,3572	0 7531	1	C*MM*N3	TC	MPACVBUF
0151	REF	33	LAST 1257	23,3573	3 6244	0		CA	THREE
0152	REF	1		23,3574	1 3561	1		TCF	C*MM*N2

FOR AX*SR*T
SIGNAL FOR NB TO SM TRANSFORMATION

R0153 *NBSM* AND *SMNB* EXPECT TO SEE THE SINES AND COSINES (AT SINCDU
R0154 AND COSCDU) RATHER THAN THE ANGLES THEMSELVES. OTHERWISE THEY ARE
R0155 LIKE TRG*NBSM AND TRG*SMNB.

R0156 NOTE THAT JUST AS CO*TR*GS NEED BE CALLED ONLY ONCE FOR EACH SERIES
R0157 OF TRANSFORMATIONS USING THE SAME ANGLES, SO TOO ONLY ONE OF TRG*NBSM

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R0158 AND TRG*SMNB NEED BE CALLED FOR EACH SERIES. FOR SUBSEQUENT TRANSFOR-
 R0159 MATIONS USE *NBSM* AND *SMNB*.

0160				23,3575	77776 1	*SMNB*	EXIT	
0161	REF	2	LAST 1257	23,3576	1 3557 1		TCF	C*MM*N1

0162				23,3577	77776 1	*NBSM*	EXIT	
0163	REE	2	LAST 1257	23,3600	1 3572 0		TCF	C*MM*N3

R0164 AX*SR*T COMBINES THE OLD SMNB AND NBSM. FOR THE NB TO SM
 R0165 TRANSFORMATION, ENTER WITH +3 IN A. FOR SM TO NB, ENTER WITH -3.
 R0166 THE VECTOR TO BE TRANSFORMED ARRIVES, AND IS RETURNED, IN VBUF.
 R0167 AX*SR*T EXPECTS TO FIND THE SINES AND COSINES OF THE ANGLES OF ROTATION
 R0168 AT SINCDU AND COSCDU, IN THE ORDER Y Z X. A CALL TO CD*TR*GS, WITH
 R0169 THE 2'S COMPLEMENT ANGLES (ORDER Y Z X) AT CDUSROT, WILL TAKE CARE OF
 R0170 THIS. HERE IS A SAMPLE CALLING SEQUENCE:-

R0171		TC	CDUTRIGS	
R0172		CS	THREE	("CA THREE" FOR NBSM)
R0173		TC	AX*SR*T	

R0174 THE CALL TO CD*TR*GS NEED NOT BE REPEATED, WHEN AX*SR*T IS CALLED MORE
 R0175 THAN ONCE, UNLESS THE ANGLES HAVE CHANGED.

R0176 AX*SR*T IS GUARANTEED SAFE ONLY FOR VECTORS OF MAGNITUDE LESS THAN
 R0177 UNITY. A LOOK AT THE CASE IN WHICH A VECTOR OF GREATER MAGNITUDE
 R0178 HAPPENS TO LIE ALONG AN AXIS OF THE SYSTEM TO WHICH IT IS TO BE TRANS-
 R0179 FORMED CONVINCES ONE THAT THIS IS A RESTRICTION WHICH MUST BE ACCEPTED.

0180	REF	2	LAST 1254	23,3601	54 142 1	AX*SR*T	TS	DEXDEX	WHERE IT BECOMES THE INDEX OF INDEXES
0181				23,3602	0 0006 1		EXTEND		
0182	REF	1		23,3603	22 145 1		QXCH	RTNSAVER	

0183	REF	3	LAST 125B	23,3604	10 142 1	R*TL**R	CCS	DEXDEX	+3 --> 0	-3 --> 2
0184	REF	4	LAST 125B	23,3605	4 0142 1		CS	DEXDEX	+2 --> 1	-2 --> 1
0185	REF	34	LAST 1257	23,3606	6 6244 0		AD	THREE	+1 --> 2	-1 --> 0
0186				23,3607	0 0006 1		EXTEND			
0187	REE	383	LAST 1256	23,3610	5 0000 1		INDEX	A		
0188	REF	1		23,3611	3 3670 0		DCA	INDEXI		
0189	REF	1		23,3612	52 144 1		DXCH	DEXI		

0190	REF	128	LAST 1216	23,3613	3 4753 1		CA	ONE		
0191	REF	143	LAST 1110	23,3614	54 130 1		TS	BUE		
0192				23,3615	0 0006 1		EXTEND			
0193	REF	2	LAST 114	23,3616	5 0143 1		INDEX	DEXI		
0194	REF	68	LAST 1257	23,3617	4 0123 0		DCS	VBUF		
0195	REF	1		23,3620	1 3622 0		TCF	LOOPI		

REALLY BE A SUBTRACT, AND VICE VERSA

0196	REF	144	LAST 125B	23,3621	52 131 0	LOOR2	DXCH	BUE	LOADING VECTOR COMPONENT, STORING INDEX
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L POWERED FLIGHT SUBROUTINES

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0197	REF 722	LAST 1255	23,3622	52 155 1	LOOP1	DXCH	MPAC	
0198	REF 1		23,3623	3 3666 1		CA	SINE SLOC	
0199	REF 3	LAST 1258	23,3624	6 0143 1		AD	DEX1	
0200	REF 81	LAST 1071	23,3625	54 116 0		TS	ADDRWD	
0201	REF 21	LAST 1080	23,3626	0 7106 1		TC	DMPSUB	MULTIPLY BY SIN(CDUANGLE)
0202	REF 5	LAST 1258	23,3627	10 142 1		CCS	DEXDEX	
0203	REF 723	LAST 1259	23,3630	52 155 1		DXCH	MPAC	NBSM CASE
0204			23,3631	1 3634 1		TCF	+3	
0205			23,3632	0 0006 1		EXTEND		SMNB CASE
0206	REF 724	LAST 1259	23,3633	4 0155 1		DCS	MPAC	
0207	REF 1		23,3634	52 160 1		DXCH	TERMITMP	
0208	REF 24	LAST 1256	23,3635	3 6241 0		CA	SIX	SINCDU AND COSCDU (EACH 6 WORDS) MUST
0209	REF 82	LAST 1259	23,3636	26 116 0		ADS	ADDRWD	BE CONSECUTIVE AND IN THAT ORDER
0210			23,3637	0 0006 1		EXTEND		
0211	REF 145	LAST 1258	23,3640	5 0130 0		INDEX	BUF	
0212	REF 4	LAST 1259	23,3641	5 0143 1		INDEX	DEX1	
0213	REF 69	LAST 1258	23,3642	3 0123 1		DCA	VBUF	
0214	REF 725	LAST 1259	23,3643	52 155 1		DXCH	MPAC	
0215	REF 22	LAST 1259	23,3644	0 7106 1		TC	DMPSUB	MULTIPLY BY COS(CDUANGLE)
0216	REF 726	LAST 1259	23,3645	52 155 1		DXCH	MPAC	
0217	REF 2	LAST 1259	23,3646	20 160 1		DAS	TERMITMP	
0218	REF 3	LAST 1259	23,3647	52 160 1		DXCH	TERMITMP	
0219			23,3650	20 001 1		DDOUBL		
0220	REF 146	LAST 1259	23,3651	50 130 0		INDEX	BUF	
0221	REF 5	LAST 1259	23,3652	50 143 1		INDEX	DEX1	
0222	REF 70	LAST 1259	23,3653	52 123 0		DXCH	VBUF	
0223	REF 147	LAST 1259	23,3654	52 131 0		DXCH	BUF	LOADING INDEX, STORING VECTOR COMPONENT
0224	REF 384	LAST 1258	23,3655	10 000 0		CCS	A	'CAUSE THAT'S WHERE THE INDEX NOW IS
0225	REF 1		23,3656	1 3621 0		TCF	LOOP2	
0226			23,3657	0 0006 1		EXTEND		
0227	REF 6	LAST 1259	23,3660	26 142 1		DIM	DEXDEX	DECREMENT MAGNITUDE PRESERVING SIGN
0228	REF 7	LAST 1259	23,3661	10 142 1	TSTPOINT	CCS	DEXDEX	ONLY THE BRANCHING FUNCTION IS USED
0229	REF 1		23,3662	1 3604 1		TCF	R*TL**P	
0230	REF 2	LAST 1258	23,3663	0 0145 1		TC	RTNSAVER	
0231	REF 2	LAST 1259	23,3664	1 3604 1		TCF	R*TL**P	
0232	REF 3	LAST 1259	23,3665	0 0145 1		TC	RTNSAVER	
0233	REF 6	LAST 1256	23,3666	00736 0	SINESLOC ADRES	SINCDU		FOR USE IN SETTING ADDRWD
0234			23,3667	00004 0	INDEXI	DEC	4	***** DON'T *****
0235			23,3670	00002 0		DEC	2	***** TOUCH *****
0236			23,3671	00000 1		DEC	0	***** THESE *****

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0237

23,3672 00004 0

DEC 4

***** CONSTANTS *****

R0238

L POWERED ELIGHT SUBROUTINES

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P0240 THIS SUBROUTINE COMPUTES INCREMENTAL CHANGES IN COU(GIMBAL) ANGLES FROM INCREMENTAL CHANGES ABOUT SM AXES. IT
 R0242 REQUIRES SM INCREMENTS AS A DP VECTOR SCALED AT ONE REVOLUTION(DTHETASM,+2,+4). SIN,COS(COUY,Z,X) ARE IN
 R0244 SINCDU,+2,+4 AND COSCDU,+2,+4 RESPECTIVELY, SCALED TO ONE HALF. CDU INCREMENTS ARE PLACED IN DCU,+2,+4 SCALED TO
 R0246 ONE REVOLUTION.

R0247 * COS(IGA)SEC(MGA) 0 -SIN(IGA)SEC(MGA) *
 R0248 * * *
 R0249 * -COS(IGA)TAN(MGA) 1 SIN(IGA)TAN(MGA) *
 R0250 * * *
 R0251 * SIN(IGA) 0 COS(IGA) *

0252 14,3711 BANK 14
 0253 REE 1 23,2000 SETLOC POWELIT1
 0254 23,3673 BANK
 0255 23,3673 41345 0 SMCDURES DLOAD DMP
 0256 REE 1 23,3674 01265 1 DTHE TASM
 0257 REF 6 LAST 946 23,3675 00745 1 COSCDUY

0258 23,3676 41325 0 PODL DMP
 0259 REE 2 LAST 1261 23,3677 01271 1 DTHE TASM +4
 0260 REF 6 LAST 946 23,3700 00737 1 SINCDUY

0261 23,3701 77621 1 BOSU
 0262 23,3702 77671 1 DDV
 0263 REE 10 LAST 946 23,3703 00747 0 COSCDUZ
 0264 REF 1 23,3704 03234 1 STORE DCU

0265 23,3705 72405 0 OMP SL1 SCALE
 0266 REF 8 LAST 945 23,3706 00741 0 SINCDUZ
 0267 23,3707 77621 1 BOSU

0268 REE 3 LAST 1261 23,3710 01267 0 DTHE TASM +2
 0269 REE 2 LAST 1261 23,3711 17236 0 STODL DCU +2
 0270 REF 4 LAST 1261 23,3712 01265 1 DTHE TASM

0271 23,3713 65205 0 DMP PDDL
 0272 REF 7 LAST 1261 23,3714 00737 1 SINCDUY
 0273 REE 5 LAST 1261 23,3715 01271 1 DTHE TASM +4

0274 23,3716 43205 1 OMP DAD
 0275 RFE 7 LAST 1261 23,3717 00745 1 COSCDUY
 0276 23,3720 77752 1 SL1
 0277 REF 3 LAST 1261 23,3721 03240 1 STORE DCU +4
 0278 23,3722 77616 0 RVQ

L TIME OF FREE FALL

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R0001 THE TFF SUBROUTINES MAY BE USED IN EITHER EARTH OR MOON CENTERED COORDINATES. THE TFF ROUTINES NEVER
 R0003 KNOW WHICH ORIGIN APPLIES. IT IS THE USER WHO KNOWS, AND WHO SUPPLIES RONE, VONE AND 1/SQRT(MU) AT THE
 R0005 APPROPRIATE SCALE LEVEL FOR THE PROPER PRIMARY BODY.

R0006	EARTH ORIGIN	POSITION	-29	METERS
R0007		VELOCITY	-7	METERS/CENTISECOND
R0009		1/SQRT(MU)	+17	SQRT(CS SQ/METERS CUBED)

R0011	MOON ORIGIN	POSITION	-27	METERS
R0012		VELOCITY	-5	METERS/CENTISECONDS
R0014		1/SQRT(MU)	+14	SQRT(CS SQ/METERS CUBED)

R0016 ALL DATA PROVIDED TO AND RECEIVED FROM ANY TFF SUBROUTINE WILL BE AT ONE OF THE LEVELS ABOVE. IN ALL CASES,
 R0018 THE FREE FALL TIME IS RETURNED IN CENTISECONDS AT (-28). PROGRAM TFF/CONIC WILL GENERATE VONE/RTMU AND
 R0020 LEAVE IT IN VONE' AT (+10) IF EARTH ORIGIN AND (+9) IF MOON ORIGIN.

R0021 THE USER MUST STORE THE STATE VECTOR IN RONE, VONE AND MU IN THE FORM 1/SQRT(MU) IN TFF/PTMU
 R0023 AT THE PROPER SCALE BEFORE CALLING TFF/CONIC. SINCE RONE, VONE ARE IN THE EXTENDED VERB STORAGE AREA,
 R0025 THE USER MUST ALSO LOCK OUT THE EXTENDED VERBS, AND RELEASE THEM WHEN FINISHED.

R0027 PROGRAMS CALC/TFF AND CALC/TPER ASSUME THAT THE TERMINAL RADIUS IS LESS THAN THE PRESENT
 R0029 RADIUS. THIS RESTRICTION CAN BE REMOVED BY A 15 W CODING CHANGE, BUT AT PRESENT IT IS NOT DEEMED NECESSARY.

R0031
 R0032 THE FOLLOWING ERASABLE QUANTITIES ARE USED BY THE TFF ROUTINES, AND ARE LOCATED IN THE PUSH LIST.
 R0034

A0035		BELOW	F:	IS USED FOR EARTH ORIGIN SCALE
A0036			M:	IS USED FOR MOON ORIGIN SCALE

A0037		TFFSW	=	119D	BIT1	0 = CALCTFF	1 = CALCTPER
0038	0012	TFFDELQ	=	10D		Q2-Q1	E: (-16) M: (-15)
0039	0014	RMAG1	=	12D		ABVAL(RN) M	E: (-29) M: (-27)
A0040		RPER	=	14D		PERIGEE RADIUS M	E: (-29) M: (-27)
0041	0016	TFFQ1	=	14D		R.V / SQRT(MUE)	E: (-16) M: (-15)
A0042		SDELF/2				SIN(THETA) /2	
0043	0016	CDELF/2	=	14D		COS(THETA) /2	
A0044		RAPO	=	16D		APOGEE RADIUS M	E: (-29) M: (-27)
0045	0020	NRTERM	=	16D		TERMINAL RADIUS M	E: (-29+NR)
A0046							M: (-27+NR)
0047	0022	RTERM	=	18D		TERMINAL RADIUS M	E: (-29) M: (-27)
0048	0024	TFFVSQ	=	20D		-(V SQUARED/MU) 1/M	E: (20) M: (18)
0049	0026	TFF1/ALF	=	22D		SEMI MAJ AXIS M	E: (-22-2 NA)
A0050							M: (-20-2 NA)
0051	0030	TFFRTALF	=	24D		SQRT(ALFA)	E: (10+NA) M: (9+NA)
0052	0032	TFFALFA	=	26D		ALFA 1/M	E: (26-NR) M: (24-NR)
0053	0034	TFFNP	=	28D		SEMI LATUS RECTUM M	E: (-38+2 NR)
A0054							M: (-36+2 NR)
0055	0036	TFF/RTMU	=	30D		1/SQRT(MU)	E: (17) M: (14)
0056	0040	NRMAG	=	32D		PRESENT RADIUS M	E: (-29+NR)
A0057							M: (-27+NR)
0058	0042	TFFX	=	34D			
0059	0044	TFFTEM	=	36D		TEMPORARY	

L TIME OF FREE FALL

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A0060
A0061
A0062
A0063
A0064
A0065

REGISTERS S1, S2 ARE UNTOUCHED BY ANY TFF SUBROUTINE
INDEX REGISTERS X1, X2 ARE USED BY ALL TFF SUBROUTINES. THEY ARE ESTAB-
LISHED IN TFF/CONIC AND MUST BE PRESERVED BETWEEN CALLS TO SUBSEQUENT
SUBROUTINES.
-NR
-NA

C(X1) = NORM COUNT OF RMAG
C(X2) = NORM COUNT OF SORT(ABS(ALFA))

L TIME OF FREE FALL

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P0066

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R0067 SUBROUTINE NAME: TFFCONIC DATE: 01.29.67
R0069 MOD NO: 0 LOG SECTION: TIME OF FREE FALL
R0071 MCD BY: RR BAIRNSFATHER
R0072 MCD NC: 1 MOD BY: RR BAIRNSFATHER DATE: 11 APR 67
R0073 MCD NC: 2 MOD BY: RR BAIRNSFATHER DATE: 21 NOV 67 ADD MOON MU.
R0075 MCD NO: 3 MOD BY: RR BAIRNSFATHER DATE: 21 MAR 68 ACCEPT DIFFERENT EARTH/MOON SCALES
R0077 FUNCTIONAL DESCRIPTION: THIS SUBROUTINE IS CALLED TO COMPUTE THOSE CONIC PARAMETERS REQUIRED BY THE TFF
R0079 SUBROUTINES AND TO ESTABLISH THEM IN THE PUSH LIST AREA. THE PARAMETERS ARE LISTED UNDER OUTPUT.
R0081 THE EQUATIONS ARE
R0082
R0083  $H = RN * VN$  ANGULAR MOMENTUM
R0085
R0086  $LCP = H.H / MU$  SEMI LATUS RECTUM
R0088
R0089  $ALFA = 2/RN - VN.VN / MU$  RECIPROCAL SEMI MAJ AXIS, SIGNED

R0091 AND ALFA IS POS FOR ELLIPTIC ORBITS
R0092 0 FOR PARABOLIC ORBITS
R0093 NEG FOR HYPERBOLIC ORBITS.
R0094 SUBROUTINE ALSO COMPUTES AND SAVES RMAG.
R0095 CALLING SEQUENCE:
R0096 TFFCONIC EXPECTS CALLER TO ENTER WITH CORRECT GRAVITATIONAL CONSTANT IN MPAC, IN THE FORM
R0098  $1/\sqrt{MU}$ . PROGRAM WILL SAVE IN TFF/RTMU. THE SCALE IS DETERMINED BY WHETHER EARTH OR MOON
R0100 ORIGIN IS USED. THE CALLER MUST LOCK OUT THE EXTENDED VERBS BEFORE PROVIDING STATE VECTOR IN RONE,
R0102 VONE AT PROPER SCALE. THE EXTENDED VERBS MUST BE RESTORED WHEN THE CALLER IS FINISHED USING THE
R0104 TFF ROUTINES.
R0105 ENTRY POINT TFFCONMU EXPECTS THAT TFF/RTMU IS ALREADY LOADED.
R0107 TO SPECIFY MU: OLOAD CALL IF MU ALREADY STORED: CALL
R0109 YOURMU 1/RTMU E: (17) M: (14) TFFCONMU
R0111 TFFCONIC
R0112 PUSHLOC = PDL+0, ARBITRARY IF LEQ 180

R0113 SUBROUTINES CALLED: NONE
R0114 NORMAL EXIT MODES: RVQ
R0115 ALARMS: NONE
R0116 OUTPUT: THE FOLLOWING ARE STORED IN THE PUSH LIST AREA.
R0117 RMAG1 E: (-29) M: (-27) M RN, PRESENT RADIUS LENGTH.
R0118 NRMAG E: (-29+NR) M RMAG, NORMALIZED
R0119 M: (-27+NR)
R0120 X1 -NR, NORM COUNT
R0121 TFFNP E: (-38+2NR) M LCP, SEMI LATUS RECTUM, WEIGHTED BY NR. FOR VGAMCALC
R0123 M: (-36+2NR)
R0124 TFF/RTMU E: (17) M: (14)  $1/\sqrt{MU}$ 
R0125 TFFVSO E: (20) M: (18) 1/M  $-(V SQ/MU)$ : PRESENT VELOCITY, NORMALIZED. FOR VGAMCALC
R0127 TEFALFA E: (26-NR) 1/M ALFA, WEIGHTED BY NR
R0128 M: (24-NR)
R0129 TFFRTALF E: (10+NA) SORT(ALFA), NORMALIZED
R0130 M: (9+NA)

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R0131 X2 -NA, NORM COUNT
 R0132 TFF1/ALF E: (-22-2NA) SIGNED SEMI MAJ AXIS, WEIGHTED BY NA
 R0133 M: (-20-2NA)
 R0134 PUSHLOC AT PDL+0
 R0135 THE FOLLOWING IS STORED IN GENERAL ERASABLE
 R0136 VONE' E:(10) M:(9) V/RT(MU), NORMALIZED VELOCITY
 R0137 ERASABLE INITIALIZATION REQUIRED:
 R0138 RCNE E:(-29) M:(-27) M STATE VECTOR LEFT BY CALLER
 R0140 VCNE E:(-7) M:(-5) M/CS STATE VECTOR LEFT BY CALLER
 R0142 TFF/RTMU E:(17) M:(14) 1/RT(CS SQ/M CUBE) IF ENTER VIA TFFCONMU.
 R0144 DEFRRIS: QPRET, PDL+0 ... PDL+3
 R0145

0146				33,3755		BANK 33	
0147	REF	1		27,2000		SETLOC TOF-FF	
0148				27,3332		BANK	
0149	REF	2	LAST	61 TO 61:	2 2*	COUNT* %/TFF	
0150	REF	4	LAST	725	27,3332	00037 0 TFFCONIC STORE TFF/RTMU	1/SQRT(MU) E: (17) M: (14)
0151				27,3333	53575 0	TFFCONMU VLOAD UNIT	COME HERE WITH TFFRTMU LOADED.
0152	REF	18	LAST	728	27,3334	02213 0	SAVED RN. M E: (-29) M: (-27)
0153				27,3335	77725 1	PDDL	UR/2 TO PDL+0, +5
0154				27,3336	00045 0	36D	MAGNITUDE
0155	REF	1		27,3337	00015 0	STORE RMAG1	M E: (-29) M: (-27)
0156				27,3340	77701 1	NORM	
0157	REF	63	LAST	1231	27,3341	00047 1	X1 -NR
0158	REF	1		27,3342	24041 1	STOVL NRMAG	RMAG M E: (-29+NR) M: (-27+NR)
0159	REF	9	LAST	728	27,3343	02221 1	SAVED VN. M/CS E: (-7) M: (-5)
0160				27,3344	77761 1	VXSC	
0161	REF	5	LAST	1265	27,3345	00037 0	TFF/RTMU E: (17) M: (14)
0162	REF	1		27,3346	02170 0	STORE VONE'	VN/SQRT(MU) E: (10) M: (9)
0163				27,3347	47361 0	VXSC	
0164	REF	2	LAST	1265	27,3350	00041 1	VXV NRMAG E: (-29+NR) M: (-27+NR)
A0165							UR/2 FROM PDL
0166				27,3351	47572 1	VSL1 VSQ	BEFORE: E: (-19+NR) M: (-18+NR)
0167	REF	1		27,3352	14035 1	STODL TFFNP	LC P M E: (-38+2NR) M: (-36+2NR)
A0168							SAVE ALSO FOR VGAMCALC
0169	REF	1		27,3353	06414 0		
0170				27,3354	63271 0	DDV PDVL	(2/RMAG) 1/M E: (26-NR) M: (24-NR)
0171	REF	3	LAST	1265	27,3355	00041 1	RMAG M E: (-29+NR) M: (-27+NR)
0172	REF	2	LAST	1265	27,3356	02170 0	VONE' SAVED VN. E: (10) M: (9)
0173				27,3357	57436 1	VSQ DCOMP	KEEP MPAC+2 HONFST FOR SORT.
0174	REF	1		27,3360	00025 0	STORE TFFVSQ	-(V SQ/MU) E: (20) M: (18)
A0175							SAVE FOR VGAMCALC
0176				27,3361	43257 0	SR* DAD	

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0177			27,3362	20573 1		0 -6,1	GET -VSQ/MU	E:(26-NR)	M:(24-NR)
0178			27,3363	77626 0	STADR				
A0179							2/RMAG	FROM PDL+2	
0180	REF	1	27,3364	77744 0	STORE	TFFALFA	ALFA 1/M	F:(26-NR)	M:(24-NR)
0181			27,3365	41457 1	SL*	PUSH	TEMP SAVE ALFA	E:(20)	M:(18)
0182			27,3366	20173 0		0 -6,1			
0183			27,3367	75446 0	ABS	SQRT	E:(10)	M:(9)	
0184			27,3370	77701 1	NORM				
0185	REF	28	27,3371	00050 1		X2	X2 = -NA		
0186	REF	1	27,3372	00031 0	STORF	TFFFTALF	SQRT(ABS(ALFA))	E:(10+NA)	M:(9+NA)
0187			27,3373	75316 1	DSQ	SIGN	NOT SO ACCURATE, BUT OK		
A0188							ALFA FROM PDL+2	F:(20)	M:(18)
0189			27,3374	55254 1	BZE	BDDV	SET 1/ALFA =0, TO SHOW SMALL ALFA		
0190			27,3375	57377 0		+2			
0191	REF	2	27,3376	06414 0		TFF1/4			
0192	REF	1	27,3377	00027 1	+2	STORE	1/ALFA	E:(-22-2 NA)	M:(-20-2 NA)
0193			27,3400	77616 0	DUMPCNIC	RVQ			

A0194

39 W

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R0195 SUBROUTINE NAME: TFFRP/RA
 R0197 MOD NO: 0
 R0199 MOD BY: RR BAIRNSFATHER
 R0200 MOD NO: 1 MOD BY: RR BAIRNSFATHER
 R0201 MOD NO: 2 MOD BY: RR BAIRNSFATHER
 R0203
 R0205 FUNCTIONAL DESCRIPTION: USED BY CALCTPER AND TFF DISPLAYS TO CALCULATE PERIGEE RADIUS AND ALSO
 R0207 APOGEE RADIUS FOR A GENERAL CONIC.
 R0208 PROGRAM GIVES PERIGEE RADIUS AS APOGEE RADIUS IS GIVEN BY
 R0210 $RP = P / (1+E)$ $RA = (1+E) / ALFA$
 R0212 WHERE $E = 1 - P ALFA$
 R0213
 R0214 IF RA IS NEGATIVE OR SHOWS DIVIDE OVERFLOW, THEN RA = POSMAX BECAUSE
 R0216 1. APOGEE RADIUS IS NOT MEANINGFUL FOR HYPERBOLA
 R0217 2. APOGEE RADIUS IS NOT DEFINED FOR PARABOLA
 R0218 3. APOGEE RADIUS EXCEEDS THE SCALING FOR ELLIPSE.
 R0219 THIS SUBROUTINE REQUIRES THE SIGNED RECIPROCAL SEMI MAJ AXIS, ALFA, AND SEMI LATUS RECTUM AS DATA.
 R0221 CALLING SEQUENCE: CALL TFFRP/RA
 R0222
 R0223 PLSHLOC = PDL+0, ARBITRARY IF LEQ 10D
 R0224 C(MPAC) UNSPECIFIED

 R0225 SUBROUTINES CALLED: NONE
 R0226 NORMAL EXIT MODE: RVQ
 R0227 IF ELLIPSE, WITHIN NORMAL SCALING, RAPO IS CORRECT.
 R0228 OTHERWISE, RAPO = POSMAX.
 R0229 ALARMS: NONE
 R0230 OUTPUT: STORED IN PUSH LIST AREA. SCALE OF OUTPUT AGREES WITH DATA SUPPLIED TO TFF/CONIC.
 R0232 RPER E: (-29) M: (-27) M PERIGEE RADIUS DESTROYED BY CALCTFF/CALCTPER, TFFTRIG.
 R0234 RAPO E: (-29) M: (-27) M APOGEE RADIUS WILL BE DESTROYED BY CALCTFF/CALCTPER
 R0236 PUSHLOC AT PDL+0
 R0237 ERASABLE INITIALIZATION REQUIRED:
 R0238 TFFALFA E: (26-NR) M 1/SEMI MAJ AXIS LEFT BY TFFCONIC
 R0240 M: (24-NR)
 R0241 TFFNP E: (-38+2NR) M LC P, SEMI LATUS RECTUM LEFT BY TFFCONIC
 R0243 M: (-36+2NR)
 R0244 X1 -NR, NORM COUNT OF RMAG LEFT BY TFFCONIC
 R0246 X2 -NA, NORM COUNT OF ALFA LEFT BY TFFCONIC
 R0248 DEBRIS: QPRET, PDL+0 ... PDL+1

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A0285

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R0286 SUBROUTINE NAME: CALCTPER / CALCTFF
 R0288 MOD NO: 0
 R0290 MOD BY: RR BAIRNSFATHER
 R0291 MOD NO: 1 MOD BY: RR BAIRNSFATHER OATE: 21 MAR 67
 R0292 MOD NO: 2 MOD BY: RR BAIRNSFATHER OATE: 14 APR 67
 R0293 MOD NO: 3 MOD BY: RR BAIRNSFATHER DATE: 8 JUL 67 NEAR EARTH MUE AND NEG TFF (GONFPAST)
 R0295 MOD NO: 4 MOD BY: RR BAIRNSFATHER OATF: 21 NOV 67 AOO VARIABLE MU.
 R0297 MOD NO: 5 MOD BY: RR BAIRNSFATHER OATE: 21 MAR 68 ACCEPT DIFFERENT EARTH/MOON SCALES
 R0299 FUNCTIONAL DESCRIPTION: PROGRAM CALCULATES THE FREE-FALL TIME OF FLIGHT FROM PRESENT POSITION RN AND
 R0301 VELOCITY VN TO A RADIUS LENGTH SPECIFIED BY RTERM, SUPPLIED BY THE USER. THE POSITION VECTOR
 R0303 RN MAY BE ON EITHER SIDE OF THE CONIC, BUT RTERM IS CONSIDERED ON THE INBOUND SIDE.
 R0305 THE EQUATIONS ARE

R0306 $Q2 = -\sqrt{RTERM (2 - RTERM \text{ ALFA}) - LCP} \quad (\text{INBOUND SIDE}) \quad LEQ \leftarrow -LCE / \sqrt{\text{ALFA}}$
 R0308 $=$
 R0309 $Q1 = RN \cdot VN / \sqrt{\text{MU}}$ $LEQ \leftarrow LCE / \sqrt{\text{ALFA}}$

R0311 $Z = \text{NUM} / \text{DEN} \quad LEQ \leftarrow 1 / \sqrt{\text{ALFA}}$

R0313 WHERE, IF INBOUND
 R0314 $\text{NUM} = RTERM - RN \quad LEQ \leftarrow 2 LCE / \text{ALFA}$
 R0316 $\text{DEN} = Q2 + Q1 \quad LEQ \leftarrow 2 LCE / \sqrt{\text{ALFA}}$

R0318 AND, IF OUTBOUND
 R0319 $\text{NUM} = Q2 - Q1 \quad LEQ \leftarrow 2 LCE / \sqrt{\text{ALFA}}$
 R0321 $\text{DEN} = 2 - \text{ALFA} (RTERM + RN) \quad LEQ \leftarrow 2 LCE$

R0323 IF $\text{ALFA} \cdot ZZ < 1.0 \quad (\text{FOR ALL CONICS EXCEPT ELLIPSES HAVING ABS(DEL ECC ANOM) G 90 DEG})$

R0325 THEN $X = \text{ALFA} \cdot Z \cdot Z$
 R0326 AND $\text{TFF} = (RTERM + RN - 2 \cdot ZZ \cdot T(X)) \cdot Z / \sqrt{\text{MU}}$

R0327 EXCEPT IF $\text{ALFA} \cdot \text{PNZ}$, AND IF TFF NEG,
 R0328 THEN $\text{TFF} = 2 \cdot \text{PI} / (\text{ALFA} \cdot \sqrt{\text{ALFA}}) + \text{TFF}$

R0329 OR IF $\text{ALFA} \cdot ZZ \cdot \text{GEQ} \cdot 1.0 \quad (\text{FOR ELLIPSES HAVING ABS(DEL ECC ANOM) GEQ 90 DEG})$

R0331 THEN $X = 1 / \text{ALFA} \cdot Z \cdot Z$
 R0332 AND $\text{TFF} = (\text{PI} / \sqrt{\text{ALFA}}) - Q2 + Q1 + 2(X \cdot T(X) - 1) / \text{ALFA} \cdot Z / \text{ALFA} \cdot \sqrt{\text{MU}}$

R0334 WHERE $T(X)$ IS A POLYNOMIAL APPROXIMATION TO THE SERIES
 R0335 $\frac{1}{3} - \frac{X}{5} + \frac{X^2}{7} - \frac{X^3}{9} \dots \quad (X < 1.0)$
 R0336

R0337 CALLING SEQUENCE: TIME TO RTERM
 R0339 CALL TIME TO PERIGEE

R0340 CALCTFF
 R0342 $C(\text{MPAC}) = \text{TERMNL RAD} \cdot M \quad C(\text{MPAC}) = \text{PERIGEE RAD} \cdot M$

R0344 FOR EITHER, E: (-29) M: (-27)
 R0345 FOR EITHER, PUSHLOC = PDL+0, ARBITRARY IF LEQ RD.

L TIME OF FREE FALL

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R0346 SUBROUTINES CALLED: T(X), VIA RTB
 R0347 NORMAL EXIT MODE: RVQ
 R0348 HOWEVER, PROGRAM EXITS WITH ONE OF THE FOLLOWING VALUES FOR TFF (-28) CS IN MPAC. USER MUST STORE.
 R0350 A. TFF= FLIGHT TIME. NORMAL CASE FOR POSITIVE FLIGHT TIME LESS THAN ONE ORBITAL PERIOD.
 R0352 B. (THIS OPTION IS NO LONGER USED.)
 R0353 C. TFF = POSMAX. THIS INDICATES THAT THE CONIC FROM THE PRESENT POSITION WILL NOT RETURN TO
 R0355 THE SPECIFIED ALTITUDE. ALSO INDICATES OUTBOUND PARABOLA OR HYPERBOLA.
 R0357 OUTPUT: C(MPAC) (-28) CS TIME OF FLIGHT, OR TIME TO PERIGEE
 R0358 TFFX (0) X, LEFT FOR ENTRY DISPLAY TFF ROUTINES
 R0360 RTERM E: (-29+NR) M RTERM, WEIGHTED BY NR LEFT FOR ENTRY DISPLAY TFF ROUTINES
 R0362 M: (-27+NR)
 R0363 TFFTEM E: (-59+2NR) LCP Z Z SGN(SDELF) LEFT FOR ENTRY DISPLAY TFF ROUTINES
 R0365 M: (-55+2NR) LCP /ALFA SGN(SDELF) LEFT FOR ENTRY DISPLAY TFF ROUTINES
 R0367 NOTE: TFFTEM = PDL 36D AND WILL BE DESTROYED BY .:UNIT:.
 R0368 RMAG1 E: (-29) M: (-27) PDL 12 NOT TOUCHED.
 R0369 TFFQ1 E: (-16) M: (-15) PDL 14D
 R0370 TFFDELQ E: (-16) M: (-15) PDL 10D
 R0371 PLSHLOC AT PDL+0
 R0372 ERASABLE INITIALIZATION REQUIRED:
 R0373 RCNE E: (-29) M: (-27) M STATE VECTOR LEFT BY USER
 R0375 VCNE E: (-10) M: (-9) VN/SQRT(MU) LEFT BY TFF/CONIC
 R0377 RMAG1 E: (-29) M: (-27) PRESENT RADIUS, M LEFT BY TFFCONIC
 R0379 C(MPAC) E: (-29) M: (-27) RTERM, TERMINAL RADIUS LENGTH, M LEFT BY USER

 R0381 THE FOLLOWING ARE STORED IN THE PUSH LIST AREA.
 R0382 TFF/RTMU E: (17) M: (14) 1/SQRT(MU) LEFT BY TFFCONIC.
 R0384 NRMAG E: (-29+NR) M RMAG, NORMALIZED LEFT BY TFFCONIC
 R0386 M: (-27+NR)
 R0387 X1 -NR, NORM COUNT LEFT BY TFFCONIC
 R0389 TFFNP E: (-38+2NR) M LCP, SEMI LATUS RECTUM, WEIGHT NR LEFT BY TFFCONIC
 R0391 M: (-36+2NR)
 R0392 TFFALFA E: (26-NR) 1/M ALFA, WEIGHT NR LEFT BY TFFCONIC
 R0394 M: (24-NR)
 R0395 TFFRTALF E: (10+NA) SQRT(ALFA), NORMALIZED LEFT BY TFFCONIC
 R0397 M: (9+NA)
 R0398 X2 -NA, NORM COUNT LEFT BY TFFCONIC
 R0400 TFF1/ALF E: (-22-2NA) SIGNED SEMIMAJ AXIS, WEIGHTED BY NA LEFT BY TFFCONIC
 R0402 M: (-20-2NA)
 R0403 DEBRIS: QPRET, PDL+0 ... PDL+3
 R0404 RTERM E: (-29) M: (-27) RTERM, TERMINAL RADIUS LENGTH
 R0405 RAPO E: (-29) M: (-27) PDL 16D (=NRTERM)
 R0406 RPER E: (-29) M: (-27) PDL 14D (=TFFQ1)

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P0407				27,3437	77614 1	CALCTPER	SETGO		ENTER WITH RPER IN MPAC
0408	REF	1		27,3440	03436 0			TFESW	
0409				27,3441	57444 1			+3	
0410				27,3442	77614 1	CALCTFF	CLEAR		ENTER WITH RTERM IN MPAC
0411				27,3443	03676 0			TFESW	
0412	REF	2	LAST 1271	27,3444	00023 0	+3	STORE	RTERM	E: (-29) M: (-27)
0413	REF	1		27,3445	77657 0		SL*		
0414				27,3446	20201 0			0,1	X1=-NR
0415	REF	1		27,3447	00021 1		STORE	NRTERM	RTERM E: (-29+NR) M: (-27+NR)
0416				27,3450	44205 0		DMP	BOSU	
0417	REF	3	LAST 1268	27,3451	00033 1			TFALFA	ALFA E: (26-NR) M: (24-NR)
0418	REF	4	LAST 1268	27,3452	06414 0			TF1/4	
0419				27,3453	41206 0		PUSH	OMP	(2-ALFA RTERM) (-3) TO PDL+0
0420				27,3454	00021 1			NRTERM	E: (-29+NR) M: (-27+NR)
0421	REF	2	LAST 1271	27,3455	53725 1		PDDL	SR*	RTERM(2-ALFA RTERM) TO POL+2
0422									E: (-32+NR) M: (-30+NR)
A0423									LC P E: (-38+2NP) M: (-36+2NR)
0424	REF	4	LAST 1268	27,3456	00035 1			TFNP	X1 = -NR
0425				27,3457	20573 1			0 -6,1	QUE TO SHIFTS, KEEP PRECISION FOR SORT
0426				27,3460	43276 0		OCOMP	OAD	RTERM(2-ALFA RTERM) FROM PDL+2
A0427									E: (-32+NR) M: (-30+NR)
A0428									LEAVE E: (-32) M: (-30)
0429				27,3461	77657 0		SR*		X1 = -NR
0430				27,3462	20601 1			0,1	CHECK TFF / TPER SWITCH
0431				27,3463	71214 0		BOFF	OLDAD	
0432	REF	3	LAST 1271	27,3464	03756 0			TFESW	
0433				27,3465	57467 0			+2	IF TFF, CONTINUE
0434	REF	1		27,3466	06424 0			TFZEROS	IF TPER, SET Q2 = 0
0435				27,3467	75440 0	+2	BMN	SQRT	E: (-16) M: (-15)
0436	REF	1		27,3470	57622 0			MAXTFF1	NO FREE FALL CONIC TO RTERM FROM HERE
A0437									RESET PDL, SET TFF=POS MAX, AND EXIT.
0438				27,3471	41076 0		OCOMP	BCVR	RT IS DN INBOUND SIDE. ASSURE DVFIND=0
0439	REF	5	LAST 1268	27,3472	57725 0			TC DANZIG	ANY PORT IN A STORM.
0440	REF	1		27,3473	24045 0		SIQVL	TFELEM	Q2 E: (-16) M: (-15)
0441	REF	3	LAST 1265	27,3474	02170 0			VDNE'	VN/SORT(MU) E: (10) M: (9)
0442				27,3475	52441 1		DOT	SL3	
0443	REF	19	LAST 1265	27,3476	02213 0			RONE	SAVE0 RN. E: (-29) M: (-27)
0444	REF	1		27,3477	00017 1		STORE	TFFQ1	Q1, SAVE FOR GONEPAST TEST.
A0445									E: (-16) M: (-15)
0446				27,3500	44240 1		BMN	RDSU	
0447	REF	1		27,3501	57522 0			INBOUND	USE ALTERNATE Z
0448	REF	2	LAST 1271	27,3502	00045 0			TFELEM	Q2 E: (-16) M: (-15)
A0449									OUTBOUND Z CALC CONTINUES HERE
0450	REF	1		27,3503	14043 0		SIODL	TFFX	NUM=Q2-Q1 E: (-16) M: (-15)
0451	REF	4	LAST 1271	27,3504	00033 1			TFALFA	ALFA E: (26-NR) M: (24-NR)
0452				27,3505	44205 0		OMP	BOSU	

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A0498									F: (-13) M: (-12)
0499									Z TO PDL+0
0500									Z SQ TO PDL+2 E: (-26) M: (-24)
0501	REF	5	LAST 1271	27,3551	00035	1			LC P E: (-38+2NR) M: (-36+2NR)
0502				27,3552	75261	0	SL	SIGN	
0503				27,3553	20206	1		5	
0504	REF	5	LAST 1272	27,3554	00045	0		TFFTFM	AFFIX SIGN FOR SDELF (ENTRY DISPLAY)
0505	REF	6	LAST 1273	27,3555	14045	0	STOOL	TFFTFM	P ZSQ E: (-59+2NR) M: (-55+2NR)
A0506									(ARG IS USED IN TFF/TRIG)
A0507									ZSQ FROM PDL+2 E: (-26) M: (-24)
0508				27,3556	41206	0	PUSH	DMP	RESTORE PUSH LOC
0509	REF	6	LAST 1272	27,3557	00033	1		TFFALFA	ALFA E: (26-NR) M: (24-NR)
0510				27,3560	77657	0	SL*		
0511				27,3561	20201	0		0,1	X1=-NR
0512	REF	5	LAST 1272	27,3562	00043	0	STORE	IFEX	X
0513				27,3563	41234	1	RTB	OMP	
0514	REF	1		27,3564	57707	0		T(X)	POLY
A0515									ZSQ FROM PDL+2 E: (-26) M: (-24)
0516				27,3565	44302	0	SR2	ROSU	2 ZSQ T(X) E: (-29) M: (-27)
0517	RFF	3	LAST 1272	27,3566	00023	0		RTFRM	RTERM F: (-29) M: (-27)
0518				27,3567	41215	1	DAD	DMP	
0519	REF	3	LAST 1272	27,3570	00015	0		RMAG1	E: (-29) M: (-27)
A0520									Z FROM PDL+0 E: (-13) M: (-12)
0521				27,3571	51042	0	SR3	BPL	TFF SQRT(MU) F: (-45) M: (-42)
0522	REF	1		27,3572	57613	1		FNOTFF	(NO PUSH UP)
0523				27,3573	75206	1	PUSH	SIGN	TFF SQRT(MU) TO PDL+0
0524	REF	3	LAST 1272	27,3574	00017	1		TFFQ1	Q1 FOR GONEPAST TEST
0525				27,3575	71244	0	BPL	DLOAD	GONE PAST ?
0526	RFF	1		27,3576	57617	0		NEGTF	YES. TFF < 0 .
0527	REF	3	LAST 1268	27,3577	00027	1		TFF1/ALF	1/ALFA F: (-22-2NA) M: (-20-2NA)
0528				27,3600	51076	1	DCOMP	BPL	ALFA > 0 ?
0529	REF	2	LAST 1273	27,3601	57617	0		NEGTF	NO. TFF IS NEGATIVE.
A0530									CORRECT FOR ORBITAL PERIOD.
0531				27,3602	77676	0	DCOMP		YES. CORRECT FOR ORB PERIOD.
0532				27,3603	56205	0	OMP	DDV	
0533	REF	1		27,3604	17727	0		PI/16	2 PI (-5)
0534	REF	3	LAST 1272	27,3605	00031	0		IFERTALF	SQRT(ALFA) E: (10+NA) M: (9+NA)
0535				27,3606	53657	0	SL*	SL*	
0536				27,3607	57602	1		0 -4,2	X2=-NA
0537				27,3610	57602	1		0 -4,2	
0538				27,3611	43257	0	SL*	OAO	
0539				27,3612	57576	1		0,2	
A0540									TFF SQRT(MU) FROM POL+0 E: (-45) M: (-42)
0541				27,3613	40005	0	ENOTFF	OMP	TFF SQRT(MU) IN MPAC E: (-45) M: (-42)
0542	REF	6	LAST 1265	27,3614	00037	0		BOV	E: (17) M: (14)
0543	REF	1		27,3615	57623	1		TFF/RTMU	SET POSMAX IF OVFL.
								MAXTFF	
0544				27,3616	77616	0		DUMPTFF2 RVQ	RETURN TFF (-28) CS IN MPAC.

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0545				27,3617	77745 1	NEGTF	DLOAD		
A0546									TFF SORT(MU) FROM PDL+0, NEGATIVE.
0547				27,3620	77650 1		GOTO		
0548	REF	2	LAST 1273	27,3621	57613 1			ENDTFF	
0549				27,3622	77745 1	MAXTFF1	DLOAD		RESET PDL
0550				27,3623	43545 1	MAXTFF	DLOAD	RVQ	
0551	REF	4	LAST 1268	27,3624	17743 1			NEARONE	
R0552									TIME OF FLIGHT ELLIPSE WHEN DEL (ECCENTRIC ANOM) GEO 90 AND LEQ -90.
A0553									NUM FROM TFFX. E: (-16) OR (-29)
A0554									M: (-15) OR (-27)
0555				27,3625	77712 0	TFFELL	SL2		NUM E: (-14) OR (-27) M: (-13) OR (-25)
0556				27,3626	41465 0		BDDV	PUSH	TEMP SAVE D/N IN PDL+0
A0557									DEN FROM PDL+0 E: (-3)/(16) M: (-3)/(-15)
A0558									N/D TO PDL+0 E: (11) M: (10)
0559				27,3627	45345 1	TFFELL	DLOAD	DSU	{ENTER WITH D/N=0 IN PDL+0}
0560	REF	7	LAST 1273	27,3630	00045 0			TFFTEM	Q2 E: (-16) M: (-15)
0561	REF	4	LAST 1273	27,3631	00017 1			TFFQ1	Q1 E: (-16) M: (-15)
0562	REF	1		27,3632	14013 0		STODL	TFFELQ	Q2-Q1 E: (-16) M: (-15)
A0563									D/N FROM PDL+0
0564				27,3633	77626 0		STADR		
0565	REF	8	LAST 1274	27,3634	77732 1		STORE	TFFTEM	D/N E: (11) M: (10)
0566				27,3635	53605 1		DMP	SL*	
0567	REF	4	LAST 1273	27,3636	00027 1			TFF1/ALF	1/ALFA E: (-22-2NA) M: (-20-2NA)
0568				27,3637	57576 1			0,2	1/ALFA Z E: (-11-NA) M: (-10-NA)
0569				27,3640	41206 0		PUSH	DMP	TO PDL+0
0570	REF	9	LAST 1274	27,3641	00045 0			TFFTEM	1/2 E: (11) M: (10)
0571				27,3642	41057 0		SL*	ROVB	
0572				27,3643	57576 1			0,2	X2= -NA
0573	REF	14	LAST 1214	27,3644	21664 0			SIGNMPAC	IN CASE X= 1.0, CONTINUE
0574	REF	6	LAST 1273	27,3645	00043 0		STORE	TFFX	X=1/ALFA ZSQ
0575				27,3646	41234 1		RTB	DMP	
0576	REF	2	LAST 1273	27,3647	57707 0			T(X)	POLY
0577	REF	7	LAST 1274	27,3650	00043 0			TFFX	
0578				27,3651	45242 1		SR3	DSU	
0579	REF	1		27,3652	17735 0			DP2(-3)	
0580				27,3653	41405 0		DMP	PUSH	2(X T(X)-1) /Z ALFA E: (-15-NA)
A0581									M: (-14-NA)
A0582									1/ALFA Z FROM PDL+0 E: (-11-NA)
A0583									M: (-10-NA)
0584				27,3654	41345 0		DLOAD	DMP	GET SIGN FOR SDELF
0585	REF	10	LAST 1274	27,3655	00045 0			TFFTEM	1/2 E: (11) M: (10)
0586	REF	4	LAST 1273	27,3656	00015 0			RMAG1	E: (-29) M: (-27)
0587				27,3657	43312 0		SL2	DAD	
0588	REF	5	LAST 1274	27,3660	00017 1			TFFQ1	Q1 E: (-16) M: (-15)
0589	REF	11	LAST 1274	27,3661	14045 0		STODL	TFFTEM	{Q1+R 1/2} =SGN OF SDELF E: (-16) M: (-15)
0590	REF	6	LAST 1273	27,3662	00035 1			TFFNP	LC P E: (-38+2NR) M: (-36+2NR)
0591				27,3663	53605 1		DMP	SL*	CALC FOR ARG FOR TFF/TRIG.

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0592	REF	5	LAST 1274	27,3664	00027 1	TFF1/ALF	1/ALFA E: (-22-2NA) M: (-20-2NA)
0593				27,3665	57575 1	1,2	X2=-NA
0594				27,3666	53765 0	SL*	
0595	REF	12	LAST 1274	27,3667	00045 0	TFFTFFM	AFFIX SIGN FOR SDELF
0596				27,3670	57576 1	0,2	
0597	REF	13	LAST 1275	27,3671	14045 0	STODL	P/ALFA E: (-59+2NR) M: (-55+2NR)
A0598							(ARG FOR USE IN TFF/TRIG)
0599	REF	6	LAST 1275	27,3672	00027 1	TFF1/ALF	1/ALFA E: (-22-2NA) M: (-20-2NA)
0600				27,3673	41366 1	SORT	
0601	REF	2	LAST 1273	27,3674	17727 0	PI/16	PI (-4)
0602				27,3675	77615 0	DAD	
A0603							2(XT(X)-1)/Z ALFA FROM PDL E: (-15-NA)
A0604							M: (-14-NA)
0605				27,3676	45257 0	SL*	DSU
0606				27,3677	57577 0		0 -1,2
0607	REF	2	LAST 1274	27,3700	00013 0	TFFDELQ	Q2-Q1 E: (-16) M: (-15)
0608				27,3701	53605 1	DMP	
0609	REF	7	LAST 1275	27,3702	00027 1	TFF1/ALF	1/ALFA E: (-22-2NA) M: (-20-2NA)
0610				27,3703	57601 1		0 -3,2
0611				27,3704	52057 1	SL*	GOTO
0612				27,3705	57602 1		0 -4,2
0613	REF	3	LAST 1274	27,3706	57613 1	ENDTFF	TFF SQRT(MU) IN MPAC E: (-45) M: (-42)

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P0614 PROGRAM NAME: T(X)
 R0616 MCO NC: 0
 R0618 MCD BY: RR BAIRNSEATHER
 R0619 FUNCTIONAL DESCRIPTION: THE POLYNOMIAL T(X) IS USED BY TIME OF FLIGHT SUBROUTINES CALCTFF AND
 R0621 CALCTPR TO APPROXIMATE THE SERIES
 R0622
$$\frac{1}{3} - X/5 + X^2/7 - X^3/9 \dots$$

 R0623
 R0624 WHERE $X = \text{ALFA } Z \cdot Z$ IF $\text{ALFA } Z \cdot Z \leq 1$
 R0625 $X = 1/(\text{ALFA } Z \cdot Z)$ IF $\text{ALFA } Z \cdot Z > 1$
 R0626 ALSO X IS NEG FOR HYPERBOLIC ORBITS
 R0627 $X = 0$ FOR PARABOLIC ORBITS
 R0628 X IS POSITIVE FOR ELLIPTIC ORBITS
 R0629 FOR FLIGHT 278, THE POLYNOMIAL T(X) IS FITTED OVER THE RANGE (0,+1) AND HAS A MAXIMUM
 R0631 DEVIATION FROM THE SERIES OF 2×10^{-5} (T(X) IS A CHEBYCHEV TYPE FIT AND WAS OBTAINED USING
 R0633 MAC PROGRAM AUTCURFIT294RRB AND IS VALID TO THE SAME TOLERANCE OVER THE RANGE (-.08,+1).)
 R0635 CALLING SEQUENCE: RTB
 R0636 T(X)
 R0637 C(MPAC) = X
 R0638 SUBROUTINES CALLED: NONE
 R0639 NORMAL EXIT MODE: TC OANZIG
 R0640 ALARMS: NONE
 R0641 OUTPUT: C(MPAC) = T(X)
 R0642 ERASABLE INITIALIZATION REQUIRED:
 R0643 C(MPAC) = X
 R0644 OEBRIS: NONE
 R0645 REF 7 LAST 1185 27,3707 0 7221 1 T(X) TC POLY
 R0646 27,3710 00004 0 DEC 4 N-1
 R0647 27,3711 12525 0 2DEC 3.333333333 E-1
 R0647 27,3712 12525 0
 R0648 27,3713 71463 0 2DEC* -1.999819135 E-1 *
 R0648 27,3714 57703 1
 R0649 27,3715 04423 0 2DEC* 1.418148467 E-1 *
 R0649 27,3716 17645 0
 R0650 27,3717 74604 0 2DEC* -1.01310997 E-1 *
 R0650 27,3720 43667 1
 R0651 27,3721 01626 1 2DEC* 5.609004986 E-2 *
 R0651 27,3722 37256 1
 R0652 27,3723 77404 1 2DEC* -1.536156925 E-2 *
 R0652 27,3724 52071 0
 R0653 REF 60 LAST 1207 27,3725 0 6060 1 ENDT(X) TC OANZIG
 R0654 REF 1 27,3725 TCOANZIG = FNOT(X)

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P0655 TFF CONSTANTS 32,3766 BANK 32
0656

0657 REF 2 LAST 61 27,2000 SETLOC TOF-FF1
0658 27,3726 BANK

A0659 NOTE _ NOTE _ ADJUSTED MUE FOR NEAR EARTH TRAJ.

A0660 MUE = 3.990 815 471 E10 M CUBE/CS SQ
A0661 RTMUE = 1.997702549 E5 B-18* MODIFIED EARTH MU

A0663 NOTE _ NOTE _ ADJUSTED MUE FOR NEAR EARTH TRAJ.

A0664 MUM = 4.902 778 F8 M CUBE /CS SQ

A0665 RTMUM 2DEC* 2.21422176 E4 B-18*
0666 PI/16 2DEC 3.141592653 B-4
0666 27,3726 06220 1 37553 0
0667 27,3727 37553 0
0667 27,3730 37777 1 LIM(-22) 20CT 37777 37700 1.0 -B(-22)
0667 27,3731 37700 1
0668 27,3732 00000 1 DP(-22) 20CT 00000 00100 B(-22)
0668 27,3733 00100 0
0669 27,3734 04000 0 DP2(-3) 2DEC 1 B-3
0669 27,3735 00000 1
0670 27,3736 02000 0 DP2(-4) 2DEC 1 B-4 1/16
0670 27,3737 00000 1
R0671 RPAD1 2DEC 6373338 B-29 M (-29) =20.909 901.57 FT

0672 REF 4 LAST 725 23,2275 RPAD1 = RPAD
0673 27,3740 00305 1 R300K 2DEC 6464778 B-29 (-29) M
0673 27,3741 11205 0
0674 27,3742 37777 1 NEARONE 2DEC .999999999
0674 27,3743 37777 1
0675 REF 18 LAST 1244 23,2423 TFFZEROS EQUALS H16ZEROS
0676 REF 1 23,2413 TFF1/4 EQUALS H16P1/4

L AGC BLOCK TWO SELF-CHECK

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R0001 PROGRAM DESCRIPTION
R0003 PROGRAM NAME - SELF-CHECK
R0005 MCD NO - 1
R0007 MCD BY - GAUNT

DATE 20 DECEMBER 1967
LOG SECTION AGC BLOCK TWO SELF-CHECK
ASSEMBLY SUBROUTINE UTILITYM REV 25

R0008 FUNCTIONAL DESCRIPTION

R0009 PROGRAM HAS TWO MAIN PARTS. THE FIRST IS SELF-CHECK WHICH RUNS AS A ZERO PRIORITY JOB WITH NO CORE SET, AS
R0011 PART OF THE BACK-UP IDLE LOOP. THE SECOND IS SHOW-BANKSUM WHICH RUNS AS A REGULAR EXECUTIVE JOB WITH ITS OWN
R0013 STARTING VERB.
R0014 THE PURPOSE OF SELF-CHECK IS TO CHECK OUT VARIOUS PARTS OF THE COMPUTER AS OUTLINED BELOW IN THE OPTIONS.
R0016 THE PURPOSE OF SHOW-BANKSUM IS TO DISPLAY THE SUM OF EACH BANK, ONE AT A TIME.
R0020 IN ALL THERE ARE 7 POSSIBLE OPTIONS IN THIS BLOCK II VERSION OF SELF-CHECK. MORE DETAIL DESCRIPTION MAY BE
R0022 FOUND IN E-2065 BLOCK II AGC SELF-CHECK AND SHOW-BANKSUM BY EDWIN D. SMALLY DECEMBER 1966, AND ADDENDA 2 AND 3.
R0024 THE DIFFERENT OPTIONS ARE CONTROLLED BY PUTTING DIFFERENT NUMBERS IN THE SMODE REGISTER (NOUN 27). BELOW IS
R0026 A DESCRIPTION OF WHAT PARTS OF THE COMPUTER THAT ARE CHECKED BY THE OPTIONS, AND THE CORRESPONDING NUMBER, IN
R0028 OCTAL, TO LOAD INTO SMODE.
R0032 +-4 ERASABLE MEMORY
R0033 +-5 FIXED MEMORY
R0034 +-1,2,3,6,7,10 EVERYTHING IN OPTIONS 4 AND 5.
R0036 -0 SAME AS +-10 UNTIL AN ERROR IS DETECTED.
R0037 +0 NO CHECK, PUTS COMPUTER INTO THE BACKUP IDLE LOOP.

R0038 WARNINGS

R0039 USE OF E MEMORY RESERVED FOR SELF-CHECK (EVEN IN IDLE LOOP) AS TEMP STORAGE BY OTHER PROGRAMS IS DANGEROUS.
R0041 SMODE SET GREATER THAN OCT 10 PUTS COMPUTER INTO BACKUP IDLE LOOP.

R0042 CALLING SEQUENCE

R0043 TO CALL SELF-CHECK KEY IN
R0044 V 21 N 27 E OPTION NUMBER E
R0047 TO CALL SHOW-BANKSUM KEY IN
R0048 V 91 E DISPLAYS FIRST BANK
R0049 V 33 E PROCEED, DISPLAYS NEXT BANK

R0050 EXIT MODES, NORMAL AND ALARM

R0051 SELF-CHECK NORMALLY CONTINUES INDEFINITELY UNLESS THERE IS AN ERROR DETECTED. IF SO + OPTION NUMBERS PUT
R0053 COMPUTER INTO BACKUP IDLE LOOP, - OPTION NUMBERS RESTART THE OPTION.
R0054 THE -0 OPTION PROCEEDS FROM THE LINE FOLLOWING THE LINE WHERE THE ERROR WAS DETECTED.
R0057 SHOW-BANKSUM PROCEEDS UNTIL A TERMINATE IS KEYED IN (V 34 E). THE COMPUTER IS PUT INTO THE BACKUP IDLE LOOP
R0059

R0060 OUTPLT

L AGC BLOCK TWO SELF-CHECK

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R0061 SELF-CHECK UPON DETECTING AN ERROR LOADS THE SELF-CHECK ALARM CONSTANT (01102) INTO THE FAILREG SFT AND
 R0063 TURNS ON THE ALARM LIGHT. THE OPERATOR MAY THEN DISPLAY THE THREE FAILREGS BY KEYING IN V 05 N 09 E. FOR FURTHER
 R0065 INFORMATION HE MAY KEY IN V 05 N 08 E, THE DSKY DISPLAY IN R1 WILL BE ADDRESS+1 OF WHERE THE ERROR WAS DETECTED,
 R0067 IN R2 THE BCON OF SELF-CHECK, AND IN R3 THE TOTAL NUMBER OF ERRORS DETECTED BY SELF-CHECK SINCE THE LAST MAN
 R0069 INITIATED FRESH START (SLAP1).
 R0073 SHOW-BANKSUM STARTING WITH BANK 0 DISPLAYS IN R1 THE BANK SUM (A +-NUMBER EQUAL TO THE BANK NUMBER), IN R2
 R0075 THE BANK NUMBER, AND IN R3 THE BUGGER WORD.

R0076 ERASABLE INITIALIZATION REQUIRED

R0077 ACCOMPLISHED BY FRESH START
 R0078 SMODE SET TO +0

R0079 DEBRIS

R0080 ALL EXITS FROM THE CHECK OF ERASABLE (ERASCHK) RESTORE ORIGINAL CONTENTS TO REGISTERS UNDER CHECK.
 R0082 EXCEPTION IS A RESTART. RESTART THAT OCCURS DURING ERASCHK RESTORES ERASABLE, UNLESS THERE IS EVIDENCE TO COURT
 R0084 E MEMCRY, IN WHICH CASE PROGRAM THEN DOES A FRESH START (DOFSTART).

0085		25,3671	BANK 25
0086	REF 1	43,2000	SETLQC SELFCHC
0087		43,3240	BANK

0088	REF 1		COUNT* 11/SELF
0089	REF 54	LAST 1094 4753	SBIT1 EQUALS BIT1
0090	REF 52	LAST 1094 4752	SBIT2 EQUALS BIT2
0091	REF 38	LAST 1094 4751	SBIT3 EQUALS BIT3
0092	REF 42	LAST 1094 4750	SBIT4 EQUALS BIT4
0093	REF 38	LAST 1009 4747	SBIT5 EQUALS BIT5
0094	REF 45	LAST 1051 4746	SBIT6 EQUALS BIT6
0095	REF 45	LAST 1091 4745	SBIT7 EQUALS BIT7
0096	REF 37	LAST 1117 4744	SBIT8 EQUALS BIT8
0097	REF 28	LAST 978 4743	SBIT9 EQUALS BIT9
0098	REF 47	LAST 1094 4742	SBIT10 EQUALS BIT10
0099	REF 34	LAST 1094 4741	SBIT11 EQUALS BIT11
0100	REF 42	LAST 1094 4740	SBIT12 EQUALS BIT12
0101	REF 45	LAST 1094 4737	SBIT13 EQUALS BIT13
0102	REF 77	LAST 1256 4736	SBIT14 EQUALS BIT14
0103	REF 44	LAST 1094 4735	SBIT15 EQUALS BIT15

0104	REF 223	LAST 1215 4755	S+ZERO EQUALS ZERO
0105	REF 55	LAST 1279 4753	S+1 EQUALS BIT1
0106	REF 53	LAST 1279 4752	S+2 EQUALS BIT2
0107	REF 35	LAST 1258 6244	S+3 EQUALS THREE
0108	REF 26	LAST 1256 4751	S+4 EQUALS FOUR
0109	REF 21	LAST 1029 4756	S+5 EQUALS FIVE
0110	REF 25	LAST 1259 6241	S+6 EQUALS SIX

L AGC BLOCK TWO SELF-CHECK

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0111	RFE	17	LAST	1094	4757		S+7	EQUALS	SEVEN	
0112	REF	15	LAST	1084	4357		S8BITS	EQUALS	LOW8	00377
0113	REF	2	LAST	319	4771		CNTRCON	=	OCT50	USED IN CNTRCHK
0114					43,3240	00061 0	ERASCON1	OCTAL	00061	USED IN ERASCHK
0115					43,3241	01373 1	ERASCON2	OCTAL	01373	USED IN ERASCHK
0116	REF	8	LAST	1094	5007		ERASCON6	=	OCT1400	USED IN ERASCHK
0117					43,3242	01461 0	ERASCON3	OCTAL	01461	USED IN ERASCHK
0118					43,3243	01773 0	ERASCON4	OCTAL	01773	USED IN ERASCHK
0119	REF	20	LAST	1019	5012		S10BITS	EQUALS	LOW10	01777, USED IN ERASCHK
0120	RFF	3	LAST	906	5020		SBNK03	EQUALS	PRIO6	06000, USED IN ROPECHK
0121	REF	7	LAST	1094	4350		-MAXADRS	=	H15	FOR ROPECHK
0122					43,3244	00060 1	SIXTY	OCTAL	00060	
0123					43,3245	60017 1	SUPRCON	OCTAL	60017	USED IN ROPECHK
0124					43,3246	17777 0	S13BITS	OCTAL	17777	
0125					43,3247	25252 0	CONC+S1	OCTAL	25252	USED IN CYCLSHFT
0126					43,3250	52400 1	CONC+S2	OCTAL	52400	USED IN CYCLSHFT
0127					43,3251	76777 1	ERASCON5	OCTAL	76777	
0128	REF	2	LAST	247	5660		S-7	=	OCT77770	
0129	RFF	2	LAST	1003	6111		S-4	EQUALS	NEG4	
0130	REE	3	LAST	890	7744		S-3	EQUALS	NEG3	
0131	REF	6	LAST	1098	7745		S-2	EQUALS	NEG2	
0132	REF	12	LAST	1094	7746		S-1	EQUALS	NEGONE	
0133	RFF	28	LAST	991	4754		S-ZERO	EQUALS	NEG0	
0134	REF	46	LAST	1127	F3,1400		EBANK=	LST1		
0135	REE	3	LAST	306	43,3252	01371 0	ADRS1	ADRES	SKFEP1	
0136	REF	4	LAST	1111	43,3253	03344 1	SELFADRS	ADRES	SELFCHK	SELFCHK RETURN ADDRESS. SHOULD BE PUT
A0137										IN SELFRET WHEN GOING FROM SELFCHK TO
A0138										SHOWSUM AND PUT IN SKEEP1 WHEN GOING
A0139										FROM SHOWSUM TO SELF-CHECK.
0140	REF	6	LAST	230	43,3254	3 1360 0	PRRORRS	CA	FRESTORE	IS IT NECESSARY TO RESTORE ERASABLE
0141					43,3255	0 0006 1		EXTEND		
0142	REF	1			43,3256	1 3265 1		BZF	FRRORS	NO
0143					43,3257	0 0006 1		EXTEND		
0144	REF	3	LAST	230	43,3260	3 1376 1		DCA	SKEEP5	
0145	REF	3	LAST	230	43,3261	51'377 0		INDEX	SKEEP7	
0146					43,3262	52 001 1		DXCH	0000	RESTORE THE TWO ERASABLE REGISTERS
0147	REF	2	LAST	305	43,3263	3 4755 1		CA	S+ZERO	
0148	REF	7	LAST	1280	43,3264	55'360 1		TS	FRFSTORE	
0149					43,3265	0 0004 0	ERRORS	INHINT		
0150	REF	324	LAST	1208	43,3266	3 0002 0		CA	Q	
0151	REF	3	LAST	484	43,3267	55'357 0		TS	SFAIL	SAVE Q FOR FAILURE LOCATION
0152	REF	3	LAST	320	43,3270	55'363 1		TS	AL4CADR	FOR DISPLAY WITH BBANK AND ERCOUNT
0153	REF	3	LAST	226	43,3271	25'365 0		INCR	ERCOUNT	KEEP TRACK OF NUMBER OF MALFUNCTIONS.
0154	REF	1			43,3272	0 5571 1	TCALARM2	TC	ALARM2	
0155					43,3273	01102 0		OCT	01102	SELF-CHECK MALFUNCTION INDICATOR
0156	REF	5	LAST	320	43,3274	11'362 0		CCS	SMD0E	
0157	REF	3	LAST	1280	43,3275	3 4755 1	STDLOOP	CA	S+ZERO	
0158	RFF	6	LAST	1280	43,3276	55'362 0		TS	SMD0E	

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0159	REF	5	LAST	1280	43,3277	0 3344 1		TC	SELFCHK	GO TO IDLE LOOP
0160	RFE	4	LAST	1280	43,3300	0 1357 1		TC	SFAIL	CONTINUE WITH SELF-CHECK
0161	REE	385	LAST	1259	43,3301	10 000 0	-1CHK	CCS	A	
0162	REF	1			43,3302	1 3254 0		TCF	PRRORS	
0163	REF	2	LAST	1281	43,3303	1 3254 0		TCF	PRRORS	
0164	REE	386	LAST	1281	43,3304	10 000 0		CCS	A	
0165	RFF	3	LAST	1281	43,3305	1 3254 0		TCF	PRRORS	
0166	RFF	325	LAST	1280	43,3306	0 0002 0		TC	Q	
0167					43,3307	0 0006 1	SMODECHK	EXTEND		
0168	REF	4	LAST	1280	43,3310	23'371 0		QXCH	SKEEP1	
0169	RFF	1			43,3311	0 3340 0		TC	CHCKNJ	CHECK FOR NEW JOB
0170	REE	7	LAST	1280	43,3312	11'362 0		CCS	SMODF	
0171	REF	1			43,3313	0 3320 0		TC	SOPTIONS	
0172	REF	1			43,3314	0 3311 1		TC	SMODECHK +2	TO BACKUP IDLE LOOP
0173	REF	2	LAST	1281	43,3315	0 3320 0		TC	SOPTIONS	
0174	REF	2	LAST	124	43,3316	25'366 0		INCR	SCOUNT	
0175	RFF	5	LAST	1281	43,3317	0 1371 0		TC	SKEEP1	CONTINUE WITH SELF-CHECK
0176	REF	1			43,3320	6 5660 1	SOPTIONS	AD	S-7	
0177					43,3321	0 0006 1		EXTEND		
0178					43,3322	6 3324 1		BZMF	+2	FOR OPTIONS BELOW NINE.
0179	REF	1			43,3323	0 3275 1	BNKOPIN	IC	SIDLOOP	ILLEGAL OPTION. GO TO IDLE LOOP.
0180	REF	3	LAST	1281	43,3324	25'366 0		INCR	SCOUNT	FOR OPTIONS BELOW NINE.
0181	REF	1			43,3325	6 4757 0		AD	S+7	
0182	RFE	387	LAST	1281	43,3326	50 000 1		INDEX	A	
0183	RFF	1			43,3327	0 3330 1		TC	SOPTION1	
0184	REF	6	LAST	1281	43,3330	0 1371 0	SOPTION1	TC	SKEEP1	WAS TC+TCF
0185	REF	7	LAST	1281	43,3331	0 1371 0	SOPTION2	TC	SKEEP1	WAS IN+OUT1
0186	REF	8	LAST	1281	43,3332	0 1371 0	SOPTION3	TC	SKEEP1	WAS COUNTCHK
0187	REF	1			43,3333	0 3345 0	SOPTION4	TC	ERASCHK	
0188	REE	1			43,3334	0 3526 0	SOPTION5	TC	ROPECHK	
0189	REF	9	LAST	1281	43,3335	0 1371 0	SOPTION6	TC	SKEEP1	
0190	REF	10	LAST	1281	43,3336	0 1371 0	SOPTION7	TC	SKEEP1	
0191	REF	11	LAST	1281	43,3337	0 1371 0	SOPTION10	TC	SKEEP1	CONTINUE WITH SELF-CHECK
0192					43,3340	0 0006 1	CHECKNJ	EXTEND		
0193	REF	7	LAST	1111	43,3341	23'361 1		QXCH	SELFRET	SAVE RETURN ADDRESS WHILE TESTING NEWJOB
0194	REF	49	LAST	1152	43,3342	0 4635 0		TC	POSTJUMP	TO SEE IF ANY JOBS HAVE BECOME ACTIVE.
0195	REF	2	LAST	1105	43,3343	03211 0		CADR	ADVAN	
0196	REE	2	LAST	1281	43,3344	0 3307 0	SELFCHK	TC	SMODFCHK	** CHARLEY, COME IN HERE
R0197	SKEEP7 HOLDS LOWEST OF TWO ADDRESSES BEING CHECKED.									
R0198	SKEEP6 HOLDS 8(X+1).									
R0199	SKEEP5 HOLDS 8(X).									
R0200	SKEEP4 HOLDS C(EBANK) DURING ERASLOOP AND CHECKNJ.									
R0201	SKEEP3 HOLDS LAST ADDRESS BEING CHECKED (HIGHEST ADDRESS).									

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R0202 SKEEP2 CONTROLS CHECKING OF NON-SWITCHABLE ERASABLE MEMORY WITH BANK NUMBERS IN EB.

R0204 ERASCHK TAKES APPROXIMATELY 7 SECONDS

0205	REF	2	LAST	305	43,3345	3 4753 1	ERASCHK	CA	S+1	
0206	REF	3	LAST	305	43,3346	55'372 1		TS	SKEEP2	
0207	REF	4	LAST	1280	43,3347	3 4755 1	OE8BANK	CA	S+ZEPO	
0208	REF	50	LAST	1084	43,3350	54 003 0		TS	EBANK	
0209	REF	1			43,3351	3 3242 0		CA	ERASCON3	01461
0210	REF	4	LAST	1280	43,3352	55'377 1		TS	SKEEP7	STARTING ADDRESS
0211	REF	1			43,3353	3 5012 1		CA	S10BITS	01777
0212	RFF	3	LAST	305	43,3354	55'373 0		TS	SKEEP3	LAST ADDRESS CHECKED
0213	RFF	1			43,3355	0 3375 0		TC	ERASLOOP	

0214	REF	1			43,3356	3 5007 0	E134567B	CA	ERASCON6	01400
0215	REF	5	LAST	1282	43,3357	55'377 1		TS	SKEEP7	STARTING ADDRESS
0216	REF	2	LAST	1282	43,3360	3 5012 1		CA	S10BITS	01777
0217	REF	4	LAST	1282	43,3361	55'373 0		TS	SKEEP3	LAST ADDRESS CHECKED
0218	REF	2	LAST	1282	43,3362	0 3375 0		TC	ERASLOOP	

0219	RFF	2	LAST	1282	43,3363	3 5007 0	2FBANK	CA	FRASCON6	01400
0220	RFF	6	LAST	1282	43,3364	55'377 1		TS	SKEEP7	STARTING ADDRESS
0221	REF	1			43,3365	3 3243 1		CA	ERASCON4	01773
0222	REF	5	LAST	1282	43,3366	55'373 0		TS	SKEEP3	LAST ADDRESS CHECKED
0223	REF	3	LAST	1282	43,3367	0 3375 0		TC	ERASLOOP	

0224	REF	4	LAST	1282	43,3370	55'372 1	NOE8BANK	TS	SKEEP2	+0
0225	REF	1			43,3371	3 3240 1		CA	ERASCON1	00061
0226	REF	7	LAST	1282	43,3372	55'377 1		TS	SKEEP7	STARTING ADDRESS
0227	REF	1			43,3373	3 3241 0		CA	ERASCON2	01373
0228	REF	6	LAST	1282	43,3374	55'373 0		TS	SKEEP3	LAST ADDRESS CHECKED

0229					43,3375	0 0004 0	ERASLOOP	INHINT		
0230	REF	51	LAST	1282	43,3376	3 0003 1		CA	EBANK	STORES C(EBANK)
0231	REF	3	LAST	230	43,3377	55'374 1		TS	SKEEP4	
0232					43,3400	0 0006 1		EXTEND		
0233	REF	8	LAST	1282	43,3401	5 1377 0		NDX	SKEEP7	
0234					43,3402	3 0001 0		DCA	0000	
0235	RFF	4	LAST	1280	43,3403	53'376 0		OXCH	SKEEP5	STORES C(X) AND C(X+1) IN SKEEP6 AND 5.
0236	REF	9	LAST	1282	43,3404	3 1377 0		CA	SKEEP7	
0237	REF	8	LAST	1280	43,3405	55'360 1		TS	RESTORE	IF RESTART, RESTORE C(X) AND C(X+1)
0238	REF	215	LAST	1215	43,3406	54 001 1		TS	L	
0239	REF	216	LAST	1282	43,3407	24 001 0		INCR	L	
0240	REF	388	LAST	1281	43,3410	50 000 1		NDX	A	
0241					43,3411	52 001 1		OXCH	0000	PUTS OWN ADDRESS IN X AND X +1
0242	REF	10	LAST	1282	43,3412	51'377 0		NOX	SKEEP7	
0243					43,3413	4 0001 1		CS	0001	CS X+1
0244	REF	11	LAST	1282	43,3414	51'377 0		NDX	SKEEP7	
0245					43,3415	6 0000 1		AD	0000	AO X
0246	REF	1			43,3416	0 3301 0		TC	-1CHK	
0247	REF	9	LAST	1282	43,3417	3 1360 0		CA	ERFSTORE	HAS ERASABLE BEEN RSTORED
0248					43,3420	0 0006 1		EXTEND		

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0249	REF 1	43,3421	1 3445 0	BZF	ELOOPFIN	YES, EXIT ERASLOOP.
0250		43,3422	0 0006 1	EXTEND		
0251	REF 12 LAST 1282	43,3423	5 1377 0	NDX	SKEEP7	
0252		43,3424	4 0001 1	DCS	0000	COMPLEMENT OF ADDRESS OF X AND X+1
0253	REF 13 LAST 1283	43,3425	51'377 0	NDX	SKEEP7	
0254		43,3426	52 001 1	DXCH	0000	PUT COMPLEMENT OF ADDRESS OF X AND X+1
0255	REF 14 LAST 1283	43,3427	51'377 0	NOX	SKEEP7	
0256		43,3430	4 0000 0	CS	0000	CS X
0257	REF 15 LAST 1283	43,3431	51'377 0	NDX	SKEEP7	
0258		43,3432	6 0001 0	AD	0001	AD X+1
0259	REF 2 LAST 1282	43,3433	0 3301 0	TC	-1CHK	
0260	REF 10 LAST 1282	43,3434	3 1360 0	CA	ERESTORE	HAS ERASABLE BEEN RESTORED
0261		43,3435	0 0006 1	EXTEND		
0262	REF 2 LAST 1283	43,3436	1 3445 0	BZF	ELOOPFIN	YES, EXIT ERASLOOP.
0263		43,3437	0 0006 1	EXTEND		
0264	REF 5 LAST 1282	43,3440	3 1376 1	OCA	SKEEP5	
0265	REF 16 LAST 1283	43,3441	51'377 0	NOX	SKEEP7	
0266		43,3442	52 001 1	DXCH	0000	PUT B(X) AND B(X+1) BACK INTO X AND X+1
0267	REF 5 LAST 1282	43,3443	3 4755 1	CA	S+ZERO	
0268	REF 11 LAST 1283	43,3444	55'360 1	TS	ERESTORE	IF RESTART, DO NOT RESTORE C(X), C(X+1)
0269		43,3445	0 0003 1	ELOOPFIN	RELINT	
0270	REF 2 LAST 1281	43,3446	0 3340 0	TC	CHECKNJ	CHECK FOR NEW JOB
0271	REF 4 LAST 1282	43,3447	3 1374 0	CA	SKEEP4	REPLACES B(EBANK)
0272	REF 52 LAST 1282	43,3450	54 003 0	TS	EBANK	
0273	REF 17 LAST 1283	43,3451	25'377 0	INCR	SKEEP7	
0274	REF 18 LAST 1283	43,3452	4 1377 1	CS	SKEEP7	
0275	REF 7 LAST 1282	43,3453	6 1373 1	AD	SKEEP3	
0276		43,3454	0 0006 1	EXTEND		
0277		43,3455	1 3457 0	BZF	+2	
0278	REF 4 LAST 1282	43,3456	0 3375 0	TC	ERASLOOP	GO TO NEXT ADDRESS IN SAME BANK
0279	REF 5 LAST 1282	43,3457	11'372 1	CCS	SKEEP2	
0280	REF 1	43,3460	0 3370 0	TC	NOEBANK	
0281	REF 6 LAST 1283	43,3461	25'372 0	INCR	SKEEP2	PUT +1 IN SKEEP2.
0282	REF 53 LAST 1283	43,3462	3 0003 1	CA	EBANK	
0283	REF 1	43,3463	6 4743 0	AD	SBIT9	
0284	REF 54 LAST 1283	43,3464	54 003 0	TS	EBANK	
0285	REF 1	43,3465	6 3251 1	AD	ERASCON5	76777, CHECK FOR BANK E2
0286		43,3466	0 0006 1	EXTEND		
0287	REF 1	43,3467	1 3363 0	BZF	2EBANK	
0288	REF 55 LAST 1283	43,3470	10 003 0	CCS	EBANK	
0289	REF 1	43,3471	0 3356 1	TC	E1345678	GO TO EBANKS 1,3,4,5,6, AND 7
0290	REF 3 LAST 1282	43,3472	3 5007 0	CA	ERASCON6	END OF ERASCHK
0291	REF 56 LAST 1283	43,3473	54 003 0	TS	EBANK	
R0292	CNTRCHK PERFORMS A CS OF ALL REGISTERS FROM OCT. 60 THROUGH OCT. 10.					
R0293	INCLUDED ARE ALL COUNTERS, I6-1, CYCLE AND SHIFT, AND ALL RUPT REGISTERS					
0294	REF 1	43,3474	3 4771 1	CNTRCHK	CA	00050
0295	REF 7 LAST 1283	43,3475	55'372 1	CNTRLOOP	TS	SKEEP2
0296	REF 1	43,3476	6 4750 1	AD	SBIT4	+10 OCTAL
0297	REF 389 LAST 1282	43,3477	50 000 1	INDEX	A	
0298		43,3500	4 0000 0	CS	0000	

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0299	REF	8	LAST 1283	43,3501	11'372 1	CCS	SKEEP2	
0300	REF	1		43,3502	0 3475 1	TC	CNTP LOOP	
R0301	CYCLSHFT CHECKS THE CYCLE AND SHIFT REGISTERS							
0302	REF	1		43,3503	3 3247 0	CYCLSHFT CA	CONC+S1	25252
0303	REF	42	LAST 1086	43,3504	54 020 1	TS	CYR	C(CYR) = 12525
0304	RFF	22	LAST 1076	43,3505	54 022 0	TS	CYL	C(CYL) = 52524
0305	REF	20	LAST 1076	43,3506	54 021 0	TS	SR	C(SR) = 12525
0306	REF	11	LAST 998	43,3507	54 023 1	TS	EDDP	C(EDDP) = 00125
0307	RFF	43	LAST 1284	43,3510	6 0020 0	AD	CYR	37777 C(CYR) = 45252
0308	RFF	23	LAST 1284	43,3511	6 0022 1	AD	CYL	00-12524 C(CYL) = 25251
0309	REF	21	LAST 1284	43,3512	6 0021 1	AD	SP	00-25251 C(SR) = 05252
0310	REF	12	LAST 1284	43,3513	6 0023 0	AD	EDDP	00-25376 C(EDDP) = +0
0311	REF	1		43,3514	6 3250 0	AD	CONC+S2	C(CONC+S2) = 52400
0312	REF	3	LAST 1283	43,3515	0 3301 0	TC	-1CHK	
0313	REF	44	LAST 1284	43,3516	6 0020 0	AD	CYR	45252
0314	REF	24	LAST 1284	43,3517	6 0022 1	AD	CYL	72523
0315	REF	22	LAST 1284	43,3520	6 0021 1	AD	SR	77775
0316	REF	13	LAST 1284	43,3521	6 0023 0	AD	EDDP	77775
0317	REF	3	LAST 1282	43,3522	6 4753 1	AD	S+1	77776
0318	REF	4	LAST 1284	43,3523	0 3301 0	TC	-1CHK	
0319	REF	4	LAST 1281	43,3524	25'367 1	INCR	SCOUNT +1	
0320	REF	3	LAST 1281	43,3525	0 3307 0	TC	SMDDECHK	
R0321	SKEEP1 HOLDS SUM							
R0322	SKEEP2 HOLDS PRESENT CONTENTS OF ADDRESS IN ROPECHK AND SHOWSUM ROUTINES							
R0323	SKEEP2 HOLDS BANK NUMBER IN LOW ORDER BITS DURING SHOWSUM DISPLAY							
R0324	SKEEP3 HOLDS PRESENT ADDRESS (00000 TO 01777 IN COMMON FIXED BANKS)							
R0325	(04000 TO 07777 IN FFX BANKS)							
R0326	SKEEP3 HOLDS BUGGER WORD DURING SHOWSUM DISPLAY							
R0327	SKEEP4 HOLDS BANK NUMBER AND SUPER BANK NUMBER							
R0328	SKEEP5 COUNTS 2 SUCCESSIVE TC SELF WORDS							
R0329	SKEEP6 CONTROLS ROPECHK OR SHOWSUM OPTION							
R0330	SKEEP7 CONTROLS WHEN ROUTINE IS IN COMMON FIXED OR FIXED FIXED BANKS							
0331	REF	1		43,3526	3 4754 0	ROPECHK CA	S-ZERO	*
03311	REF	4	LAST 306	43,3527	55'376 0	TS	SKEEP6	* -0 FOR ROPECHK.
03312	REF	6	LAST 1283	43,3530	3 4755 1	STSHOSUM CA	S+ZERO	* SHOULD BE ROPECHK
0332	REF	5	LAST 1283	43,3531	55'374 1	TS	SKEEP4	BANK NUMBER
0333	REF	4	LAST 1284	43,3532	3 4753 1	CA	S+1	
0334	REF	19	LAST 1283	43,3533	55'377 1	COMMEF TS	SKEEP7	
0335	RFF	7	LAST 1284	43,3534	3 4755 1	CA	S+ZERO	
0336	REF	12	LAST 1281	43,3535	55'371 1	TS	SKEEP1	
0337	REF	8	LAST 1283	43,3536	55'373 0	TS	SKEEP3	
0338	REF	5	LAST 1284	43,3537	3 4753 1	CA	S+1	
0339	REF	6	LAST 1283	43,3540	55'375 0	TS	SKEEP5	COUNTS DOWN 2 TC SELF WORDS
0340	REF	6	LAST 1284	43,3541	3 1374 0	COMAORS CA	SKEEP4	
0341	REF	217	LAST 1282	43,3542	54 001 1	TS	L	TO SET SUPER BANK
0342	REF	8	LAST 1280	43,3543	7 4350 1	MASK	H15	

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0343	REF	9	LAST 1284	43,3544	6 1373	1	AD	SKEFP3	
0344	REF	2	LAST 453	43,3545	0 4651	1	TC	SUPDACAL	SUPER DATA CALL
0345	REF	1		43,3546	0 3571	1	TC	ADSUM	
0346	REF	1		43,3547	6 4741	1	AD	SRT11	02000
0347	REF	1		43,3550	0 3602	0	TC	ADRSCHK	
0348	REF	390	LAST 1283	43,3551	4 0000	0	CS	A	
0349	REF	20	LAST 1284	43,3552	55'377	1	TS	SKEFP7	
0350				43,3553	0 0006	1		EXTEND	
0351				43,3554	1 3557	1	BZF	+3	
0352	REF	1		43,3555	3 4740	0	CA	SRT12	04000, STARTING ADDRESS OF BANK 02
0353				43,3556	0 3560	1	TC	+2	
0354	REF	1		43,3557	3 5020	0	CA	SBNK03	06000, STARTING ADDRESS OF BANK 03
0355	REF	10	LAST 1285	43,3560	55'373	0	TS	SKEEP3	
0356	REF	8	LAST 1284	43,3561	3 4755	1	CA	S+ZERO	
0357	REF	13	LAST 1284	43,3562	55'371	1	TS	SKEEP1	
0358	REF	6	LAST 1284	43,3563	3 4753	1	CA	S+1	
0359	REF	7	LAST 1284	43,3564	55'375	0	TS	SKEEP5	COUNTS DOWN 2 TC SELF WORDS
0360	REF	11	LAST 1285	43,3565	51'373	1	INDEX	SKEEP3	
0361				43,3566	3 0000	1	CA	0000	
0362	REF	2	LAST 1285	43,3567	0 3571	1	TC	ADSUM	
0363	REF	2	LAST 1285	43,3570	0 3602	0	TC	ADRSCHK	
0364	REF	9	LAST 1284	43,3571	55'372	1	ADSUM	TS	SKEEP2
0365	REF	14	LAST 1285	43,3572	6 1371	0	AD	SKEFP1	
0366	REF	15	LAST 1285	43,3573	55'371	1	TS	SKEEP1	
0367	REF	9	LAST 1285	43,3574	3 4755	1	CAF	S+ZERO	
0368	REF	16	LAST 1285	43,3575	6 1371	0	AD	SKEEP1	
0369	REF	17	LAST 1285	43,3576	55'371	1	TS	SKEEP1	
0370	REF	10	LAST 1285	43,3577	4 1372	1	CS	SKEEP2	
0371	REF	12	LAST 1285	43,3600	6 1373	1	AD	SKEFP3	
0372	REF	326	LAST 1281	43,3601	0 0002	0	TC	Q	
0373	REF	391	LAST 1285	43,3602	22 000	1	ADRSCHK	LXCH	A
0374	REF	13	LAST 1285	43,3603	3 1373	1	CA	SKEFP3	
0375	REF	21	LAST 1280	43,3604	7 5012	0	MASK	LOW10	RELATIVE ADDRESS
0376	REF	1		43,3605	6 4350	0	AD	-MAXADPS	SUBTRACT MAX RELATIVE ADDRESS = 1777.
0377				43,3606	0 0006	1		EXTEND	
0378	REF	1		43,3607	1 3676	1	BZF	OPTION	CHECKSUM FINISHED IF LAST ADDRESS.
0379	REF	8	LAST 1285	43,3610	11'375	0	CCS	SKEEP5	IS CHECKSUM FINISHED
0380				43,3611	0 3614	1	TC	+3	NO
0381				43,3612	0 3614	1	TC	+2	NO
0382	REF	2	LAST 1285	43,3613	0 3676	0	TC	OPTION	GO TO ROPCHK SHOWSUM OPTION
0383	REF	218	LAST 1284	43,3614	10 001	1	CCS	L	-0 MEANS A TC SELF WORD.
0384	REF	1		43,3615	0 3624	1	TC	CONTINU	
0385	REF	2	LAST 1285	43,3616	0 3624	1	TC	CONTINU	
0386	REF	3	LAST 1285	43,3617	0 3624	1	TC	CONTINU	
0387	REF	9	LAST 1285	43,3620	11'375	0	CCS	SKEEP5	
0388	REF	4	LAST 1285	43,3621	0 3625	0	TC	CONTINU +1	
0389	REF	1		43,3622	3 7746	0	CA	S-1	

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0390	REF	5	LAST	1285	43,3623	0 3625 0		TC	CONTINU +1	AD IN THE BUGGER WORD
0391	REF	7	LAST	1285	43,3624	3 4753 1	CONTINU	CA	S+1	MAKE SURE TWO CONSECUTIVE TC SELF WORDS
0392	REF	10	LAST	1285	43,3625	55'375 0		TS	SKEEP5	
03921	REF	5	LAST	1284	43,3626	11'376 0		CCS	SKEEP6	*
03922	REF	21	LAST	1111	43,3627	10 067 1		CCS	NEWJOB	* +1, SHOWSUM
03923	REF	4	LAST	725	43,3630	0 5122 0		TC	CHANG1	*
03924					43,3631	0 3633 1		TC	+2	*
0393	REF	3	LAST	1283	43,3632	0 3340 0		TC	CHECKNJ	-0 IN SKEEP6 FOR ROPECHK
0394	REF	14	LAST	1285	43,3633	25'373 1	ADRS+1	INCR	SKEEP3	
0395	REF	21	LAST	1285	43,3634	11'377 1		CCS	SKFFP7	
0396	REF	1			43,3635	0 3541 1		TC	COMADRS	
0397	REF	2	LAST	1286	43,3636	0 3541 1		TC	COMADRS	
0398	REF	1			43,3637	0 3565 1		TC	FXADRS	
0399	REF	2	LAST	1286	43,3640	0 3565 1		TC	FXADRS	
0400	REF	7	LAST	1284	43,3641	4 1374 1	NXTBNK	CS	SKEEP4	
0401	REF	1			43,3642	6 3731 1		AD	LSTBNKCH	LAST BANK TO BE CHECKED
0402					43,3643	0 0006 1		EXTEND		
0403	REF	1			43,3644	1 3137 0		BZF	ENDSUMS	END OF SUMMING OF BANKS.
0404	REF	8	LAST	1286	43,3645	3 1374 0		CA	SKEEP4	
0405	REF	2	LAST	1285	43,3646	6 4741 1		AD	SPIT11	
0406	REF	9	LAST	1286	43,3647	55'374 1		TS	SKEEP4	37 TO 40 INCRMTS SKEEP4 BY END RND CARRY
0407	REF	1			43,3650	0 3654 0		TC	CHKSUPR	
0408	REF	1			43,3651	3 4735 1	17TO20	CA	SBIT15	
0409	REF	10	LAST	1286	43,3652	27'374 1		ADS	SKEEP4	SET FOR BANK 20
0410	REF	1			43,3653	0 3670 0		TC	GONXTBNK	
0411	REF	9	LAST	1284	43,3654	7 4350 1	CHKSUPR	MASK	H15	
0412					43,3655	0 0006 1		EXTEND		
0413	REF	1			43,3656	1 3666 0		BZF	NXTSUPR	INCREMENT SUPER BANK
0414	REF	1			43,3657	6 3246 1	27TO30	AD	S13BITS	
0415					43,3660	0 0006 1		EXTEND		
0416					43,3661	1 3663 0		BZF	+2	BANK SET FOR 30
0417	REF	2	LAST	1286	43,3662	0 3670 0		TC	GONXTBNK	
0418	REF	1			43,3663	3 3244 0		CA	SIXTY	FIRST SUPER BANK
0419	REF	11	LAST	1286	43,3664	27'374 1		ADS	SKEEP4	
0420	REF	3	LAST	1286	43,3665	0 3670 0		TC	GONXTBNK	
0421	REF	1			43,3666	6 3245 1	NXTSUPR	AD	SUPPCOM	SET BNK 30 + INCR SUPR BNK AND CANCEL
0422	REF	12	LAST	1286	43,3667	27'374 1		ADS	SKEEP4	ERC BIT OF THE 37 TO 40 ADVANCE.
0423	REF	22	LAST	1286	43,3670	11'377 1	GONXTBNK	CCS	SKEEP7	
0424	REF	1			43,3671	0 3533 1		TC	COMMF	
0425	REF	8	LAST	1286	43,3672	3 4753 1		CA	S+1	
0426	REF	1			43,3673	0 3551 0		TC	FXFX	
0427	REF	1			43,3674	3 4745 0		CA	SEIT7	HAS TO BE LARGER THAN NO OF FXSW BANKS.
0428	REF	2	LAST	1286	43,3675	0 3533 1		TC	COMMF	
0429	REF	13	LAST	1286	43,3676	3 1374 0	SOPTION	CA	SKEEP4	
0430	REF	10	LAST	1286	43,3677	7 4350 1		MASK	H15	= BANK BITS
0431	REF	5	LAST	450	43,3700	0 4331 1		TC	LFFT5	
0432	REF	219	LAST	1285	43,3701	54 001 1		TS	L	BANK NUMBER BEFORE SUPER BANK

L AGC BLOCK TWO SELE-CHECK

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0433	REF	14	LAST	1286	43,3702	3 1374 0	CA	SKEEP4	
0434	REE	1			43,3703	7 4357 0	MASK	S8BITS	= SUPER BANK BITS
0435					43,3704	0 0006 1	EXTEND		
0436	REF	1			43,3705	1 3713 0	BZF	SOPT	BEFORE SUPER BANK
0437	REE	23	LAST	1284	43,3706	54 021 0	TS	SR	SUPER BANK NECESSARY
0438	REF	220	LAST	1286	43,3707	3 0001 0	CA	L	
0439	REF	18	LAST	1280	43,3710	7 4757 1	MASK	SEVEN	
0440	REE	24	LAST	1287	43,3711	6 0021 1	AD	SR	
0441	REE	221	LAST	1287	43,3712	54 001 1	TS	L	BANK NUMBER WITH SUPER BANK
0442	REE	6	LAST	1286	43,3713	3 1376 1	SOPT	CA SKEEP6	*
0443					43,3714	0 0006 1	EXTEND		*
0444					43,3715	1 3717 1	BZF	+2	* ON -0 CONTINUE WITH ROPE CHECK.
0445	REF	1			43,3716	0 3121 0	TC	S0DISPLAY	* ON +1 GO TO DISPLAY OE SUM.
0446	REF	18	LAST	1285	43,3717	11'371 1	CCS	SKEEP1	FORCE SUM TO ABSOLUTE VALUE.
04461					43,3720	0 3722 0	TC	+2	
04462					43,3721	0 3723 1	TC	+2	
04463	REE	9	LAST	1286	43,3722	6 4753 1	AD	S+1	
04464	REF	19	LAST	1287	43,3723	55'371 1	TS	SKEEP1	
0447	REE	222	LAST	1287	43,3724	4 0001 1	BNKCHK	CS L	= - BANK NUMBER
0448	REE	20	LAST	1287	43,3725	6 1371 0	AD	SKEEP1	
0449	REF	2	LAST	1285	43,3726	6 7746 0	AD	S-1	
0450	REF	5	LAST	1284	43,3727	0 3301 0	TC	-1CHK	CHECK SUM
0451	REE	2	LAST	305	43,3730	0 3641 1	TC	NXTBANK	
0454	REE	22	LAST	1286	0067		EBANK=	NEWJCB	
0455					43,3731	66100 0	LSTBNKCH	BBCON*	* CONSTANT, LAST BANK.

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P0001 SUBROUTINE TO UPDATE THE PROGRAM NUMBER DISPLAY ON THE DSKY.

0002	REF	1					COUNT#	\$/PHASE	
0003				5311			BLOCK	02	
0004	REF	1		4000			SETLOC	FFTAG1	
0005				5311			BANK		

0006	REF	327	LAST	1285	5311	50 002 0	NEWMODEX	INDEX	Q	UPDATE MODREG. ENTRY FOR MODE IN FIXED.
0007					5312	3 0000 1		CAF	Q	
0008	REF	328	LAST	1288	5313	24 002 0		INCR	Q	

0009	REF	18	LAST	1227	5314	55 011 1	NEWMODEA	TS	MODREG	ENTRY FOR MODE IN A.
0014					5315	3 5320 0	MMDSPLAY	CAF	+3	DISPLAY MAJOR MODE.
0015	REF	38	LAST	1208	5316	22 006 1	PRE8JUMP	LXCH	8BANK	PUTS 8BANK IN L
0016	REF	18	LAST	1220	5317	1 4640 0		TCF	BANKJUMP	PUTS Q INTO A
0017	REF	1			5320	20071 0		CADR	SETUPDSP	

R0018 RETURN TO CALLER +3 IF MODE = THAT AT CALLER +1. OTHERWISE RETURN TO CALLER +2.

0020	REF	329	LAST	1288	5321	50 002 0	CHECKMM	INDEX	Q	
0021					5322	4 0000 0		CS	Q	
0022	REF	19	LAST	1288	5323	6 1011 0		AD	MODREG	
0023					5324	0 0006 1		EXTEND		
0024	REF	3	LAST	1100	5325	1 6740 0		BZF	Q+2	
0025	REF	4	LAST	532	5326	1 6736 1		TCF	Q+1	NO MATCH

0026	REF	4	LAST	1288	6741		TCQ	=	Q+2 +1	
------	-----	---	------	------	------	--	-----	---	--------	--

0027					14,3711			BANK	14	
0028	REF	1			10,2000			SETLOC	PHASETAB	
0029					10,2071			BANK		

0030	REF	1						COUNT#	\$/PHASE	
0031					10,2071	0 0004 0	SETUPDSP	INHINT		
0032	REF	40	LAST	903	10,2072	52 071 0		DXCH	RUPTREG1	SAVE CALLER-S RETURN 2CADR
0033	REF	11	LAST	1094	10,2073	3 4355 0		CAF	PRIO30	EITHER A TASK OR JOB CAN COME TO
0034	REF	26	LAST	1116	10,2074	0 5072 1		TC	NOVAC	NEWMODEX
0035	REF	20	LAST	1288	1011			EBANK=	MODREG	
0036	REF	1			10,2075	03532 0		2CADR	DSPMMJOB	
0036	REF	1			10,2076	60102 1				
0037	REF	41	LAST	1288	10,2077	52 071 0		DXCH	RUPTREG1	
0038					10,2100	0 0003 1		RELINT		
0039	REF	22	LAST	864	10,2101	52 006 0		DXCH	Z	RETURN

0040	REF	2	LAST	470	40,3532		DSPMMJOB	EQUALS	DSPMMJB	
------	-----	---	------	-----	---------	--	----------	--------	---------	--

0041					5327			BLOCK	02	
0042	REF	2	LAST	1288	4000			SETLOC	FFTAG1	
0043					5327			BANK		

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R0044 PHASCHNG IS THE MAIN WAY OF MAKING PHASE CHANGES FOR RESTARTS. THERE ARE THREE FORMS OF PHASCHNG, KNOWN AS TYPE
R0046 A, TYPE B, AND TYPE C. THEY ARE ALL CALLED AS FOLLOWS, WHERE OCT XXXXX CONTAINS THE PHASE INFORMATION,

A0048 TC PHASCHNG
A0049 OCT XXXXX

R0050 TYPE A IS CONCERNED WITH FIXED PHASE CHANGES, THAT IS, PHASE INFORMATION THAT IS STORED PERMANENTLY. THESE
R0052 OPTIONS ARE, WHERE G STANDS FOR A GROUP AND .X FOR THE PHASE,

R0053 G.0 INACTIVE, WILL NOT PERMIT A GROUP G RESTART
R0055 G.1 WILL CAUSE THE LAST DISPLAY TO BE REACTIVATED, USED MAINLY IN MANNED FLIGHTS
R0057 G.EVEN A DOUBLE TABLE RESTART, CAN CAUSE ANY COMBINATION OF TWO JOBS, TASKS, AND/OR
R0059 LONGCALL TO BE RESTARTED.
R0060 G.ODD NOT .1 A SINGLE TABLE RESTART, CAN CAUSE EITHER A JOB, TASK, OR LONGCALL RESTART

R0062 THIS INFORMATION IS PUT INTO THE OCTAL WORD AFTER TC PHASCHNG AS FOLLOWS

R0063 TLO 00P PPP PPP GGG

R0065 WHERE EACH LETTER OR NUMBER STANDS FOR A BIT. THE G:S STAND FOR THE GROUP, OCTAL 1 - 7, THE P:S FOR THE PHASE,
R0067 OCTAL 0 - 127. 0:S MUST BE 0. IF ONE WISHES TO HAVE THE BASE OF GROUP G TO BE SET AT THIS TIME,
R0069 T IS SET TO 1, OTHERWISE IT IS SET TO 0. SIMILARLY IF ONE WISHES TO SET LONGBASE, THEN L IS SET TO 1, OTHERWISE
R0071 IT IS SET TO 0. SOME EXAMPLES,

A0072 TC PHASCHNG THIS WILL CAUSE GROUP 3 TO BE SET TO 0,
A0073 OCT 00003 MAKING GROUP 3 INACTIVE

A0074 TC PHASCHNG IF A RESTART OCCURS THIS WOULD CAUSE
A0075 OCT 00012 GROUP 2 TO RESTART THE LAST DISPLAY

A0076 TC PHASCHNG THIS SETS THE BASE OF GROUP 4 AND IN
A0077 OCT 40064 CASE OF A RESTART WOULD START UP THE TWO
A0078 THINGS LOCATED IN THE DOUBLE 4.6 RESTART
A0079 LOCATION

A0080 TC PHASCHNG THIS SETS LONGBASE AND UPON A RESTART
A0081 OCT 20135 CAUSES 5.13 TO BE RESTARTED (SINCE
A0082 LONGBASE WAS SET THIS SINGLE ENTRY
A0083 SHOULD BE A LONGCALL)
A0084 TC PHASCHNG SINCE BOTH BASEF4 AND LONGBASE ARE SET,
A0085 OCT 60124 4.12 SHOULD CONTAIN BOTH A TASK AND A
A0086 LONGCALL TO BE RESTARTED

R0087 TYPE C PHASCHNG CONTAINS THE VARIABLE TYPE OF PHASCHNG INFORMATION. INSTEAD OF THE INFORMATION BEING IN A
R0089 PERMANENT FORM, ONE STORES THE DESIRED RESTART INFORMATION IN A VARIABLE LOCATION. THE BITS ARE AS FOLLOWS,

R0091 TLO 1AD XXX CJW GGG

R0092 WHERE EACH LETTER OR NUMBER STANDS FOR A BIT. THE G:S STAND FOR THE GROUP, OCTAL 1 - 7. IF THE RESTART IS TO
R0094 BE BY WAITLIST, W IS SET TO 1, IF IT IS A JOB, J IS SET TO 1, IF IT IS A LONGCALL, C IS SET TO 1. ONLY ONE OF
R0096 THESE THREE BITS MAY BE SET. X:S ARE IGNORED 1 MUST BE 1, AND 0 MUST BE 0. AGAIN T STANDS FOR THE BASE,

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R009B AND L EDR LDNGBASE. THE BITS A AND D ARE CONCERNED WITH THE VARIABLE INFORMATION. IE D IS SET TO 1, A PRIORITY
 R0100 OR DELTA TIME WILL BE READ ERDM THE NEXT LOCATION AETER THE OCTAL INFORMATION, IE THIS IS TO BE INDIRECT, THAT
 R0102 IS, THE NAME OF A LOCATION COM+INING THE INFORMATION (DELTA TIME ONLY), THEN THIS IS GIVEN AS THE -GENADR OE
 R0104 THAT LOCATION WHICH CONTAINS THE DELTA TIME. IE THE OLD PRIORITY OR DELTA TIME IS TO BE USED, THAT WHICH IS
 R0106 ALREADY IN THE VARIABLE STORAGE, THEN D IS SET TO 0. NEXT THE A BIT IS USED. IE IT IS SET TO 0, THE ADDRESS
 R0108 THAT WOULD BE RESTARTED DURING A RESTART IS THE NEXT LOCATION AETER THE PHASE INFORMATION, THAT IS, EITHER
 R0110 (TC PHASCHNG) +2 OR +3, DEPENDING ON WHETHER D HAD BEEN SET OR NOT. IE A IS SET TO 1, THEN THE ADDRESS THAT
 R0112 WOULD BE RESTARTED IS THE 2CADR THAT IS READ ERDM THE NEXT TWO LOCATIONS. EXAMPLES,

A0114	AD	TC	PHASCHNG	THIS WOULD CAUSE LOCATION AD +3 TO BE
A0115	AD+1	OCT	05023	RESTARTED BY GRDUP THREE WITHA PRIORITY
A0116	AD+2	OCT	23000	OF 23. NDTE UPDN RETURNING IT WOULD
A0117	AD+3			ALSD GO TO AD+3
A0118	AD	TC	PHASCHNG	GROUP 1 WOULD CAUSE CAUSE CALLCALL TO
A0119	AD+1	OCT	27441	BE STARTED AS A LDNGCALL FROM THE TIME
A0120	AD+2	-GENADR	DELTIME	STORED IN LDNGBASE (LDNGBASE WAS SFT) BY
A0121	AD+3	2CADR	CALLCALL	A DELTATIME STORED IN DELTIME. THE
A0122	AD+4			BBCDN DE THE 2CADR SHOULD CONTAIN THE E
A0123	AD+5			BANK DE DELTIME. PHASCHNG RETURNS TO
A0124				LOCATION AD+5

R0125 NOTE THAT IE A VARIABLE PRIORITY IS GIVEN EOR A JDB, THE JOB WILL BE RESTARTED AS A NDVAC IE THE PRIDRITY IS
 R0127 NEGATIVE, AS A FINDVAC IF THE PRIORITY IS POSITIVE.

R0128 TYPE B PHASCHNG IS A COMBINATION OF VARIABLE AND FIXED PHASE CHANGES. IT WILL START UP A JOB AS INDICATED
 R0130 BELDW AND ALSO START UP ONE EIXED RESTART, THAT IS EITHER AN G.1 OR A G.000 OR THE FIRST ENTRY OE G.EVEN
 R0132 DDUBLE ENTRY. THE BIT INEORMATION IS AS FOLLOWS,

R0133 TLL DAP PPP PPP GGG

R0134 WHERE EACH LETTER OR NUMBER STANDS FOR A BIT. THE G:S STAND FOR THE GROUP, OCTAL 1 - 7. THE P:S FOR THE FIXED
 R0136 PHASE INEORMATION, OCTAL 0 - 127. I MUST BE 1. AND AGAIN T STANDS EOR THE TBASE AND L FOR LDNGBASE. D THIS
 R0138 TIME STANDS ONLY FOR PRIORITY SINCE THIS WILL BE CONSIDERED A JOB, AND IT MUST BE GIVEN DIRECTLY IE GIVEN.
 R0140 AGAIN A STANDS FOR THE ADDRESS OF THE LOCATION TO BE RESTARTED, 1 IF THE 2CADR IS GIVEN, OR 0 IE IT IS TO BE
 R0142 THE NEXT LOCATION. (THE RETURN LOCATION OE PHASCHNG) EXAMPLES,

A0143	AD	TC	PHASCHNG	TBASE IS SET AND ARESTART CAUSE GROUP 3
A0144	AD+1	OCT	56043	TO START THE JDB AJDBAJOB WITH PRIORITY
A0145	AD+2	DCT	31000	31 AND THE FIRST ENTRY DE 3.4SPDT (WE CAN
A0146	AD+3	2CADR	AJDBAJOB	ASSUME IT IS A TASK SINCE WE SET TBASE3)
A0147	AD+4			UPDN RETURN ERDM PHASCHNG CONTRDL WOULD
A0148	AD+5			GO TO AD+5
A0149	AD	TC	PHASCHNG	UPDN A RESTART THE LAST DISPLAY WOULD BE
A0150	AD+1	DCT	10015	RESTARTED AND A JDB WITH THE PREVIOUSLY
A0151	AD+2			STORED PRIORITY WOULD BE BEGUN AT AD+2
A0152				BY MEANS DE GROUP 5

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R0153 THE NCVAC-FINDVAC CHOICE FOR JOBS HOLOS HERE ALSO - NEGATIVE PRIORITY CAUSES A NOVAC CALL, POSITIVE A FINOVAC.

R0155 SUMMARY OF BITS

R0156 TYPE A TLO 00P PPP PPP GGG

R0157 TYPE B TL1 DAP PPP PPP GGG

R0158 TYPE C TLO 1AD XXX CJW GGG

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R0159 2PHSCHNG IS USED WHEN ONE WISHES TO START UP A GROUP OR CHANGE A GROUP WHILE UNDER THE CONTROL OF A DIFFERENT
 R0161 GROUP. FOR EXAMPLE, CHANGE THE PHASE OF GROUP 3 WHILE THE PORTION OF THE PROGRAM IS UNDER GROUP 5. ALL 2PHSCHNG
 R0163 CALLS ARE MADE IN THE FOLLOWING MANNER,

A0164 TC 2PHSCHNG
 A0165 OCT XXXXX
 A0166 OCT YYYYY

R0167 WHERE OCT XXXXX MUST BE OF TYPE A AND OCT YYYYY MAY BE OF EITHER TYPE A OR TYPE B OR TYPE C. THERE IS ONE
 R0169 DIFFERENCE --- NOTE- IF LONGBASE IS TO BE SET THIS INFORMATION IS GIVEN IN THE OCT YYYYY INFORMATION, IT WILL
 R0171 BE DISREGARDED IF GIVEN WITH THE OCT XXXXX INFORMATION. A COUPLE OF EXAMPLES MAY HELP,

A0173 AD TC 2PHSCHNG SET TBASE3 AND IF A RESTART OCCURS START
 A0174 AD+1 OCT 40083 THE TWO ENTRIES IN 3.8 TABLE LOCATION
 A0175 AD+2 OCT 05025 THIS IS OF TYPE C, SET THE JOB TO BE
 A0176 AD+3 OCT 18000 TO 8F LOCATION AD+4, WITH A PRIORITY 18,
 A0177 AD+4 FOR GROUP 5 PHASE INFORMATION

REF	LAST	TIME	AD	TC	2PHSCHNG	SET TBASE3 AND IF A RESTART OCCURS START THE TWO ENTRIES IN 3.8 TABLE LOCATION THIS IS OF TYPE C, SET THE JOB TO BE TO 8F LOCATION AD+4, WITH A PRIORITY 18, FOR GROUP 5 PHASE INFORMATION
0178	REF 1					
0179			5327	0 0004 0	2PHSCHNG	COUNT# \$\$/PHASE
0180	REF 330	LAST 1288	5330	50 002 0		INHINT THE ENTRY FOR A DOUBLE PHASE CHANGE
0181			5331	3 0000 1		NDX Q
0182	REF 331	LAST 1292	5332	24 002 0		CA 0
0183	REF 1		5333	54 072 0		INCR Q
						TS TEMPP2
0184	REF 1		5334	7 4757 1		MASK OCT7
0185			5335	6 0000 1		DOUBLE
0186	RFF 1		5336	54 071 0		TS TEMPG2
0187	REF 2	LAST 1292	5337	3 0072 1		CA TEMPP2
0188	REF 1		5340	7 5030 0		MASK OCT17770
0189			5341	0 0006 1		EXTEND
0190	REF 43	LAST 1279	5342	7 4740 1		MP 81112
0191	REF 3	LAST 1292	5343	56 072 1		XCH TEMPP2
0192	REF 45	LAST 1279	5344	7 4735 0		MASK BIT15
0193	REF 1		5345	54 066 0		TS TEMPSW2
						INDICATES WHETHER TO SET TBASE OR NOT
01932	REF 332	LAST 1292	5346	50 002 0		INDEX Q
01934			5347	3 0000 1		CA 0
01936	RFF 333	LAST 1292	5350	24 002 0		INCR Q
01938	REF 1		5351	54 065 0		TS TEMPSW
0194	REF 1		5352	1 5363 0		TCF PHAS JUMP
0195			5353	0 0004 0	PHASCHNG	INHINT
0196	RFF 334	LAST 1292	5354	50 002 0		INDEX Q
0197			5355	3 0000 1		CA 0
0198	REF 335	LAST 1292	5356	24 002 0		INCR Q
0199			5357	0 0004 0	PHSCHNGA	INHINT
						FIRST OCTAL PARAMETER IN A.

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0200	REF	2	LAST 1292	5360	54 065 0		TS	TEMPSW	
0201	REF	129	LAST 1258	5361	3 4753 1		CA	DNF	
02015	REF	2	LAST 1292	5362	54 066 0		TS	TEMPSW2	
0202				5363	0 0006 1	PHASJUMP	EXTEND		
0203	REF	1		5364	3 5367 0		DCA	ADRPCHN2	OFF TO SWITCHED BANK
0204				5365	52 006 0		DTCB		
0205	REF	47	LAST 1280	E3,1400			EBANK=	LST1	
0206	REF	1		5366	02102 0	ADRPCHN2	2CADR	PHSCHNG2	
0206	REF	1		5367	20103 1				
0207	REF	1		5370	22 073 0	ONFORTWO	LXCH	TEMPBBCN	
0208	REF	39	LAST 1288	5371	22 006 1		LXCH	BBANK	
0209	REF	2	LAST 1293	5372	22 073 0		LXCH	TEMPBBCN	
0210	RFF	1		5373	7 5024 0		MASK	DCT14000	SEE WHAT KIND OF PHASE CHANGE IT IS
0211	REF	392	LAST 1285	5374	10 000 0		CCS	A	
0212	RFF	1		5375	1 7747 0		TCF	CHCKCP	IT IS OF TYPE :B:
0213	RFF	1		5376	3 0062 0		CA	TEMPP	
0214	RFF	46	LAST 1279	5377	7 4745 1		MASK	BIT7	
0215	RFF	393	LAST 1293	5400	10 000 0		CCS	A	SHALL WE USE THE OLD PRIORITY
0216	REF	1		5401	1 5423 0		TCF	GETPRIO	NO GET A NEW PRIORITY (OR DELTA T)
0217	REF	1		5402	50 061 0	OLDPRIO	NDX	TFMPG	USE THE OLD PRIORITY (OR DELTA T)
0218	REF	1		5403	3 1052 1		CA	PHSPRDT1 -2	
0219	RFF	1		5404	54 070 1		TS	TFMPPR	
0220	REF	2	LAST 1293	5405	3 0062 0	CON1	CA	TEMPP	SEE IF A 2CADR IS GIVEN
0221	RFF	38	LAST 1279	5406	7 4744 0		MASK	BIT8	
0222	RFF	394	LAST 1293	5407	10 000 0		CCS	A	
0223	REF	1		5410	1 5427 1		TCF	GETNEWM	
0224	REF	336	LAST 1292	5411	3 0002 0		CA	Q	
0225	REF	1		5412	54 063 0		TS	TEMPNM	
0226	REF	1		5413	3 0006 1		CA	BR	
0227				5414	0 0006 1		EXTEND		PICK UP USERS SUPERBANK
0228	REF	24	LAST 1124	5415	04 007 1		ROR	SUPERBANK	
0229	RFF	1		5416	54 064 1		TS	TFMPBB	
0230	REF	1		5417	3 5422 0	TOCON2	CA	CON2ADR	BACK TO SWITCHED BANK
0231	REF	3	LAST 1293	5420	22 073 0		LXCH	TEMPBBCN	
0232				5421	52 006 0		DTCB		
0233	REF	1		5422	02170 0	CON2ADR	GENADR	CON2	
0234	REF	337	LAST 1293	5423	50 002 0	GETPRIO	NDX	Q	DON'T CARE IF DIRECT OR INDIRECT
0235				5424	3 0000 1		CA	Q	LEAVE THAT DECISION TO RESTARTS
0236	RFF	338	LAST 1293	5425	24 002 0		INCR	Q	OBTAIN RETURN ADDRESS

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0237	REF	1		5426	1 5404 0	TCF	CON1 -1	
0238				5427	0 0006 1	GETNEWNM	EXTEND	
0239	REF	339	LAST 1293	5430	5 0002 0		INDEX Q	
0240				5431	3 0001 0		DCA 0	
0241	REF	2	LAST 1293	5432	52 064 1		DXCH TEMPNM	
0242	REF	80	LAST 1216	5433	3 4752 0		CA TWO	
0243	REF	340	LAST 1294	5434	26 002 1	ADS	Q	OBTAIN RETURN ADDRESS
0244	REF	1		5435	1 5417 1	TCF	TDCON2	
0245	REF	2	LAST 515	5024		OCT14000	EQUALS PRI014	
0246	REF	40	LAST 1256	0061		TEMPG	EQUALS ITEMPI	
0247	REF	20	LAST 1256	0062		TEMPP	EQUALS ITEMPI2	
0248	REF	26	LAST 902	0063		TEMPNM	EQUALS ITEMPI3	
0249	REF	12	LAST 902	0064		TEMPB8	EQUALS ITEMPI4	
0250	REF	50	LAST 906	0065		TEMPSW	EQUALS ITEMPI5	
0251	REF	7	LAST 904	0066		TEMPSW2	EQUALS ITEMPI6	
0252	REF	42	LAST 1288	0070		TEMPPR	EQUALS RUPTREG1	
0253	REF	8	LAST 273	0071		TEMPG2	EQUALS RUPTREG2	
0254	REF	10	LAST 995	0072		TEMPP2	EQUALS RUPTREG3	
0255	REF	5	LAST 995	0073		TEMPBRCN	EQUALS RUPTREG4	
0256	REF	40	LAST 1293	0006		BB	EQUALS BBANK	
0257				14,3711		BANK	14	
0258	REF	2	LAST 1288	10,2000		SETLOC	PHASETAB	
0259				10,2102		BANK		
0260	REF	1		E3,1436		EBANK=	PHSNAME1	
0261	REF	2	LAST 1288 TO	1292:	9 9*	COUNT*	\$/PHASE	
0262	REF	4	LAST 1293	10,2102	22 073 0	PHSCHNG2	LXCH TEMPBRCN	
0263	REF	3	LAST 1293	10,2103	3 0065 1		CA TEMP SW	
0264	REF	2	LAST 1292	10,2104	7 4757 1		MASK OCT7	
0265				10,2105	6 0000 1		DOUBLE	
0266	REF	2	LAST 1293	10,2106	54 061 1	TS	TEMPG	
0267	REF	4	LAST 1294	10,2107	3 0065 1	CA	TEMPSW	
0268	REF	2	LAST 1292	10,2110	7 5030 0	MASK	OCT17770	
0269				10,2111	0 0006 1		EXTEND	
0270	REF	44	LAST 1292	10,2112	7 4760 1	MP	BIT12	
0271	REF	3	LAST 1293	10,2113	54 062 1	TS	TEMPP	
0272	REF	5	LAST 1294	10,2114	3 0065 1	CA	TEMPSW	
0273	REF	1		10,2115	7 4101 1	MASK	OCT60000	
0274	REF	6	LAST 1294	10,2116	56 065 1	XCH	TEMPSW	
0275	REF	2	LAST 1293	10,2117	7 5024 0	MASK	OCT14000	
0276	REF	395	LAST 1293	10,2120	10 000 0	CCS	A	

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0277	REF	1		10,2121	1 5370 1	TCF	ONEORTWO	
0278	REF	4	LAST 1294	10,2122	3 0062 0	CA	TEMP	START STORING THE PHASE INFORMATION
0279	REF	3	LAST 1294	10,2123	50 061 0	NDX	TEMPG	
0280	REF	2	LAST 232	10,2124	54 751 0	TS	PHASE1 -2	
0281	REF	3	LAST 1293	10,2125	10 066 0	CCS	TEMPSW2	IS IT A PHASCHNG OR A 2PHSCHNG
0282	REF	1		10,2126	1 2142 0	TCF	BELOW2	IT'S A PHASCHNG
0283				10,2127	1 2130 0	TCF	+1	IT'S A 2PHSCHNG
0284	REF	4	LAST 1292	10,2130	4 0072 0	CS	TEMPPP2	
0285	REF	5	LAST 1295	10,2131	22 072 1	LXCH	TEMPG2	
0286	REF	2	LAST 1292	10,2132	50 071 1	NDX	TEMPG2	
0287	REF	6	LAST 866	10,2133	52 751 0	DXCH	-PHASE1 -2	
0288	REF	4	LAST 1295	10,2134	10 066 0	CCS	TEMPSW2	
0289				10,2135	12 136 0	NOOP		CAN'T GET HERE
0290	REF	2	LAST 1295	10,2136	1 2142 0	TCF	BELOW2	
0291	REF	17	LAST 991	10,2137	4 0025 1	CS	TIME1	
0292	REF	3	LAST 1295	10,2140	50 071 1	NDX	TEMPG2	
0293	REF	2	LAST 744	10,2141	55 051 0	TS	TBASE1 -2	
0294	REF	7	LAST 1294	10,2142	10 065 0	CCS	TEMPSW	SEE IF WE SHOULD SET TBASE OR LONGBASE
0295	REF	1		10,2143	1 2156 0	TCF	BELOW3	SET LONGBASE ONLY
0296	REF	1		10,2144	1 2161 1	TCF	BELOW4	SET NEITHER
0297	REF	18	LAST 1295	10,2145	4 0025 1	CS	TIME1	SET TBASE TO BEGIN WITH
0298	REF	4	LAST 1295	10,2146	50 061 0	NDX	TEMPG	
0299	REF	3	LAST 1295	10,2147	55 051 0	TS	TBASE1 -2	
0300	REF	8	LAST 1295	10,2150	3 0065 1	CA	TEMPSW	SHALL WE NOW SET LONGBASE
0301	REF	1		10,2151	6 2154 0	AD	BIT14COM	
0302	REF	396	LAST 1294	10,2152	10 000 0	CCS	A	
0303				10,2153	12 154 1	NOOP		***** CANT GET HERE *****
0304				10,2154	17777 0	OCT	17777	***** CANT GET HERE *****
0305	REF	2	LAST 1295	10,2155	1 2161 1	TCF	BELOW4	NO WE NEED ONLY SET TBASE
0306				10,2156	0 0006 1	BELOW3	EXTEND	SET LONGBASE
0307	REF	30	LAST 1220	10,2157	3 0025 0	DCA	TIME2	
0308	REF	1		10,2160	53 152 1	DXCH	LONGBASE	
0309	REF	5	LAST 1295	10,2161	4 0062 1	BELOW4	CS	AND STORE THE FINAL PART OF THE PHASE
0310	REF	5	LAST 1295	10,2162	50 061 0	NDX	TEMPG	
0311	REF	7	LAST 1295	10,2163	54 750 1	TS	-PHASE1 -2	
0312	REF	341	LAST 1294	10,2164	3 0002 0	CA	Q	
0313	REF	5	LAST 1294	10,2165	22 073 0	LXCH	TEMP88CN	
0314				10,2166	0 0003 1	RELINT		
0315				10,2167	52 006 0	DTC8		

L PHASE TABLE MAINTENANCE

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0316	REF	6	LAST 1295	10,2170	22 073 0	CON2	LXCH	TEMPBBCN
0317	REF	6	LAST 1295	10,2171	3 0062 0		CA	TEMP
0318	REF	6	LAST 1295	10,2172	50 061 0		NDX	TEMPG
0319	RFF	3	LAST 1295	10,2173	54 751 0		TS	PHASE1 -2
0320	REF	2	LAST 1293	10,2174	3 0070 0		CA	TEMPPR
0321	RFF	7	LAST 1296	10,2175	50 061 0		NDX	TEMPG
0322	REF	2	LAST 1293	10,2176	55 052 0		TS	PHSPROT1 -2
0323				10,2177	0 0006 1		EXTEND	
0324	REF	3	LAST 1294	10,2200	3 0064 0		DCA	TEMPNM
0325	REF	8	LAST 1296	10,2201	50 061 0		NDX	TEMPG
0326	RFF	2	LAST 1294	10,2202	53 435 0		DXCH	PHSNAME1 -2
0327	REF	1		10,2203	1 2125 1		TCF	BELOW1
0328				7747			BLOCK	03
0329	RFF	3	LAST 757	6000			SETLOC	FFTAG6
0330				7747			BANK	
0331	REF	1					COUNT#	\$\$/PHASE
0332	RFF	45	LAST 1294	7747	7 4740 1	CHECKB	MASK	BIT12
0333	REF	397	LAST 1295	7750	10 000 0		CCS	A
0334	REF	2	LAST 1293	7751	1 5423 0		TCF	GETPRIO
0335	REF	1		7752	1 5402 0		TCF	OLDPRIO

SINCE THIS IS OF TYPE B, THIS BIT SHOULD
BE HERE IF WE ARE TO GET A NEW PRIORITY
IT IS, SO GET NEW PRIORITY

IT ISN'T, USE THE OLD PRIORITY

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0001				01,3523				BANK	01		
0002	REF	2	LAST	254	01,2000			SETLOC	RESTART		
0003					01,3523			BANK			
0004	REF	3	LAST	1296	E3,1436			EBANK =	PHSNAME1	GOPROG MUST SWITCH TO THIS FBANK	
0005	REF	1						COUNT*	\$/RSROU		
0006	REF	727	LAST	1259	01,3523	3 0161 1	RESTARTS	CA	MPAC +5	GET GROUP NUMBER -1	
0007					01,3524	6 0000 1		DOUBLE		SAVE FOR INDEXING	
0008	REF	1			01,3525	54 155 1		TS	TEMP2G		
0009	REF	1			01,3526	3 3765 0		CA	PHS2CADR	SET UP EXIT IN CASE IT IS AN EVEN	
0010	REF	1			01,3527	54 157 0		TS	TEMPSWCH	TABLE PHASE	
0011	REF	1			01,3530	3 3562 0		CA	RTRNCADR	TO SAVE TIME ASSUME IT WILL GET NEXT	
0012	REF	1			01,3531	54 707 0		TS	GOLDC +2	GROUP AFTER THIS	
0013	REF	1			01,3532	3 0154 1		CA	TEMPPHS		
0014	REF	9	LAST	1280	01,3533	7 5007 1		MASK	OCT1400		
0015	REF	398	LAST	1296	01,3534	10 000 0		CCS	A	IS IT A VARIABLE OR TABLE RESTART	
0016	REF	1			01,3535	1 3546 1		TCF	ITSABAR	IT'S A VARIABLE RESTART	
0017	REF	2	LAST	1297	01,3536	10 154 0	GETPART2	CCS	TEMPPHS	IS IT AN X.1 RESTART	
0018	REF	399	LAST	1297	01,3537	10 000 0		CCS	A		
0019	REF	1			01,3540	1 3646 1		TCF	ITSATBI	NO, ITS A TABLE RESTART	
0020	REF	3	LAST	1294	01,3541	3 5024 1		CA	PRID14	IT IS AN X.1 RESTART, THEREFORE START	
0021	REF	40	LAST	1204	01,3542	0 5105 0		TC	FINDVAC	THE DISPLAY RESTART JOB	
0022	REF	48	LAST	1293	E3,1400			EBANK =	LST1		
0023	REF	1			01,3543	02712 1		2CADR	INITDSP		
0023	REF	1			01,3544	20103 1					
0024	REF	2	LAST	1297	01,3545	0 3562 0		TC	RTRNCADR	FINISHED WITH THIS GROUP, GET NEXT ONE	
0025	REF	10	LAST	1297	01,3546	7 5007 1	ITSABAR	MASK	OCT1400	IS IT TYPE B ?	
0026	REF	40	LAST	1297	01,3547	10 000 0		CCS	A		
0027	REF	1			01,3550	1 3617 0		TCF	ITS LIKEB	YES, IT IS TYPE B	
0028					01,3551	0 0006 1		EXTEND		STORE THE JOB (OR TASK) 2CADR FOR EXIT	
0029	REF	2	LAST	1297	01,3552	5 0155 0		NDX	TEMP2G		
0030	REF	4	LAST	1297	01,3553	3 1437 0		DCA	PHSNAME1		
0031	REF	2	LAST	1297	01,3554	52 706 1		DXCH	GOLDC		
0032	REF	3	LAST	1297	01,3555	3 0154 1		CA	TEMPPHS	SEE IF THIS IS A JOB, TASK, OR A LONGCAL	
0033	REF	3	LAST	1294	01,3556	7 4757 1		MASK	OCT17		
0034	REF	3	LAST	1150	01,3557	6 7745 0		AD	MINUS2		
0035	REF	401	LAST	1297	01,3560	10 000 0		CCS	A		
0036	REF	1			01,3561	1 3731 0		TCF	ITS LONGCL	ITS A LONGCALL	
0037	REF	6	LAST	978	01,3562	0 4631 1	RTRNCADR	TC	SWRETURN	CANT GET HERE	

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0038	REF	1		01,3563	1 3565 0	TCF	ITSWAIT	
0039	REF	1		01,3564	1 3632 1	TCF	ITSAJOB	ITS A JOB
0040	REF	1		01,3565	3 3771 0	ITSWAIT	CA	SET UP WAITLIST CALL
0041	REF	3	LAST 1297	01,3566	54 704 0	TS	GOLOC -1	
0042	REF	3	LAST 1297	01,3567	50 155 0	NDX	TEMP2G	DIRECTLY STORED
0043	REF	3	LAST 1296	01,3570	3 1054 1	CA	PHSPD11	
0044	REF	402	LAST 1297	01,3571	10 000 0	TIMETEST	CCS	IS IT AN IMMEDIATE RESTART
0045	REF	403	LAST 1298	01,3572	24 000 1	INCR	A	NO,
0046	REF	1		01,3573	1 3576 1	TCF	FINDTIME	FIND OUT WHEN IT SHOULD BEGIN
0047	REF	1		01,3574	1 5436 1	TCF	ITSINDIR	STORED INDIRECTLY
0048	REF	1		01,3575	1 3615 1	TCF	IMEDIATE	IT WANTS AN IMMEDIATE RESTART
R0049 ***** THIS MUST BE IN FIXED FIXED *****								
0050				5436		BLOCK	02	
0051	REF	1		4000		SETLOC	FFTAG2	
0052				5436		BANK		
0053	REF	1				COUNT*	\$\$/RSROU	
0054	REF	4	LAST 1298	5436	22 706 0	ITSINDIR	LXCH	GET THE CORRECT E BANK IN CASE THIS IS
0055	REF	2	LAST 1293	5437	22 006 1		GOLOC +1	SWITCHED ERRASIBLE
						LXCH	BE	
0056	REF	404	LAST 1298	5440	50 000 1	NDX	A	GET THE TIME INDIRECTLY
0057				5441	3 0001 0	CA	1	
0058	REF	3	LAST 1298	5442	22 006 1	LXCH	BB	RESTORE THE BB AND GOLOC
0059	REF	5	LAST 1298	5443	22 706 0	LXCH	GOLOC +1	
0060	REF	2	LAST 1298	5444	1 3576 1	TCF	FINDTIME	FIND OUT WHEN IT SHOULD BEGIN
R0061 ***** YOU MAY RETURN TO SWITCHED FIXED *****								
0062				01,3576		BANK	01	
0063	REF	3	LAST 1297	01,2000		SETLOC	RESTART	
0064				01,3576		BANK		
0065	REF	2	LAST 1297 TO 1298:	43	43*	COUNT*	\$\$/RSROU	
0066				01,3576	4 0000 0	FINDTIME	COM	MAKE NEGITIVE SINCE IT WILL BE SUBTRACTD
0067	REF	223	LAST 1287	01,3577	54 001 1	TS	L	AND SAVE
0068	REF	4	LAST 1298	01,3600	50 155 0	NDX	TEMP2G	
0069	REF	4	LAST 1295	01,3601	4 1053 1	CS	TBASE1	
0070				01,3602	0 0006 1	EXTEND		
0071	REF	19	LAST 1295	01,3603	60 025 0	SU	TIME1	
0072	REF	405	LAST 1298	01,3604	10 000 0	CCS	A	
0073				01,3605	4 0000 0	COM		

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0074	REF	2	LAST	174	01,3606	6 7730 1	AD	DCT37776	
0075	REF	130	LAST	1293	01,3607	6 4753 1	AD	ONE	
0076	REF	224	LAST	1298	01,3610	6 0001 0	AD	L	
0077	REF	406	LAST	1298	01,3611	10 000 0	CCS	A	
0078	REF	224	LAST	1279	01,3612	3 4755 1	CA	ZFRD	
0079					01,3613	1 3615 1	TCF	+2	
0080					01,3614	1 3615 1	TCF	+1	
0081	REF	131	LAST	1299	01,3615	6 4753 1	AD	ONF	
0082	REF	6	LAST	1298	01,3616	0 0704 1	TC	GOLOC -1	
0083	REF	3	LAST	1297	01,3617	3 3562 0	ITS LIKE B CA	RTRNCADR	TYPE B, SO STORE RETURN IN
0084	REF	2	LAST	1297	01,3620	54 157 0	TS	TEMPSWCH	TEMPSWCH IN CASE OF AN EVEN PHASE
0085	REF	1			01,3621	3 3766 0	CA	PRT2CADR	SET UP EXIT TO GET TABLE PART OF THIS
0086	REF	7	LAST	1299	01,3622	54 707 0	TS	GOLOC +2	VARIABLE TYPE OF PHASE
0087	REF	4	LAST	1297	01,3623	3 0154 1	CA	TEMPPHS	MAKE THE PHASE LOOK RIGHT FOR THE TABLE
0088	REF	1			01,3624	7 6073 1	MASK	DCT177	PART OF THIS VARIABLE PHASE
0089	REF	5	LAST	1299	01,3625	54 154 0	TS	TEMPPHS	
0090					01,3626	0 0006 1	EXTEND		
0091	REF	5	LAST	1298	01,3627	5 0155 0	NDX	TEMP2G	OBTAIN THE JOB'S 2CADR
0092	REF	5	LAST	1297	01,3630	3 1437 0	DCA	PHSNAME1	
0093	REF	8	LAST	1299	01,3631	52 706 1	DXCH	GOLDC	
0094	REF	6	LAST	1299	01,3632	50 155 0	ITS A JOB NDX	TEMP2G	NOW ADD THE PRIORITY AND LET'S GO
0095	REF	4	LAST	1298	01,3633	3 1054 1	CA	PHSPRDT1	
0096	REF	9	LAST	1299	01,3634	54 704 0	CHK NO VAC TS	GOLOC -1	SAVE PRIQ UNTIL WE SEE IF ITS
0097					01,3635	0 0006 1	EXTEND		A FINDVAC OR A NDVAC
0098	REF	1			01,3636	6 3642 1	BZMF	ITSNDVAC	
0099	REF	1			01,3637	3 3770 1	CAF	FVACCADR	POSITIVE, SET UP FINDVAC CALL.
0100	REF	10	LAST	1299	01,3640	56 704 1	XCH	GCLOC -1	PICK UP PRIQ,
0101	REF	11	LAST	1299	01,3641	0 0704 1	TC	GOLOC -1	AND GO
0102	REF	1			01,3642	3 3772 0	ITS NO VAC CAF	NOVACADR	NEGATIVE,
0103	REF	12	LAST	1299	01,3643	56 704 1	XCH	GOLDC -1	SET UP NOVAC CALL,
0104					01,3644	4 0000 0	COM		CORRECT PRIQ,
0105	REF	13	LAST	1299	01,3645	0 0704 1	TC	GOLDC -1	AND GO
0106	REF	45	LAST	1284	01,3646	54 020 1	ITS AT 8 TS	CYR	FIND OUT IF THE PHASE IS ODD OR EVEN
0107	REF	46	LAST	1299	01,3647	10 020 1	CCS	CYR	
0108					01,3650	1 3651 1	TCF	+1	IT'S EVEN
0109	REF	1			01,3651	1 3747 1	TCF	ITSEVEN	
0110	REF	4	LAST	1299	01,3652	3 3562 0	CA	RTRNCADR	IN CASE THIS IS THE SECOND PART OF A
0111	REF	14	LAST	1299	01,3653	54 707 0	TS	GOLDC +2	TYPE 8 RESTART, WE NEED PROPER EXIT
0112	REF	6	LAST	1299	01,3654	3 0154 1	CA	TEMPPHS	SET UP POINTER FOR FINDING OUR PLACE IN
0113	REF	25	LAST	1287	01,3655	54 021 0	TS	SR	THE RESTART TABLES
0114	REF	26	LAST	1299	01,3656	6 0021 1	AD	SF	

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0115	REF	7	LAST 1299	01,3657	50 155 0	NDX	TEMP2G	
0116	REF	1		01,3660	6 2003 0	AD	SIZETAB +1	
0117	REF	1		01,3661	54 156 1	TS	POINTER	
0118				01,3662	0 0006 1	CONBL2	EXTEND	FIND OUT WHAT'S IN THE TABLE
0119	REF	2	LAST 1300	01,3663	5 0156 0	NDX	POINTER	
0120	REF	1		01,3664	3 2002 1	DCA	CADFTAB	GET THE 2CADR
0121	REF	15	LAST 1299	01,3665	22 706 0	LXCH	GOLDC +1	STORE THE BB INFORMATION
0122	REF	407	LAST 1299	01,3666	10 000 0	CCS	A	IS IT A JOB OR IS IT TIMED
0123	REF	408	LAST 1300	01,3667	24 000 1	INCR	A	POSITIVE, MUST BE A JOB
0124	REF	1		01,3670	1 3743 0	TCF	ITSAJOB2	
0125	REF	409	LAST 1300	01,3671	24 000 1	INCR	A	MUST BE EITHER A WAITLIST OR LONGCALL
0126	REF	16	LAST 1300	01,3672	54 705 1	TS	GOLDC	LET-S STORE THE CORRECT CADR
0127	REF	2	LAST 1298	01,3673	3 3771 0	CA	WILTCADR	SET UP OUR EXIT TO WAITLIST
0128	REF	17	LAST 1300	01,3674	54 704 0	TS	GOLDC -1	
0129	REF	18	LAST 1300	01,3675	3 0706 0	CA	GOLDC +1	NOW FIND OUT IF IT IS A WAITLIST CALL
0130	REF	48	LAST 1279	01,3676	7 4742 0	MASK	BIT10	THIS SHOULD BE ONE IF WE HAVE -BB
0131	REF	410	LAST 1300	01,3677	10 000 0	CCS	A	FOR THAT MATTER SO SHOULD BE BITS 9,8,7, 6,5, AND LAST BUT NOT LEAST (PERHAPS NOT
A0132								IN IMPORTANCE ANYWAY. BIT 4
A0133								IT IS A WAITLIST CALL
0134	REF	1		01,3700	1 3736 1	TCF	ITSWTLST	
0135	REF	3	LAST 1300	01,3701	50 156 0	NDX	POINTER	OBTAIN THE ORIGINAL DELTA T
0136	REF	1		01,3702	3 2000 0	CA	PRDTTAB	ADDRESS FOR THIS LONGCALL
0137	REF	1		01,3703	1 5445 0	TCF	ITSLGCL1	NOW GO GET THE DELTA TIME
P0138	*****		THIS MUST BE IN FIXED FIXED	*****				
0139				5445		BLOCK	02	
0140	REF	2	LAST 1298	4000		SETLOC	FFTAG2	
0141				5445		BANK		
0142	REF	2	LAST 1298 TO 1298:	7	7*	COUNT*	1\$/RSRCU	
0143	REF	19	LAST 1300	5445	22 706 0	ITSLGCL1	LXCH GOLDC +1	OBTAIN THE CORRECT E BANK
0144	REF	4	LAST 1298	5446	22 006 1	LXCH	BB	
0145	REF	20	LAST 1300	5447	22 706 0	LXCH	GOLDC +1	AND PRESERVE OUR E AND F BANKS
0146				5450	0 0006 1	EXTEND		GET THE DELTA TIME
0147	REF	411	LAST 1300	5451	5 0000 1	NDX	A	
0148				5452	3 0001 0	DCA	0	
0149	REF	21	LAST 1300	5453	22 706 0	LXCH	GOLDC +1	RESTORE OUR E AND F BANK
0150	REF	5	LAST 1300	5454	22 006 1	LXCH	BB	RESTORE THE TASKS E AND F BANKS
0151	REF	22	LAST 1300	5455	22 706 0	LXCH	GOLDC +1	AND PRESERVE OUR L

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0152	REF	1		5456	1	3704	0	TCF	ITSLGCL2	NOW LET'S PROCESS THIS LONGCALL
R0153 ***** YOU MAY RETURN TO SWITCHED FIXED *****										
0154				01,3704				BANK	01	
0155	REF	4	LAST 1298	01,2000				SETLOC	RESTART	
0156				01,3704				BANK		
0157	REF	3	LAST 1298 TO 1300:	70	113*			COUNT*	\$/RSPDU	
0158	REF	8	LAST 1127	01,3704	53	154	1	ITSLGCL2	DXCH	LONGTIME
0159				01,3705	0	0006	1	EXTEND		CALCULATE TIME LEFT
0160	REF	31	LAST 1295	01,3706	4	0025	1	OCS	TIME 2	
0161	REF	9	LAST 1301	01,3707	21	154	1	OAS	LONGTIME	
0162				01,3710	0	0006	1	EXTEND		
0163	REF	2	LAST 1295	01,3711	3	1152	0	DCA	LONGBASE	
0164	REF	10	LAST 1301	01,3712	21	154	1	DAS	LONGTIME	
0165	REF	11	LAST 1301	01,3713	11	153	0	CCS	LONGTIME	FIND OUT HOW THIS SHOULD BE RESTARTED
0166	REF	1		01,3714	1	3724	1	TCF	LONGCLCL	
0167				01,3715	1	3717	1	TCF	+2	
0168	REF	2	LAST 1298	01,3716	1	3612	0	TCF	IMEDIATE -3	
0169	REF	12	LAST 1301	01,3717	11	154	1	CCS	LONGTIME +1	
0170	REF	2	LAST 1301	01,3720	1	3724	1	TCF	LONGCLCL	
0171				01,3721	13	722	1	NOOP		CAN'T GET HERE *****
0172	REF	3	LAST 1301	01,3722	1	3612	0	TCF	IMEDIATE -3	
0173	REF	4	LAST 1301	01,3723	1	3615	1	TCF	IMEDIATE	
0174	REF	1		01,3724	3	3767	1	LONGCLCL	CA	LGCLCAOP
0175	REF	23	LAST 1300	01,3725	54	704	0	TS		GOLOC -1
										WE WILL GO TO LONGCALL
0176				01,3726	0	0006	1	EXTEND		
0177	REF	13	LAST 1301	01,3727	3	1154	0	DCA	LONGTIME	PREPARE OUR ENTRY TO LONGCALL
0178	REF	24	LAST 1301	01,3730	0	0704	1	TC	GOLOC -1	
0179	REF	3	LAST 1300	01,3731	3	3771	0	ITSLNGCL	CA	WTLICADR
0180	REF	25	LAST 1301	01,3732	54	704	0	TS		GOLOC -1
										ASSUME IT WILL GO TO WAITLIST
0181	REF	8	LAST 1300	01,3733	50	155	0	NDX	TEMP26	
0182	REF	5	LAST 1299	01,3734	4	1054	0	CS	PHSPROT1	GET THE DELTA T ADDRESS
0183	REF	2	LAST 1300	01,3735	1	5445	0	TCF	ITSLGCL1	NOW GET THE DELTA TIME
0184	REF	26	LAST 1301	01,3736	4	0706	1	ITSWTLST	CS	GOLOC +1
0185	REF	27	LAST 1301	01,3737	54	706	1	TS		GOLOC +1
										CORRECT THE BBCON INFORMATION
0186	REF	4	LAST 1300	01,3740	50	156	0	NOX	POINTER	GET THE DT AND FIND OUT IF IT WAS STORED
0187	REF	2	LAST 1300	01,3741	3	2000	0	CA	PROTTAB	DIRECTLY OR INDIRECTLY
0188	REF	1		01,3742	1	3571	0	TCF	TIME TEST	FIND OUT HOW THE TIME IS STORED

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0189	RFF	28	LAST 1301	01,3743	56 705 0	ITSAJ082	XCH	GOLOC	STORE THE CADP
0190	REF	5	LAST 1301	01,3744	50 156 0		NDX	POINTER	ADD THE PRIORITY AND LET:S GO
0191	REF	3	LAST 1301	01,3745	3 2000 0		CA	PRDTTAB	
0192	REF	1		01,3746	1 3634 1		TCF	CHKNOVAC	
0193	RFF	3	LAST 1299	01,3747	3 0157 1	ITSEVEN	CA	TEMPSWCH	SET UP FOR EITHER THE SECOND PART OF THE
0194	REF	29	LAST 1302	01,3750	54 707 0		TS	GOLOC +2	TABLE, OR A RETURN FOR THE NEXT GROUP
0195	REF	9	LAST 1301	01,3751	50 155 0		NDX	TEMP2G	SET UP POINTER FOR OUR LOCATION WITHIN
0196	REF	2	LAST 1300	01,3752	3 2002 1		CA	SIZE TAB	THE TABLE
0197	REF	7	LAST 1299	01,3753	6 0154 1		AD	TEMPPHS	THIS MAY LOOK BAD BUT LET:S SFF YOU DO
0198	REF	8	LAST 1302	01,3754	6 0154 1		AD	TEMPPHS	BETTER IN TIME OR NUMBERR OF LOCATIONS
0199	REF	9	LAST 1302	01,3755	6 0154 1		AD	TEMPPHS	
0200	RFF	6	LAST 1302	01,3756	54 156 1		TS	POINTER	
0201	REF	1		01,3757	1 3662 1		TCF	CONTRL2	NOW PROCESS WHAT IS IN THE TABLE
0202	RFF	36	LAST 1279	01,3760	3 6244 0	PHSPART2	CA	THRFE	SET THE POINTER FOR THE SFCOND HALF OF
0203	REF	7	LAST 1302	01,3761	26 156 1		ADS	POINTER	THE TABLE
0204	REF	5	LAST 1299	01,3762	3 3562 0		CA	RTPNCADR	THIS WILL BE OUR LAST TIME THROUGH THE
0205	REF	30	LAST 1302	01,3763	54 707 0		TS	GOLOC +2	EVEN TABLE, SO AFTER IT GET THE NEXT
A0206									GROUP
0207	RFF	2	LAST 1302	01,3764	1 3662 1		TCF	CONTRL2	SO LET:S GET THE SECOND ENTRY IN THE TBL
0208	RFF	728	LAST 1297	0154		TFMPPHS	EQUALS	MPAC	
0209	RFF	729	LAST 1302	0155		TFMP2G	EQUALS	MPAC +1	
0210	REF	730	LAST 1302	0156		POINTER	EQUALS	MPAC +2	
0211	RFF	731	LAST 1302	0157		TFMPSWCH	EQUALS	MPAC +3	
0212	REF	1		0705		GOLOC	EQUALS	VAC5 +200	
0213	REF	7	LAST 1280	7745		MINUS2	EQUALS	NEG2	
0214	REF	9	LAST 1105	6073		OCT177	EQUALS	LOW7	
0215	REF	1		01,3765	03760 0	PHS2CADR	GFNADR	PHSPART2	
0216	REF	1		01,3766	03536 1	PRT2CADR	GENADR	GETPART2	
0217	REF	4	LAST 1205	01,3767	05277 0	LGCLCADR	GENADR	LONGCALL	
0218	REF	41	LAST 1297	01,3770	05105 0	FVACCADR	GENADR	FINDVAC	
0219	RFF	37	LAST 1127	01,3771	05203 0	WLTLCADR	GENADR	WAITLIST	
0220	REF	27	LAST 1288	01,3772	05072 1	NOVACADR	GENADR	NOVAC	

L IMU MODE SWITCHING ROUTINES

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0001			5457	BLOCK 02
0002	REF 1		4000	SETLOC FFTAG3
0003			5457	BANK
0004	REF 1	E3,1471		EBANK= COMMAND

R0005 FIXED-FIXED ROUTINES.

							COUNT*	\$/IMODE	
0006	REF 1								
0007	REF 225	LAST 1299	5457	3 4755 1	ZEROICDU	CAF	ZERO		ZERO ICPU COUNTERS.
0008	REF 18	LAST 1254	5460	54 032 1		TS	CDUX		
0009	REF 9	LAST 1254	5461	54 033 0		TS	CDUY		
0010	REF 12	LAST 1255	5462	54 034 1		TS	CDUZ		
0011	REF 342	LAST 1295	5463	0 0002 0		TC	Q		
0012	REF 29	LAST 1279	4 743		SPSCODE	=	BIT9		

L IMU MODE SWITCHING ROUTINES

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P0013 IMU ZEROING ROUTINE.

0014				11,3722		BANK	11	
0015	REF	1		07,2000		SETLOC	MODE SW	
0016				07,2667		BANK		
0017	REF	1				COUNT*	\$/IMODE	
0018				07,2667	0 0004 0	INHINT		ROUTINE TO ZERO ICDUS.
0019	REF	42	LAST	536	07,2670	4 1036 1	IMUZERO	DONT ZERO CDUS IF IMU IN GIMBAL LOCK AND
0020	REF	4	LAST	227	07,2671	7 4771 0	CS	DSPTAB +11D
0021	REF	412	LAST	1300	07,2672	10 000 0	MASK	BITS4&6
0022	REF	1			07,2673	1 2677 1	CCS	A
							TCF	IMUZEROA
0023	REF	43	LAST	1249	07,2674	0 5567 0	TC	ALARM
0024					07,2675	00206 0	DCT	00206
								IF SO.
0025	REF	1			07,2676	1 3632 1	TCF	CAGETSTJ +4
								IMMEDIATE FAILUPE.
0032	REF	2	LAST	1304	07,2677	0 3626 0	IMUZEROA	TC
R0033			DELETE				CAGETSTJ	
0034	REF	41	LAST	906	07,2700	4 1303 1	CS	IMODES33
0035	REF	2	LAST	858	07,2701	7 4773 1	MASK	SUPER011
0036	REF	42	LAST	1304	07,2702	27*303 1	ADS	IMODES33
								DISABLE DAP AUTO AND HOLD MODES
								BITS FOR GROUND
0037	REF	47	LAST	978	07,2703	4 1302 0	CS	IMODES30
0038	REF	1			07,2704	7 5742 1	MASK	BITS3&4
0039	REF	48	LAST	1304	07,2705	27*302 0	ADS	IMODES30
								INHIBIT ICDUFALL AND IMUFALL (IN CASE WE
								JUST CAME OUT OF COARSE ALIGN).
0040	REF	5	LAST	1304	07,2706	4 4771 0	CS	BITS4&6
0041					07,2707	0 0006 1	EXTEND	
0042	REF	54	LAST	906	07,2710	03 012 1	WAND	CHAN12
								SEND ZERO ENCODE WITH COARSE AND ERROR
								COUNTER DISABLED.
0043	REF	3	LAST	181	07,2711	0 3241 0	TC	NOAITOFF
								TURN OFF NO ATT LAMP.
0044	REF	39	LAST	1279	07,2712	3 4747 1	CAF	BITS
0045					07,2713	0 0006 1	EXTEND	
0046	REF	55	LAST	1304	07,2714	05 012 1	WOR	CHAN12
00461	REF	3	LAST	181	07,2715	0 5457 1	TC	ZEROICDU
0047	REF	46	LAST	1279	07,2716	3 4746 0	CAF	BIT6
0048	REF	38	LAST	1302	07,2717	0 5203 0	TC	WAITLIST
0049	REF	3	LAST	185	E3,1474		EBANK=	CDUIND
0050	REF	1			07,2720	02732 0	2CAOR	IMUZFRO2
0050	REF	1			07,2721	16103 1		
0051	REF	49	LAST	1304	07,2722	4 1302 0	CS	IMODES30
0052	REF	30	LAST	1303	07,2723	7 4743 1	MASK	BIT9
0053	REF	413	LAST	1304	07,2724	10 000 0	CCS	A
0054	REF	1			07,2725	1 2730 0	TCF	MODEEXIT
								SEE IF IMU OPERATING AND ALARM IF NOT.

L IMU MODE SWITCHING ROUTINES

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0055	RFF	44	LAST 1304	07,2726	0 5567 0		TC	ALAPM	
0056				07,2727	00210 1		OCT	210	
0057				07,2730	0 0003 1	MODEEXIT	RFLINT		GENERAL MODE-SWITCHING EXIT.
0058	RFF	7	LAST 1297	07,2731	1 4631 0		TCF	SWRETURN	
0059	REF	1		07,2732	0 3614 1	IMUZFRD2	TC	CAGETEST	
0061	REF	4	LAST 1304	07,2733	0 5457 1		TC	ZEROICDU	ZERO CDUX, CDUY, CDUZ
0062	RFF	40	LAST 1304	07,2734	4 4747 0		CS	BIT5	REMOVE ZERO DISCRETE.
0063				07,2735	0 0006 1		EXTEND		
0064	REF	56	LAST 1304	07,2736	03 012 1		WAND	CHAN12	
0065	REF	35	LAST 1279	07,2737	3 4741 1		CAR	BIT11	WAIT 10 SECS FOR CTRS TO FIND GIMBALS
0066	RFF	10	LAST 901	07,2740	0 5224 0		TC	VARDELAY	
0067	REF	2	LAST 1305	07,2741	0 3614 1	IMUZERO3	TC	CAGETEST	
0069	RFF	2	LAST 1304	07,2742	4 5742 1		CS	BITS364	REMOVE IMUFAIL AND ICDUFAIL INHIBIT.
0070	REF	50	LAST 1304	07,2743	7 1302 0		MASK	IMODFS30	
0071	REF	51	LAST 1305	07,2744	55 1302 0		TS	IMODFS30	
0072	RFF	3	LAST 1304	07,2745	4 4773 1		CS	SUPER011	ENABLE DAP AUTO AND HOLD MODFS
0073	REF	43	LAST 1304	07,2746	7 1303 1		MASK	IMODES33	BIT5 FOR GROUND
0074	RFF	44	LAST 1305	07,2747	55 1303 1		TS	IMODES33	
0075	RFF	48	LAST 964	07,2750	0 4674 0		TC	IBNKCALL	SET ISS WARNING IF EITHER OF ABOVE ARE
0076	RFF	5	LAST 195	07,2751	14703 0		CADR	SETISSW	PRESENT.
0077	REF	1		07,2752	1 3604 1		TCF	ENDIMU	

L IMU MODE SWITCHING ROUTINES

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P0078 IMU COARSE ALIGN MODE.

0079				07,2753	0 0004 0	IMUCOARS	INHINT		
0080	REF	3	LAST	1304	07,2754	0 3626 0	TC	CAGETSTJ	
0081	REF	2	LAST	184	07,2755	0 3117 0	TC	SFTCOARS	
0082	REF	26	LAST	1279	07,2756	3 6241 0	CAF	SIX	
0083	REF	39	LAST	1304	07,2757	0 5203 0	TC	WAITLIST	
0084	REF	4	LAST	1304	E3,1474		EBANK=	CDUIND	
0085	REF	1			07,2760	02763 1	2CAOR	COAFS	
0085	REF	1			07,2761	16103 1			
0086	REF	2	LAST	1304	07,2762	1 2730 0	TCF	MODEEXIT	
0087	REF	3	LAST	1305	07,2763	0 3614 1	COARS	TC	CAGETEST
0088	REF	47	LAST	1304	07,2764	3 4746 0	CAF	BIT6	ENABLE ALL THREE ISS CDU ERROR COUNTERS
0089					07,2765	0 0006 1	EXTEND		
0090	REF	57	LAST	1305	07,2766	05 012 1	WOR	CHAN12	
0091	REF	81	LAST	1294	07,2767	3 4752 0	CAF	TWO	SET CDU INDICATOR
0092	REF	5	LAST	1306	07,2770	55*474 0	COARS1	TS	CDUIND
0093	REF	6	LAST	1306	07,2771	51*474 1	INDEX	CDUIND	COMPUTE THETAD - THETAA IN 1:S
0094	REF	21	LAST	1249	07,2772	3 0321 1	CA	THETAD	COMPLEMENT FORM
0095					07,2773	0 0006 1	EXTEND		
0096	REF	7	LAST	1306	07,2774	5 1474 1	INDEX	CDUIND	
0097	REF	19	LAST	1303	07,2775	20 032 1	MSU	CDUX	
0098					07,2776	0 0006 1	EXTEND		
0099	REF	46	LAST	1279	07,2777	7 4737 1	MP	BIT13	SHIFT RIGHT 2
0100	REF	225	LAST	1299	07,3000	56 001 0	XCH	L	ROUND
0101					07,3001	6 0000 1	DOUBLE		
0102	REF	41	LAST	1294	07,3002	54 061 1	TS	ITEMP1	
0103					07,3003	1 3005 0	TCF	+2	
0104	REF	226	LAST	1306	07,3004	26 001 1	ADS	L	
0105	REF	8	LAST	1306	07,3005	51*474 1	INDEX	CDUIND	DIFFERENCE TO BE COMPUTED
0106	REF	2	LAST	1303	07,3006	23*471 1	LXCH	COMMAND	
0107	REF	9	LAST	1306	07,3007	11*474 0	CCS	CDUIND	
0108	REF	1			07,3010	0 2770 0	TC	COARS1	
0109	REF	82	LAST	1306	07,3011	3 4752 0	CAF	TWO	MINIMUM OF 4 MS WAIT
0110	REF	11	LAST	1305	07,3012	0 5224 0	TC	VARDELAY	

L	IMU MCDE	SWITCHING ROUTINES	USER'S PAGE NO.	5	E3 S4	
0111	REF 4	LAST 1306 07,3013 0 3614 1	COARS2	TC	CASFTST	DONT CONTINUE IF CAGED.
0112	REF 42	LAST 1306 07,3014 54 061 1		TS	ITEMP1	SETS TO +0.
0113	REF 83	LAST 1306 07,3015 3 4752 0		CAF	TWO	SET CDU INDICATOR
0114	REF 10	LAST 1306 07,3016 55 474 0	+3	TS	CDUIND	
0115	REF 11	LAST 1307 07,3017 51 474 1		INDEX	CDUIND	
0116	REF 3	LAST 1306 07,3020 11 471 0		CCS	COMMAND	NUMBER OF PULSES REQUIRED
0117	REF 1	07,3021 0 3025 0		TC	COMPOS	GREATER THAN MAX ALLOWED
0118	REF 1	07,3022 0 3034 0		TC	NEXTCDU +1	
0119	REF 1	07,3023 0 3072 1		TC	COMNEG	
0120	REF 2	LAST 1307 07,3024 0 3034 0		TC	NEXTCDU +1	
0121	REF 1	07,3025 6 3720 1	COMPDS	AD	-COMMAX	COMMAX = MAX NUMBER OF PULSES ALLOWED
0122		07,3026 0 0006 1		EXTEND		MINUS ONE
0123	REF 1	07,3027 6 3102 1		BZME	COMZERO	
0124	REF 12	LAST 1307 07,3030 51 474 1		INDEX	CDUIND	
0125	REF 4	LAST 1307 07,3031 55 471 0		TS	COMMAND	REDUCE COMMAND BY MAX NUMBER OF PULSES
0126	REF 1	07,3032 4 3721 1		CS	-COMMAX-	ALLOWED
0127	REF 43	LAST 1307 07,3033 24 061 0	NEXTCDU	INCR	ITEMP1	
0128	REF 29	LAST 1280 07,3034 6 4754 0		AD	NEGO	
0129	REF 13	LAST 1307 07,3035 51 474 1		INDEX	CDUIND	
0130	REF 3	LAST 297 07,3036 54 050 0		TS	CDUXCMD	SET UP COMMAND REGISTER.
0131	REF 14	LAST 1307 07,3037 11 474 0		CCS	CDUIND	
0132	REF 1	07,3040 0 3016 0		TC	COARS2 +3	
0133	REF 44	LAST 1307 07,3041 10 061 1		CCS	ITEMP1	SEE IF ANY PULSES TO GO OUT.
0134	REF 1	07,3042 1 3106 1		TCF	SENDPULS	
0135	REF 16	LAST 1116 07,3043 0 5221 0		TC	FIXDELAY	WAIT FOR GIMBALS TO SETTLE.
0136		07,3044 00226 1		DEC	150	
0137	REF 84	LAST 1307 07,3045 3 4752 0	CHKCORS	CAF	TWO	AT END OF COMMAND, CHECK TO SEE THAT
0138	REF 45	LAST 1307 07,3046 54 061 1		TS	ITEMP1	GIMBALS ARE WITHIN 2 DEGREES OF THETA.
0139	REF 414	LAST 1304 07,3047 50 000 1		INDEX	A	
0140	REF 20	LAST 1306 07,3050 3 0032 0		CA	CDUX	
0141		07,3051 0 0006 1		EXTEND		
0142	REF 46	LAST 1307 07,3052 5 0061 0		INDEX	ITEMP1	
0143	REF 22	LAST 1306 07,3053 20 321 0		MSU	THETAD	
0144	REF 415	LAST 1307 07,3054 10 000 0		CCS	A	
0145	REF 1	07,3055 1 3063 0		TCF	COAR SERR	
0146	REF 1	07,3056 1 3060 0		TCF	COR SCHK2	
0147	REF 2	LAST 1307 07,3057 1 3063 0		TCF	COAR SERR	

L IMU MCODE SWITCHING ROUTINES

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0148	RFF	47	LAST 1307	07,3060	10 061 1	CORSCHK2	CCS	ITFMP1		
0149	RFF	1		07,3061	1 3046 1		TCF	CHKCCRS		
0150	REF	2	LAST 1305	07,3062	1 3604 1		TCF	ENDIMU	END OF COARSE ALIGNMENT.	
0151	REF	1		07,3063	6 3071 1	COARSERR	AD	COARSTOL	2 DEGREES.	
0152				07,3064	0 0006 1		EXTEND			
0153	REF	2	LAST 1307	07,3065	6 3060 1		BZMF	CORSCHK2		
0154	RFF	45	LAST 1305	07,3066	0 5567 0		TC	ALARM	COARSE ALIGN ERROR.	
0155				07,3067	00211 0		OCT	211		
0156	REF	2	LAST 180	07,3070	1 3612 0		TCF	INUBAD		
0157				07,3071	77511 1	COARSTOL	DEC	-.01111	2 DEGREES SCALED AT HALF-REVOLUTIONS	
0158	RFF	2	LAST 1307	07,3072	6 3720 1	COMNEG	AD	-COMMAX		
0159				07,3073	0 0006 1		EXTEND			
0160	REF	2	LAST 1307	07,3074	6 3102 1		BZMF	COMZERO		
0161				07,3075	4 0000 0		COM			
0162	REF	15	LAST 1307	07,3076	51'474 1		INDEX	CDUIND		
0163	REF	5	LAST 1307	07,3077	55'471 0		TS	COMMAND		
0164	REF	2	LAST 1307	07,3100	3 3721 0		CA	-COMMAX-		
0165	REF	3	LAST 1307	07,3101	0 3033 1		TC	NEXTCDU		
0166	RFF	226	LAST 1303	07,3102	3 4755 1	COMZERO	CAF	ZERO		
0167	RFF	16	LAST 1308	07,3103	51'474 1		INDEX	CDUIND		
0168	RFF	6	LAST 1308	07,3104	57'471 1		XCH	COMMAND		
0169	REF	4	LAST 1308	07,3105	0 3033 1		TC	NEXTCDU		
0170	REF	3	LAST 543	07,3106	3 7737 0	SENDPULS	CAF	13,14,15		
0171				07,3107	0 0006 1		EXTEND			
0172	RFF	16	LAST 906	07,3110	05 014 1		WOR	CHAN14		
0173	RFF	1		07,3111	3 3722 0		CAF	500MS		
0174	REF	2	LAST 1307	07,3112	1 3012 0		TCF	COARS2 -1	THEN TO VARDELAY	
0175	REF	48	LAST 1306	07,3113	3 4746 0	CA+ECE	CAF	BIT6	ENABLE ALL THREE ISS CDU ERROR COUNTERS	
0176				07,3114	0 0006 1		EXTEND			
0177	REF	58	LAST 1306	07,3115	05 012 1		WOR	CHAN12		
0178	REF	71	LAST 1204	07,3116	0 5261 1		TC	TASKOVER		

L	IMU MODE	SWITCHING ROUTINES	USER'S PAGE NO.	7	E3 S4
0179	REF 43	LAST 1279	07,3117	3 4750 1	SETCOARS CAF BIT4
0180			07,3120	0 0006 1	EXTEND
0181	REF 59	LAST 1308	07,3121	02 012 0	RAND CHAN12
0182	REF 416	LAST 1307	07,3122	10 000 0	CCS A
0183	REF 343	LAST 1303	07,3123	0 0002 0	TC Q
0184	REF 49	LAST 1308	07,3124	4 4746 1	CS BIT6
0185			07,3125	0 0006 1	EXTEND
0186	REF 60	LAST 1309	07,3126	03 012 1	RAND CHAN12
0187	REF 49	LAST 1300	07,3127	4 4742 0	CS BIT10
0188			07,3130	0 0006 1	EXTEND
0189	REF 17	LAST 1308	07,3131	03 014 1	RAND CHAN14
0190	REF 227	LAST 1308	07,3132	4 4755 0	CS ZERO
0191	REF 2	LAST 190	07,3133	54 047 0	TS GYROCMD
0192	REF 44	LAST 1309	07,3134	3 4750 1	CAF BIT4
0193			07,3135	0 0006 1	EXTEND
0194	REF 61	LAST 1309	07,3136	05 012 1	RAND CHAN12
0195	REF 43	LAST 1304	07,3137	4 1036 1	CS DSPTAB +11D
0196	REF 1		07,3140	7 3162 0	MASK OCT40010
0197	REF 44	LAST 1309	07,3141	27 036 1	ADS DSPTAB +11D
0198	REF 45	LAST 1305	07,3142	4 1303 1	CS IMODES33
0199	REF 50	LAST 1309	07,3143	7 4746 1	MASK BIT6
0200	REF 46	LAST 1309	07,3144	27 303 1	ADS IMODES33
0201	REF 52	LAST 1305	07,3145	4 1302 0	CS IMODES30
0202	REF 45	LAST 1309	07,3146	7 4750 0	MASK BIT4
0203	REF 53	LAST 1309	07,3147	27 302 0	ADS IMODES30
0204	REF 14	LAST 529	07,3150	4 4747 0	RNDREFDR CS TRACKBIT
0205	REF 28	LAST 906	07,3151	7 0075 1	MASK FLAGWRD1
0206	REF 29	LAST 1309	07,3152	54 075 1	TS FLAGWRD1
0207	REF 3	LAST 858	07,3153	4 4735 0	CS DRIFTBIT
0208	REF 28	LAST 1116	07,3154	7 0076 1	MASK FLAGWRD2
0209	REF 29	LAST 1309	07,3155	54 076 1	TS FLAGWRD2
0210	REF 6	LAST 972	07,3156	4 4737 1	CS REFSMBIT
0211	REF 18	LAST 972	07,3157	7 0077 0	MASK FLAGWRD3
0212	REF 19	LAST 1309	07,3160	54 077 0	TS FLAGWRD3
0213	REF 344	LAST 1309	07,3161	0 0002 0	TC Q
0214			07,3162	40010 1	OCT40010 OCT 40010

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P0215	IMU FINE ALIGN MODE SWITCH.									
0216					07,3163	0 0004 0	IMU FINE	INHINT		
0217	REE	4	LAST	1306	07,3164	0 3626 0	TC	CAGETSTJ	SEE IF IMU BEING CAGED.	
0218	REF	1			07,3165	4 3717 1	CS	BITS4-5	RESET ZERO AND COARSE	
0219					07,3166	0 0006 1	EXTEND			
0220	REE	62	LAST	1309	07,3167	03 012 1	WAND	CHAN12		
0221	REE	51	LAST	1309	07,3170	4 4746 1	CS	BIT6	INSURE DAP AUTO AND HOLD MODES ENABLED	
0222	REE	47	LAST	1309	07,3171	7 1303 1	MASK	IMODES33		
0223	REF	48	LAST	1310	07,3172	55 303 1	TS	IMODES33		
0224	REE	4	LAST	1304	07,3173	0 3241 0	TC	NOATTTOFF		
0225	REF	50	LAST	1309	07,3174	3 4742 1	CAF	BIT10	IMU FAIL WAS INHIBITED DURING THE	
0226	REE	40	LAST	1306	07,3175	0 5203 0	TC	WAITLIST	PRESUMABLY PRECEDING COARSE ALIGN. LEAVE	
0227	REF	17	LAST	1308	E3,1474		EBANK=	CDUIND		
0228	REF	1			07,3176	03207 1	2CADR	IFAILOK	IT ON FOR THE FIRST 5 SECS OF FINE ALIGN	
0228	REF	1			07,3177	16103 1				
0229	REE	7	LAST	964	07,3200	3 5000 1	CAF	2SFCS		
0230	REE	41	LAST	1310	07,3201	0 5203 0	TC	WAITLIST		
0231	REF	18	LAST	1310	E3,1474		EBANK=	CDUIND		
0232	REE	1			07,3202	03205 0	2CADR	IMUEINED		
0232	REF	1			07,3203	16103 1				
0233	REF	3	LAST	1306	07,3204	1 2730 0	TCE	MODEEXIT		
0234	REF	5	LAST	1307	07,3205	0 3614 1	IMU FINE	TC	CAGETEST	SEE THAT NO ONE HAS CAGED THE IMU.
0235	REF	3	LAST	1308	07,3206	1 3604 1	TCF	ENDIMU		

L IMU MODE SWITCHING ROUTINES

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0236	REE	1		07,3207	0 3621 1	IFAILOK	TC	CAGFTSTQ	ENABLE IMU FIAL UNLESS IMU BEING CAGED.
0237	REE	72	LAST 1308	07,3210	1 5261 0		TCE	TASKOVER	IT IS.
0238	RFF	46	LAST 1309	07,3211	3 4750 1		CAE	BIT4	DONT RESET IMU FAIL INHIBIT IF SOMEONE
0239				07,3212	0 0006 1		EXTEND		HAS GONE INTO COARSE ALIGN.
0240	REF	63	LAST 1310	07,3213	02 012 0		RAND	CHAN12	
0241	RFF	417	LAST 1309	07,3214	10 000 0		CCS	A	
0242	REF	73	LAST 1311	07,3215	1 5261 0		TCF	TASKOVER	
0243	RFF	54	LAST 1309	07,3216	4 1302 0		CS	IMODES30	RFSET IMUFAIL.
0244	REF	47	LAST 1306	07,3217	7 4737 1		MASK	BIT13	
0245	REF	55	LAST 1311	07,3220	27'302 0		ADS	IMODES30	
0246	RFF	47	LAST 1311	07,3221	4 4750 0		CS	BIT4	
0247	REE	56	LAST 1311	07,3222	7 1302 0	PFAILOK2	MASK	IMODES30	
0248	REF	57	LAST 1311	07,3223	55'302 0		IS	IMODES30	
0249	RFF	49	LAST 1305	07,3224	0 4674 0		TC	IBNKCALL	THE ISS WARNING LIGHT MAY COME ON NOW
0250	REF	6	LAST 1305	07,3225	14703 0		CADR	SETISSW	THAT THE INHIBIT HAS BEEN REMOVED.
0251	REF	74	LAST 1311	07,3226	1 5261 0		TCF	TASKOVER	
0252	REE	2	LAST 1311	07,3227	0 3621 1	PFAILOK	TC	CAGFTSTQ	ENABLE PIP FAIL PROG ALARM.
0253	REF	75	LAST 1311	07,3230	1 5261 0		TCF	TASKOVER	
0254	REE	58	LAST 1311	07,3231	4 1302 0		CS	IMODES30	RESET IMU AND PIPA FAIL BITS.
0255	REF	51	LAST 1310	07,3232	7 4742 0		MASK	BIT10	
0256	REF	59	LAST 1311	07,3233	27'302 0		ADS	IMODES30	
0257	RFF	49	LAST 1310	07,3234	4 1303 1		CS	IMODES33	
0258	RFF	48	LAST 1311	07,3235	7 4737 1		MASK	BIT13	
0259	RFF	50	LAST 1311	07,3236	27'303 1		ADS	IMODES33	
0260	RFF	41	LAST 1305	07,3237	4 4747 0		CS	BIT5	
0261	REF	1		07,3240	1 3222 1		TCF	PFAILOK2	
0262	RFE	2	LAST 1309	07,3241	4 3162 0	NOATT OFF	CS	DCT40010	SUBROUTINE TO TURN OFF NO ATT LAMP.
0263	REF	45	LAST 1309	07,3242	7 1036 1		MASK	DSPTAB +110	
0264	REF	46	LAST 1292	07,3243	6 4735 1		AD	BIT15	
0265	REF	46	LAST 1311	07,3244	55'036 1		TS	DSPTAB +110	
0266	REF	345	LAST 1309	07,3245	0 0002 0		TC	0	

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P0267 ROUTINES TO INITIATE AND TERMINATE PROGRAM USE OF THE PIPAS. NO IMUSTALL REQUIRED IN EITHER CASE.

0272	REF 228	LAST 1309	07,3246	4 4755 0	PIPUSE	CS	ZERO	
0273	REF 13	LAST 900	07,3247	54 037 1		TS	PIPAX	
0274	REF 5	LAST 900	07,3250	54 040 1		TS	PIPAY	
0275	REF 7	LAST 901	07,3251	54 041 0		TS	PIPAZ	
02752	REF 3	LAST 1311	07,3252	0 3621 1	PIPUSE1	TC	CAGETSTO	DO NOT ENABLE PIPA FAIL IF IMU IS CAGED
02754	REF 8	LAST 1305	07,3253	1 4631 0		TCF	SWRETURN	
02756			07,3254	0 0004 0		INHINT		
0276	REF 56	LAST 1279	07,3255	4 4753 0		CS	BIT1	IF PIPA FAILS FROM NOW ON (UNTIL
0277	REF 60	LAST 1311	07,3256	7 1302 0		MASK	IMODES30	PIPFREE), LIGHT ISS WARNING.
0278	REF 61	LAST 1312	07,3257	55 302 0		TS	IMODES30	
0279	REF 50	LAST 1311	07,3260	0 4674 0	PIPFREE2	TC	IBNKCALL	ISS WARNING MIGHT COME ON NOW.
0280	REF 7	LAST 1311	07,3261	14703 0		CADR	SETISSW	(OR GO OFF ON PIPFREE).
0281	REF 4	LAST 1310	07,3262	1 2730 0		TCF	MODEEXIT	
0282			07,3263	0 0004 0	PIPFREE	INHINT		PROGRAM DONE WITH PIPAS. DONT LIGHT
0283	REF 62	LAST 1312	07,3264	4 1302 0		CS	IMODES30	ISS WARNING.
0284	REF 57	LAST 1312	07,3265	7 4753 0		MASK	BIT1	
0285	REF 63	LAST 1312	07,3266	27 302 0		ADS	IMODES30	
0286	REF 52	LAST 1311	07,3267	7 4742 0		MASK	BIT10	IF PIP FAIL ON, DO PROG ALSRM AND RESET
0287	REF 418	LAST 1311	07,3270	10 000 0		CCS	A	ISS WARNING.
0288	REF 5	LAST 1312	07,3271	1 2730 0		TCF	MODEEXIT	
0289	REF 46	LAST 1308	07,3272	0 5567 0		TC	ALARM	
0290			07,3273	00212 0		OCT	212	
0291			07,3274	0 0004 0		INHINT		
0292	REF 1		07,3275	1 3260 1		TCF	PIPFREE2	

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P0293 THE FOLLOWING ROUTINE TORQUES THE IRIGS ACCORDING TO DOUBLE PRECISION INPUTS IN THE SIX REGISTERS
 R0295 BEGINNING AT THE ECADR ARRIVING IN A. THE MINIMUM SIZE OF ANY PULSE TRAIN IS 16 PULSES (.25 CDU COUNTS). THE
 R0297 UNSENT PORTION OF THE COMMAND IS LEFT INTACT IN THE INPUT COMMAND REGISTERS.

0299	F3,1400				EBANK= 1400		VARIABLE, ACTUALLY.	
0300	REF 732	LAST 1302	07,3276	54 161 0	IMUPULSE	TS	MPAC +5	SAVE ARRIVING ECADR.
0301	REF 5	LAST 1310	07,3277	0 3626 0		TC	CASESTJ	DONT PROCEED IF IMU BEING CAGED.
0302	REF 2	LAST 237	07,3300	11'314 1		CCS	LGYRO	SEE IF GYROS BUSY.
0303	REF 1		07,3301	0 3342 1		TC	GYROBUSY	SLEEP.
0304	REF 733	LAST 1313	07,3302	54 156 1		TS	MPAC +2	
0305	REF 52	LAST 1310	07,3303	3 4746 0		CAF	BIT6	ENABLE THE POWER SUPPLY.
0306			07,3304	0 0006 1		EXTEND		
0307	REF 18	LAST 1309	07,3305	05 014 1		WOR	CHAN14	
0308	REF 27	LAST 1279	07,3306	3 4751 0		CAF	FOUR	
0310	REF 42	LAST 1310	07,3307	0 5203 0	GWAKE2	TC	WAITLIST	(IF A JOB WAS PUT TO SLEEP, THE POWER
0311	REF 19	LAST 1310	E3,1474			EBANK=	CDJIND	SUPPLY IS LEFT ON BY THE WAKING JOB).
0312	REF 1		07,3310	03360 1		2CADR	STRGYRO	
0312	REF 1		07,3311	16103 1				
0313	REF 734	LAST 1313	07,3312	3 0161 1		CA	MPAC +5	SET UP EBANK, SAVING CALLER'S EBANK FOR
0314	REF 57	LAST 1283	07,3313	56 003 1		XCH	EBANK	RESTORATION ON RETURN.
0315	REF 735	LAST 1313	07,3314	56 161 1		XCH	MPAC +5	
0316	REF 3	LAST 1313	07,3315	55'314 1		TS	LGYRO	RESERVES GYROS.
0317	REF 16	LAST 1280	07,3316	7 4357 0		MASK	LOW8	
0318	REF 48	LAST 1308	07,3317	54 061 1		TS	ITEMP1	
0319	REF 85	LAST 1307	07,3320	3 4752 0		CAF	TWO	FORCE SIGN AGREEMENT ON INPUTS.
0320	REF 736	LAST 1313	07,3321	54 157 0	GYROAGRE	TS	MPAC +3	
0321			07,3322	6 0000 1		DOUBLE		
0322	REF 49	LAST 1313	07,3323	6 0061 0		AD	ITEMP1	
0323	REF 737	LAST 1313	07,3324	54 160 1		TS	MPAC +4	
0324			07,3325	0 0006 1		EXTEND		
0325	REF 419	LAST 1312	07,3326	5 0000 1		INDEX	A	
0326			07,3327	3 1401 0		DCA	1400	
0327	REF 738	LAST 1313	07,3330	52 155 1		DXCH	MPAC	
0328	REF 15	LAST 1220	07,3331	0 7256 1		TC	TPAGREE	
0329	REF 739	LAST 1313	07,3332	52 155 1		DXCH	MPAC	
0330	REF 740	LAST 1313	07,3333	50 160 0		INDEX	MPAC +4	
0331			07,3334	53'401 1		DXCH	1400	
0332	REF 741	LAST 1313	07,3335	10 157 0		CCS	MPAC +3	
0333	REF 1		07,3336	1 3321 0		TCF	GYROAGRE	
0334	REF 742	LAST 1313	07,3337	3 0161 1		CA	MPAC +5	RESTORE CALLER'S EBANK.
0335	REF 58	LAST 1313	07,3340	54 003 0		TS	EBANK	
0336	REF 6	LAST 1312	07,3341	1 2730 0		TCF	MODEEXIT	

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P0337 ROUTINES TO ALLOW TORQUING BY ONLY ONE JOB AT A TIME.

0338				07,3342	0 0006	1	GYROBUSY	EXTEND		SAVE RETURN 2FCADR.
0339	REF	23	LAST 1080	07,3343	3 0134	1		DCA	BUF2	
0340	REF	743	LAST 1313	07,3344	52 155	1		DXCH	MPAC	
0341	REF	1		07,3345	3 3357	0	REGSLEEP	CAF	LGWAKE	
0342	REF	5	LAST 1215	07,3346	1 5133	1		TCF	JOBSLEEP	
0343	REF	4	LAST 1313	07,3347	11'314	1	GWAKE	CCS	LGYRO	WHEN AWAKENED, SEE IF GYROS STILL BUSY.
0344	REF	1		07,3350	1 3345	1		TCF	REGSLEEP	IF SO, SLEEP SOME MORE.
0345	REF	744	LAST 1314	07,3351	54 156	1		TS	MPAC +2	
0346				07,3352	0 0006	1		EXTEND		
0347	REF	745	LAST 1314	07,3353	3 0155	0		DCA	MPAC	
0348	REF	24	LAST 1314	07,3354	52 134	0		DXCH	BUF2	RESTORE SWRETURN INFO.
0349	REF	132	LAST 1299	07,3355	3 4753	1		CAF	ONE	
0350	REF	1		07,3356	1 3307	1		TCF	GWAKE2	
0351	REF	1		07,3357	17347	1	LGWAKE	CADR	GWAKE	

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P0352 GYRO-TORQUING WAITLIST TASKS.

0353	REF	1		07,3360	4 3601 1	STR	GYRO CS	GSEFLCT	DE-SELECT LAST GYRO.
0354				07,3361	0 0006 1		EXTEND		
0355	REF	19	LAST 1313	07,3362	03 014 1		WAND	CHAN14	
0356	REF	6	LAST 1310	07,3363	0 3614 1		TC	CAGETEST	
0357	REF	5	LAST 1314	07,3364	3 1314 0	STR	GYR2 CA	LGYPD	JUMP ON PHASE COUNTER IN BITS 13-14.
0358				07,3365	0 0006 1		EXTEND		
0359	REF	48	LAST 1311	07,3366	7 4750 0		MP	BIT4	
0360	REF	420	LAST 1313	07,3367	50 000 1		INDEX	A	
0361				07,3370	1 3371 0		TCF	+1	
0362	REF	1		07,3371	0 3406 0		TC	GSELECT	=0. DO Y GYRO.
0363				07,3372	00202 1		DGT	00202	
0364	REF	2	LAST 1315	07,3373	0 3406 0		TC	GSELECT	=1. DO Z GYRO.
0365				07,3374	00302 0		DGT	00302	
0366	REF	3	LAST 1315	07,3375	0 3404 1		TC	GSELECT -2	=2. DO X GYRO.
0367				07,3376	00100 0		DGT	00100	
0368	REF	229	LAST 1312	07,3377	3 4755 1		CAF	ZERO	=3. DOONE
0369	REF	6	LAST 1315	07,3400	55 314 1		TS	LGYRO	
0370	REF	2	LAST 1314	07,3401	3 3357 0		CAF	LGWAKE	WAKE A POSSIBLE SLEEPING JOB.
0371	REF	6	LAST 1215	07,3402	0 5137 1		TC	JOBWAKE	
0372	REF	2	LAST 1310	07,3403	1 3205 1	NORESET	TCF	IMUFINED	DO NOT RESET POWER SUPPLY

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0373	REF	28	LAST	1313	07,3404	4 4751 1	-2	CS	FOUR	SPECIAL ENTRY TO REGRESS LGYRO FOR X.
0374	REF	7	LAST	1315	07,3405	27'314 1		ADS	LGYRO	
0375	REF	346	LAST	1311	07,3406	50 002 0	GSELECT	INDEX	Q	SELECT GYRO.
0376					07,3407	3 0000 1		CAF	0	PACKED WORD CONTAINS GYRO SELECT 8 BITS
0377	REF	13	LAST	1294	07,3410	54 064 1		TS	ITEMP4	AND INCREMENT TO LGYRO.
0378	REF	19	LAST	1287	07,3411	7 4757 1		MASK	SEVEN	
0379	REF	49	LAST	1311	07,3412	6 4737 0		AD	8IT13	
0380	REF	8	LAST	1316	07,3413	27'314 1		ADS	LGYPD	
0381	REF	59	LAST	1313	07,3414	54 003 0		TS	E8ANK	
0382	REF	17	LAST	1313	07,3415	7 4357 0		MASK	LOW8	
0383	REF	50	LAST	1313	07,3416	54 061 1		TS	ITEMP1	
0384	REF	20	LAST	1316	07,3417	4 4757 1		CS	SEVEN	
0385	REF	14	LAST	1316	07,3420	7 0064 1		MASK	ITEMP4	
0386	REF	15	LAST	1316	07,3421	54 064 1		TS	ITEMP4	
0387					07,3422	0 0006 1		EXTEND		MOVE DP COMMAND TO RUPTREGS FOR TESTING.
0388	REF	51	LAST	1316	07,3423	5 0061 0		INDEX	ITEMP1	
0389					07,3424	3 1401 0		DCA	1400	
0390	REF	43	LAST	1294	07,3425	52 071 0		DXCH	RUPTREG1	
0391	REF	44	LAST	1316	07,3426	10 070 1		CCS	RUPTREG1	
0392	REF	1			07,3427	1 3442 1		TCF	MAJ+	
0393					07,3430	1 3432 0		TCF	+2	
0394	REF	1			07,3431	1 3562 1		TCF	MAJ-	
0395	REF	9	LAST	1294	07,3432	10 071 0		CCS	RUPTREG2	
0396	REF	1			07,3433	1 3437 0		TCF	MIN+	
0397	REF	1			07,3434	1 3364 1		TCF	STRIGYR2	
0398	REF	1			07,3435	1 3557 1		TCF	MIN-	
0399	REF	2	LAST	1316	07,3436	1 3364 1		TCF	STRIGYR2	

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0400	REF	1		07,3437	6 3473	1	MIN+	AD	-GYROMIN	SMALL POSITIVE COMMAND. SEE IF AT LEAST
0401				07,3440	0 0006	1		EXTEND		16 GYRO PULSES.
0402	REF	3	LAST 1316	07,3441	6 3364	0		BZMF	STRTGYR2	
0403				07,3442	0 0006	1	MAJ+	EXTEND		DEFINITE POSITIVE OUTPUT.
0404	REF	1		07,3443	3 3603	1		DCA	GYROERAC	
0405	REF	45	LAST 1316	07,3444	20 071	0		DAS	RUPTREG1	
0406	REF	16	LAST 1316	07,3445	3 0064	0		CA	ITEMP4	SELECT POSITIVE TORQUING FOR THIS GYRO.
0407				07,3446	0 0006	1		EXTEND		
0408	REF	20	LAST 1315	07,3447	05 014	1		WOR	CHAN14	
0409	RFF	10	LAST 1302	07,3450	3 6073	0		CAF	LOW7	LEAVE NUMBER OF POSSIBLE 8192 AUGMENTS
0410	REF	10	LAST 1316	07,3451	7 0071	0		MASK	RUPTREG2	TO INITIAL COMMAND IN MAJOR PART OF LONG
0411	REF	11	LAST 1317	07,3452	56 071	1		XCH	RUPTREG2	TERM STORAGE AND TRUNCATED FRACTION
0412				07,3453	0 0006	1	GMERGE	EXTEND		IN MINOR PART. THE MAJOR PART WILL BE
0413	REF	39	LAST 1293	07,3454	7 4744	0		MP	BIT8	COUNTED DOWN TO ZERO IN THE COURSE OF
0414	REF	21	LAST 1294	07,3455	54 062	1		TS	ITEMP2	PUTTING OUT THE ENTIRE COMMAND.
0415	REF	46	LAST 1317	07,3456	3 0070	0		CA	RUPTREG1	
0416				07,3457	0 0006	1		EXTEND		
0417	REF	31	LAST 1304	07,3460	7 4743	1		MP	BIT9	
0418	REF	47	LAST 1317	07,3461	54 070	1		TS	RUPTREG1	
0419	REF	227	LAST 1306	07,3462	3 0001	0		CA	L	
0420				07,3463	0 0006	1		EXTEND		
0421	REF	78	LAST 1279	07,3464	7 4736	0		MP	BIT14	
0422	REF	22	LAST 1317	07,3465	26 062	1		ADS	ITEMP2	INITIAL COMMAND.
0423				07,3466	0 0006	1		EXTEND		SEE IF MORE THAN ONE PULSE TRAIN NEEDED
0424	REF	48	LAST 1317	07,3467	3 0071	1		DCA	RUPTREG1	(MORE THAN 16383 PULSES).
0425	REF	1		07,3470	6 7746	0		AD	MINUS1	
0426	REF	421	LAST 1315	07,3471	10 000	0		CCS	A	
0427	REF	1		07,3472	1 3516	1		TCF	LONGGYRO	
0428				07,3473	77601	0	-GYROMIN	DCI	-176	MAY BE ADJUSTED TO SPECIFY MINIMUM CMD
0429				07,3474	1 3500	0		TCF	+4	
0430	REF	79	LAST 1317	07,3475	3 4736	1		CAF	BIT14	
0431	REF	23	LAST 1317	07,3476	26 062	1		ADS	ITEMP2	
0432	REF	230	LAST 1315	07,3477	3 4755	1		CAF	ZERO	
0433	REF	52	LAST 1316	07,3500	50 061	0	+4	INDEX	ITEMP1	
0434				07,3501	53,401	1		DXCH	1400	

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0435	REF	24	LAST	1317	07,3502	3 0062 0	CA	ITEMP2	ENTIRE COMMAND.
0436	REF	3	LAST	1309	07,3503	54 047 0	TS	GYROCMD	
0437					07,3504	0 0006 1	EXTEND		
0438	REF	53	LAST	1312	07,3505	7 4742 0	MP	BIT10	WAITLIST DT
0439	REF	37	LAST	1302	07,3506	6 6244 0	AD	THRE	TRUNCATION AND PHASE UNCERTAINTIES.
0440	REF	43	LAST	1313	07,3507	0 5203 0	TC	WAITLIST	
0441	REF	20	LAST	1313	E3,1474		EBANK=	CDUIND	
0442	REF	2	LAST	1313	07,3510	03360 1	2CADR	STRTGyro	
0442					07,3511	16103 1			
0448	REF	54	LAST	1318	07,3512	3 4742 1	GYROEXIT	CAF	BIT10
0449					07,3513	0 0006 1	EXTEND		
0450	REF	21	LAST	1317	07,3514	05 014 1	WOR	CHAN14	
0451	REF	76	LAST	1311	07,3515	1 5261 0	TCF	TASKOVER	
0452	REF	53	LAST	1317	07,3516	50 061 0	LONGGYRO	INDEX	ITEMP1
0453					07,3517	53'401 1	DXCH	1400	INITIAL COMMAND OUT PLUS N AUGMENTS OF
0454	REF	80	LAST	1317	07,3520	3 4736 1	CAF	BIT14	8192. INITIAL COMMAND IS AT LEAST 8192.
0455	REF	25	LAST	1318	07,3521	6 0062 0	AD	ITEMP2	
0456	REF	4	LAST	1318	07,3522	54 047 0	TS	GYROCMD	
0457					07,3523	0 0006 1	AUG3	EXTEND	GET WAITLIST DT TO TIME WHEN TRAIN IS
0458	REF	55	LAST	1318	07,3524	7 4742 0	MP	BIT10	ALMOST OUT.
0459	REF	4	LAST	1280	07,3525	6 7744 1	AD	NEG3	
0460	REF	44	LAST	1318	07,3526	0 5203 0	TC	WAITLIST	
0461	REF	21	LAST	1318	E3,1474		EBANK=	CDUIND	
0462	REF	1			07,3527	03532 0	2CADR	8192AUG	
0462	REF	1			07,3530	16103 1			
0463	REF	1			07,3531	1 3512 0	TCF	GYROEXIT	
0464	REF	7	LAST	1315	07,3532	0 3614 1	8192AUG	TC	CAGFTST
04641	REF	49	LAST	1315	07,3533	3 4750 1	CAF	BIT4	
04642					07,3534	0 0006 1	EXTEND		
04643	REF	64	LAST	1311	07,3535	02 012 0	RAND	CHAN12	
04644	REF	422	LAST	1317	07,3536	10 000 0	CCS	A	
04645	REF	3	LAST	1308	07,3537	1 3612 0	TCF	IMU8AD	
0465	REF	9	LAST	1316	07,3540	3 1314 0	CA	LGyro	ADD 8192 PULSES TO GYROCMD
0466	REF	60	LAST	1316	07,3541	54 003 0	TS	EBANK	
0467	REF	18	LAST	1316	07,3542	7 4357 0	MASK	LOW8	
0468	REF	54	LAST	1318	07,3543	54 061 1	TS	ITEMP1	
0469	REF	55	LAST	1318	07,3544	50 061 0	INDEX	ITEMP1	SEE IF THIS IS THE LAST AUG.
0470					07,3545	11'400 0	CCS	1400	
0471	REF	1			07,3546	1 3552 1	TCF	AUG2	MORE TO COME.
0472	REF	81	LAST	1318	07,3547	3 4736 1	CAF	BIT14	
0473	REF	5	LAST	1318	07,3550	26 047 0	ADS	GYROCMD	
0474	REF	1			07,3551	1 3504 1	TCF	LASTSEG +1	

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0475	REF	56	LAST 1318	07,3552	50 061 0	AUG2	INDEX	ITEMP1
0476				07,3553	55'400 0		TS	1400
0477	REF	82	LAST 1318	07,3554	3 4736 1		CAF	BIT14
0478	REF	6	LAST 1318	07,3555	26 047 0		ADS	GYROCMD
0479	REF	1		07,3556	1 3523 1		TCF	AUS3

COMPUTE DT.

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0480	REF	2	LAST	1317	07,3557	6 3473	1	MIN-	AD	-GYRCMIN	POSSIBLE NEGATIVE OUTPUT.
0481					07,3560	0 0006	1		EXTEND		
0482	REF	4	LAST	1317	07,3561	6 3364	0		BZMF	STRIGYR2	
0483					07,3562	0 0006	1	MAJ-	EXTEND		DEFINITE NEGATIVE OUTPUT.
0484	REF	2	LAST	1317	07,3563	4 3603	0		DCS	GYRCFRAC	
0485	REF	49	LAST	1317	07,3564	20 071	0		DAS	RUPTREG1	
0486	REF	17	LAST	1317	07,3565	3 0064	0		CA	ITEMP4	SELECT NEGATIVE TORQUING FOR THIS GYRO.
0487	REF	32	LAST	1317	07,3566	6 4743	0		AO	BIT9	
0488					07,3567	0 0006	1		EXTEND		
0489	REF	22	LAST	1318	07,3570	05 014	1		WOR	CHAN14	
0490	REF	50	LAST	1320	07,3571	4 0070	1		CS	RUPTREG1	SET UP RUPTREGS TO FALL INTO GMERGE.
0491	REF	51	LAST	1320	07,3572	54 070	1		TS	RUPTREG1	ALL NUMBERS PUT INTO GYROCMO ARE
0492	REF	12	LAST	1317	07,3573	4 0071	0		CS	RUPTREG2	POSITIVE - BIT9 OF CHAN 14 DETERMINES
0493	REF	11	LAST	1317	07,3574	7 6073	1		MASK	LOW7	THE SIGN OF THE COMMAND.
0494					07,3575	4 0000	0		COM		
0495	REF	13	LAST	1320	07,3576	56 071	1		XCH	RUPTREG2	
0496					07,3577	4 0000	0		COM		
0497	REF	1			07,3600	1 3453	1		TCF	GMERGE	
0498					07,3601	01700	1	GOESELCT OCT	1700		TURN OFF SELECT AND ACTIVITY BITS.
0499					07,3602	00000	1	GYROFRAC 20EC	.215 B -21		
0499					07,3603	00034	0				

L IMU MODE SWITCHING ROUTINES

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P0500 IMU MODE SWITCHING ROUTINES COME HERE WHEN ACTION COMPLETE.

0501				07,3604	0 0006 1	ENDIMU	EXTEND		MODE IS BAD IF CAGE HAS OCCURED OR IF
0502	REF	33	LAST	1111	07,3605	00 011 1	READ	DSAL MOUT	ISS WARNING IS ON.
0503	REF	58	LAST	1312	07,3606	7 4753 0	MASK	BIT1	
0504	REF	423	LAST	1318	07,3607	10 000 0	CCS	A	
0505	REF	4	LAST	1318	07,3610	1 3612 0	TCF	IMUBAD	
0506	REF	3	LAST	574	07,3611	1 3640 1	IMUGOOD	TCF	GOODEND
									WITH C(A) = 0.
0507	REF	231	LAST	1317	07,3612	3 4755 1	IMUBAD	CAF	ZERO
0508	REF	2	LAST	574	07,3613	1 3635 0	TCF	BADEND	
0509	REF	53	LAST	1313	07,3614	3 4746 0	CAGETEST	CAF	BIT6
0510	REF	64	LAST	1312	07,3615	7 1302 0	MASK	IMDES30	SUBROUTINE TO TERMINATE IMU MODE
0511	REF	424	LAST	1321	07,3616	10 000 0	CCS	A	SWITCH IF IMU HAS BEEN CAGED.
0512	REF	5	LAST	1321	07,3617	1 3612 0	TCF	IMUBAD	DIRECTLY.
0513	REF	347	LAST	1316	07,3620	0 0002 0	TC	Q	WITH C(A) = +0.
0514	REF	65	LAST	1321	07,3621	4 1302 0	CAGETSTQ	CS	IMDES30
0515	REF	54	LAST	1321	07,3622	7 4746 1	MASK	BIT6	SKIP IF IMU NOT BEING CAGED.
0516	REF	425	LAST	1321	07,3623	10 000 0	CCS	A	
0517	REF	348	LAST	1321	07,3624	24 002 0	INCR	Q	
0518	REF	349	LAST	1321	07,3625	0 0002 0	TC	Q	
0519	REF	66	LAST	1321	07,3626	4 1302 0	CAGETSTJ	CS	IMDES30
0520	REF	55	LAST	1321	07,3627	7 4746 1	MASK	BIT6	IF DURING MODE SWITCH INITIALIZATION
0521	REF	426	LAST	1321	07,3630	10 000 0	CCS	A	IT IS FOUND THAT THE IMU IS BEING CAGED,
0522	REF	350	LAST	1321	07,3631	0 0002 0	TC	Q	SET IMUCADR TO -0 TO INDICATE OPERATION
									COMPLETE BUT FAILED. RETURN IMMEDIATELY
0523	REF	232	LAST	1321	07,3632	4 4755 0	CS	ZERO	TO SWRETURN.
0524	REF	4	LAST	1116	07,3633	55 304 0	TS	IMUCADR	
0525	REF	7	LAST	1313	07,3634	1 2730 0	TCF	MODEEXIT	

L IMU MODE SWITCHING ROUTINES

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P0526 GENERALIZED MODE SWITCHING TERMINATION. ENTER AT GOODEND EOR SUCCESSFUL COMPLETION OF AN I/O OPERATION
 R0528 OR AT BADEND FOR A N UNSUCCESSFUL ONE. CIA) OR ARRIVAL =0 EOR IMU, 1 FOR OPTICS.

0530	REF	14	LAST	1320	07,3635	54 071 0	BADEND	TS	RUPTREG2	DEVICE INDEX.
0531	REF	233	LAST	1321	07,3636	4 4755 0		CS	ZERO	FOR FAILURE.
0532	REF	4	LAST	1321	07,3637	1 3642 0		TCF	GOODEND +2	
0533	REF	15	LAST	1322	07,3640	54 071 0	GOODEND	TS	RUPTREG2	
0534	REF	133	LAST	1314	07,3641	4 4753 0		CS	ONE	FOR SUCCESS.
0535	REF	11	LAST	1294	07,3642	54 072 0		TS	RUPTREG3	
0536	REF	16	LAST	1322	07,3643	50 071 1		INDEX	RUPTREG2	SEE IF USING PROGRAM ASLEEP.
0537	REF	5	LAST	289	07,3644	11'304 0		CCS	MODECADR	
0538					07,3645	1 3651 1		TCF	+4	YES - WAKE IT UP.
0539	REF	1			07,3646	1 3661 1		TCF	ENDMODE	IF 0, PROGRAM NOT IN YET.
05392					07,3647	0 0006 1		EXTEND		
05394	REF	2	LAST	1322	07,3650	1 3662 1		BZF	ENDMODE +1	BZF = TCF IF MODECADR = -0.
0540	REF	234	LAST	1322	07,3651	3 4755 1		CAF	ZERO	WAKE SLEEPING PROGRAM.
0541	REF	17	LAST	1322	07,3652	50 071 1		INDEX	RUPTREG2	
0542	REF	6	LAST	1322	07,3653	57'304 1		XCH	MODECADR	
0543	REF	7	LAST	1315	07,3654	0 5137 1		TC	JOBWAKE	
0544	REF	12	LAST	1322	07,3655	4 0072 0		CS	RUPTREG3	ADVANCE LOC IF SUCCESSFUL.
0545	REF	23	LAST	1215	07,3656	50 064 0		INDEX	LOCCTR	
0546	REF	43	LAST	1111	07,3657	26 164 0		ADS	LCC	
0547	REF	77	LAST	1318	07,3660	1 5261 0		TCF	TASKOVER	
0548	REF	13	LAST	1322	07,3661	3 0072 1	ENDMODE	CA	RUPTREG3	-0 INDICATES OPERATION COMPLETE BUT
0549	REF	18	LAST	1322	07,3662	50 071 1	+1	INDEX	RUPTREG2	UNSUCCESSFUL: -1 INDICATES COMPLETE AND
0550	REF	7	LAST	1322	07,3663	55'304 0		TS	MODECADR	SUCCESSFUL.
0551	REF	78	LAST	1322	07,3664	1 5261 0		TCF	TASKOVER	

L IMU MODE SWITCHING ROUTINES

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P0552 GENERAL STALLING ROUTINE. USING PROGRAMS COME HERE TO WAIT FOR I/O COMPLETION.

R0554 PROGRAM DESCRIPTION- DATE- 21 FEB 1967
 R0555 LOG SECTION IMU MODE SWITCHING
 R0556 MOD 8Y- R.MELANSON TO ADD DOCUMENTATION ASSEMBLY SUNDISK REV. 82

R0557 FUNCTIONAL DESCRIPTION-
 R0558 TO DELAY FURTHER EXECUTION OF THE CALLING ROUTINE UNTIL ITS SELECTED
 R0559 I/O FUNCTION IS COMPLETE.THE FOLLOWING CHECKS ON THE CALLING ROUTINE:S
 R0560 MODECADR ARE MADE AND ACTED UPON.
 R0561 1) +0 INDICATES INCOMPLETE I/O OPERATION.CALLING ROUTINE IS PUT TO
 R0562 SLEEP.
 R0563 2) -1 INDICATES COMPLETED I/O OPERATION. STALL BYPASSES JOBSLEEP
 R0564 CALL AND RETURNS TO CALLING ROUTINE AT L+3
 R0565 3) -0 INDICATES COMPLETED I/O WITH FAILURE. STALL CLEARS MODECADR
 R0566 AND RETURNS TO CALLING ROUTINE AT L+2.
 R0567 4) VALUE GREATER THAN 0 INDICATES TWO ROUTINES CALLING FOR USE OF
 R0568 SAME DEVICE. STALL EXITS TO ABORT WHICH EXECUTES A PROGRAM
 R0569 RESTART WHICH IN TURN CLEARS ALL MODECADR REGISTERS.

R0570 CALLING SEQUENCE-
 R0571 L TC BANKCALL
 R0572 L+1 CADR (ONE OF 5 STALL ADDRESSES I.E. IMUSTALL,OPTSTALL,RADSTALL,
 R0573 AOTSTALL,OR ATTSTALL)

R0574 NCRMAL-EXIT MODE-
 R0575 TCF JOBSLEEP OR TCF MODEEXIT

R0576 ALARM OR ABORT EXIT MODE-
 R0577 TC ABORT

R0578 OUTPUT-
 R0579 MODECADR= CADR IF JOBSLEEP
 R0580 MODECADR=+0 IF I/O COMPLETE
 R0581 BUF2=L+3 IF I/O COMPLETE AND GOOD.
 R0582 BUF2=L+2 IF I/O COMPLETE BUT FAILED.

R0583 ERASABLE INITIALIZATION-
 R0584 BUF2 CONTAINS RETURN ADDRESS PLUS 1,(L+2)
 R0585 BUF2+1 CONTAINS FBANK VALUE OF CALLING ROUTINE.
 R0586 MODECADR OF CALLING ROUTINE CONTAINS +0,-1,-0 OR CADR RETURN ADDRESS.

R0587 DEBRIS-
 R0588 RUPTREG2 AND CALLING ROUTINE MODECADR.

0589	RFF	134	LAST 1322	07,3665	3	4753	1	AOTSTALL	CAF	ONE	AOT.
0590	REF	1		07,3666	0	3672	1		TC	STALL	
0591	REF	86	LAST 1313	07,3667	3	4752	0	RADSTALL	CAF	TWO	
0592	RFF	2	LAST 1323	07,3670	1	3672	0		TCE	STALL	

L IMU MDDE SWITCHING ROUTINES

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0593	REF	3	LAST	958	07,3665		OPTSTALL	EQUALS	AOTSTALL	
0594	REF	235	LAST	1322	07,3671	3 4755 1	IMUSTALL	CAF	ZERO	IMU.
0595					07,3672	0 0004 0	STALL	INHINT		
0596	REF	19	LAST	1322	07,3673	54 071 0		TS	RUPTREG2	SAVE DEVICE INOEX.
0597	REF	427	LAST	1321	07,3674	50 000 1		INDEX	A	SEE IF OPERATION COMPLETE.
0598	REF	8	LAST	1322	07,3675	11'304 0		CCS	MODECAOR	
0599	REF	1			07,3676	1 3714 1		TCF	MODABORT	ALLOWABLE STATES ARE +0, -1, AND -0.
0600	REF	1			07,3677	1 3710 0		TCF	MODESLP	OPERATION INCOMPLETE.
0601	REF	1			07,3700	1 3704 0		TCF	MODEGOOD	COMPLETE AND GOOD IF = -1.
0602	REF	20	LAST	1324	07,3701	50 071 1	MG2	INDEX	RUPTREG2	COMPLETE AND FAILED IF -0. RESET TO +0.
0603	REF	9	LAST	1324	07,3702	55'304 0		TS	MODECADR	RETURN TO CALLER.
0604	REF	8	LAST	1321	07,3703	1 2730 0		TCF	MODEEXIT	
0605	REF	428	LAST	1324	07,3704	10 000 0	MODEGOOD	CCS	A	MAKE SURE INITIAL STATE -1.
0606	REF	2	LAST	1324	07,3705	1 3714 1		TCF	MODABORT	
0607	REF	25	LAST	1314	07,3706	24 133 0		INCR	BUF2	IF SO, INCREMENT RETURN ADDRESS AND
0608	REF	1			07,3707	1 3701 0		TCF	MG2	RETURN IMMEDIATELY, SETTING CADR = +0.
0609	REF	13	LAST	934	07,3710	0 4645 1	MODESLP	TC	MAKECADR	CALL FROM SWITCHABLE FIXED ONLY.
0610	REF	21	LAST	1324	07,3711	50 071 1		INDEX	RUPTREG2	
0611	REF	10	LAST	1324	07,3712	55'304 0		TS	MODECADR	
0612	REF	6	LAST	1314	07,3713	1 5133 1		TCF	JOBSLEEP	
0613	REF	26	LAST	1324	07,3714	52 134 0	MODABORT	DXCH	BUF2	
06132	REF	6	LAST	1121	07,3715	0 5710 1		TC	BAILOUT1	TWO PROGRAMS USING THE SAME DEVICE.
0614					07,3716	01210 0		OCT	1210	

L IMU MODE SWITCHING ROUTINES

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P0615      CONSTANTS FOR MODE SWITCHING ROUTINES

0616 REF 5 LAST 969      5742      BITS3&4 = OCT14
0617 RFF 3 LAST 1280     4771      BITS4&6 = OCT50
0618                                07,3717 00030 1 BITS4-5 OCT 00030
0619 REF 40 LAST 1317    4744      IMUSEFLG EQUALS BIT8      INTERPRETER SWITCH 7.
0620                                07,3720 77500 1 -COMMAX DEC -191
0621                                07,3721 77477 0 -COMMAX- DEC -192
0622                                07,3722 00074 1 600MS DEC 60
0623 RFF 6 LAST 965      07,3163      IMUFIN20 = IMUFINE
0624 RFF 4 LAST 382      07,3723 3 1307 1 GOMANUR CA ATTCAOR      IS KALCMANU FREE
0625                                07,3724 0 0006 1 EXTEND
0626                                07,3725 1 3730 1 BZF +3

0627 REF 5 LAST 812      07,3726 0 5652 0 IC P00000      NO
0628                                07,3727 01210 0 OCT 1210      2 TRYING TO USE SAME DEVICE

0629                                07,3730 0 0006 1 +3 EXTEND
0630 RFF 27 LAST 1324     07,3731 3 0134 1 OCA BUF2
0632 REF 5 LAST 1325     07,3732 531310 0 DXCH ATTCAOP      SAVE FINAL RETURN FOR KALCMAN3

0633 REF 41 LAST 1294     07,3733 3 0006 1 CA BBANK
0634 REF 21 LAST 1316     07,3734 7 4757 1 MASK SEVEN
0635 REF 6 LAST 1325     07,3735 271310 0 ADS ATTCAOR +1

0642 REF 32 LAST 1108     07,3736 3 0167 1 CA PRIORITY
0643 REF 2 LAST 247      07,3737 7 7724 0 MASK PRI037
0644 REF 2 LAST 382      07,3740 551311 1 TS ATTPRIO      SAVE USERS PRIO

06452 REF 1              07,3741 3 3745 1 CAF KALEBCON      SET EBANK FOR KALCMAN3
06453 REF 61 LAST 1318   07,3742 54 003 0 TS EBANK
06454 REF 50 LAST 1281   07,3743 0 4635 0 TC POST JUMP
06455 REF 1              07,3744 44004 0 CADR KALCMAN3
06456 REF 13 LAST 497    07,3745 03274 0 KALEBCON ECAOR BCJU

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L IMU MOOE SWITCHING ROUTINES

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R0646 PROGRAM DESCRIPTION
 R0647 IMU STATUS CHECK ROUTINE R02 (SUBROUTINE UTILITY)

R0648 MCD NO - 1

R0649 MOO BY - N.BROOEUR

R0650 EUNCTIONAL DESCRIPTION

R0651

R0652 TO CHECK WHETHER IMU IS ON AND IE ON WHETHER IT IS ALIGNED TO AN
 R0653 ORIENTATION KNOWN BY THE CMC. TO REQUEST SELECTION OF THE APPROPRIATE

R0654 PROGRAM IF THE IMU IS OFF OR NOT ALIGNED TO AN ORIENTATION KNOWN BY THE

R0655 CMC. CALLED THROUGH BANKCALL

R0656 CALLING SEQUENCE-

R0657

R0658 L TC BANKCALL

R0659 L+1 CADR R02BOTH

R0660 SUBROUTINES CALLED

R0661

R0662 VARALARM

R0663 FLAGUP

R0664 NCRMAL EXIT MOOES

R0665

R0666 AT L+2 OF CALLING SEQUENCE

R0667 ALARM OR ABORT EXIT MODES

R0668 GOTOPDOOH, WITH ALARM

R0673 ERASABLE INITIALIZATION REQUIRED

R0674

R0675 NGNE

R0676 DEBRIS

R0677

R0678 CENTRALS-A,Q,L

0679 34,3760

0680 REF 1 04,2000

0681 04,3174

0682 REF 1 04,3174 00063 1 0EC51 BANK 34

0683 04,3175 3 4737 0 R02BOTH OEC 51 SETLOC R02

0684 REF 7 LAST 1309 04,3176 7 0077 0 CAE REESMBIT

0685 REF 20 LAST 1309 04,3177 10 000 0 MASK FLAGWRD3

0686 REF 429 LAST 1324 04,3200 0 3211 0 CCS A

0687 REE 1 04,3201 3 1302 1 TC R02ZERO

ZERO IMUS

0688 REF 67 LAST 1321 04,3202 7 4743 1 CA IMODES30

0689 REE 33 LAST 1320 04,3203 0 0006 1 MASK BIT9

IS ISS INITIALIZED

0690 04,3204 1 3206 1 EXTEND

0691 04,3205 4 4750 0 BZF +2

0692 REE 50 LAST 1318 04,3206 6 3214 0 CS BIT4

SEND IMU ALARM CODE 210

0693 REF 1 04,3207 0 5735 0 AO OCT220

SEND REESMM ALARM

0694 REF 4 LAST 631 04,3210 0 6001 0 TC VARALARM

0695 REF 67 LAST 978 04,3211 0 5504 0 R02ZERO TC

GOTOPDOOH

UPFLAG

0700 REE 67 LAST 1249 04,3211 0 5504 0 R02ZERO TC

L IMU MODE SWITCHING ROUTINES

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0701	REF	6	LAST	978	04,3212	00007	0	ADRES	IMUSE
0702	REF	9	LAST	1312	04,3213	1 4631	0	TCF	SWFETUPN
07025					04,3214	00220	1	OCT220	OCT 220

L IMU MODE SWITCHING ROUTINES

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P0703 PROGRAM DESCRIPTION P06 10FEB67

R0704 TRANSFER THE ISS/CMC FROM THE OPERATE TO THE STANDBY CONDITION.

R0705 THE NORMAL CONDITION OF READINESS OF THE GNCS WHEN NOT IN USE IS STANDBY. IN THIS CONDITION THE IMU
R0707 HEATER POWER IS ON. THE IMU OPERATE POWER IS OFF. THE COMPUTER POWER IS ON. THE OPTICS POWER IS OFF. THE
R0709 CMC STANDBY ON THE MAIN AND LEB DISKYS IS ON.

R0710 CALLING SEQUENCE:
R0711 ASTRONAUT REQUEST THROUGH DSKY V37E 06E.

R0712 SUBROUTINES CALLED:
R0713 GCPERF1
R0716 BANKCALL
R0719 FLAGDOWN

L IMU MODE SWITCHING ROUTINES

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P0810 PRESTAND PREPARES FOR STANDBY BY SNAPSHOTTING THE SCALER AND TIME1 TIME2
 R0811 THE LCW 5 BITS OF THE SCALER ARE INSPECTED TO INSURE COMPATABILITY
 R0812 BETWEEN THE SCALER READING AND THE TIME1 TIME2 READING.

08125	REF	1		37,2000			SETLOC P05P06		
08126				37,3641			BANK		
0813	REF	2	LAST 115	0314			EBANK= TIME2SAV		
0814	REF	1					COUNT* 55/P06		
08145	REF	68	LAST 1326	37,3641	0 5504 0	P06	TC UPFLAG	SET NODOV37 BIT	
08146	REF	5	LAST 1205	37,3642	00054 0		ADRES NODOFLAG		
0815				37,3643	0 0004 0	PRESTAND	INHINT		
0816				37,3644	0 0006 1		EXTEND		
0817	REF	32	LAST 1301	37,3645	3 0025 0		DCA TIME2	SNAPSHOT TIME1TIME2	
0818	REF	3	LAST 1329	37,3646	52 315 1		DXCH TIME2SAV		
0819	REF	1		37,3647	0 3700 0		TC SCALPREP		
0820	REF	1		37,3650	0 3643 0		TC PRESTAND	T1,T2,SCALER NOT COMPATIBLE	
0821	REF	746	LAST 1314	37,3651	52 155 1		DXCH MPAC	T1,T2 AND SCALER OK	
0822	REF	1		37,3652	52 317 0		DXCH SCALSAVE	STORE SCALER	
0823				37,3653	0 0004 0		INHINT		
0824	REF	301	LAST 972	37,3654	0 4616 1		TC BANKCALL		
0825	REF	3	LAST 191	37,3655	17150 0		CADR RNDREFDR	REFSMM, DRIFT, TRACK FLAGS DOWN	
0826	REF	91	LAST 1205	37,3656	0 5516 0		TC DOWNFLAG		
0827	REF	7	LAST 1327	37,3657	00007 0		ADRES IMUSE	IMUSE DOWN	
08271	REF	52	LAST 1329	37,3660	0 5516 0		TC DOWNFLAG		
08272	REF	6	LAST B39	37,3661	00010 0		ADRES RNDVZFLG	RNDVZFLG DOWN	
0828	REF	36	LAST 1305	37,3662	3 4741 1		CAF BIT11		
0829				37,3663	0 0006 1		EXTEND		
0830	REF	19	LAST 987	37,3664	05 013 0		WDR CHAN13	SET STANDBY ENABLE BIT	
0831	REF	114	LAST 1238	37,3665	0 5353 1		TC PHASCHNG	SET RESTART TO POSTAND WHEN STANDBY	
0832				37,3666	07024 0		OCT 07024	RECOVRS	
0833				37,3667	20000 0		OCT 20000		
08335	REF	2	LAST 1329	0316			EBANK= SCALSAVE		
0834	REF	1		37,3670	03720 1		2CADR POSTAND		
0834	REF	1		37,3671	76060 0				
0835	REF	1		37,3672	3 4774 1		CAF OCT62		
0836	REF	302	LAST 1329	37,3673	0 4616 1		TC BANKCALL		
0837	REF	10	LAST 969	37,3674	20476 0		CADR GOPERF1		
0838				37,3675	1 3672 0		TCF -3		
0839				37,3676	1 3672 0		TCF -4		
0840				37,3677	1 3672 0		TCF -5		
08405	REF	3	LAST 610	4774		OCT62	EQUALS .5SEC	DEC 50 = OCT 62	

R0841 THE LCW 5 BITS OF THE SCALER READS 10000 FOR THE FIRST INTERVAL AFTER A

L IMU MODE SWITCHING ROUTINES

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R0842 T1 INCREMENT. IF SCALPREP DETECTS THIS INTERVAL THE T1,T2 AND SCALER
 R0843 DATA ARE NOT COMPATABLE AND RETURN IS TO L+1 FOR ANOTHER READING OF THE
 R0844 DATA. OTHERWISE, THE RETURN IS TO L+2 TO PROCEED. ROUTINE ALSO PREPARES
 R0845 THE SCALER READING FOR COMPUTATION OF THE INCREMENT TO UPDATE TIT2. (THE
 R0846 10 MS BIT (BIT 6) OF THE SCALER IS INCREMENTED 5 MS OUT OF PHASE FROM
 R0847 T1.) ADDITION OF 5 MS (BIT 5) TO THE SCALER READING HAS THE EFFECT OF
 R0848 ADJUSTING BIT 6 IN THE SCALER TO BE IN PHASE WITH BIT 1 OF T1. THE LOW 5
 R0849 BITS OF THE SCALER READING ARE THEN SET TO ZERO, TO TRUNCATE THE SCALER
 R0850 DATA TO 10 MS. RESULTS ARE STORED IN MPAC, +1.

0851				37,3700	0 0006 1	SCALPREP	EXTEND			
0852	REF 747	LAST 1329		37,3701	22 156 0		QXCH	MPAC	+2	
0853	REF 3	LAST 394		37,3702	0 4103 1		TC	FINETIMF	+1	
0854				37,3703	0 0003 1		RELINT			
0855	REF 748	LAST 1330		37,3704	52 155 1		DXCH	MPAC		
0856	REF 42	LAST 1311		37,3705	3 4747 1		CA	BIT5		ADD 5 MS TO THE SCALER READING.
0857	REF 228	LAST 1317		37,3706	54 001 1		TS	L		
0858	REF 236	LAST 1324		37,3707	3 4755 1		CA	ZERO		
0859	REF 749	LAST 1330		37,3710	20 155 1		DAS	MPAC		
0860	REF 9	LAST 751		37,3711	4 4346 0		CS	LOW5		SET LOW 5 BITS OF (SCALER+5MS) TO ZERO
0861	REF 750	LAST 1330		37,3712	7 0155 1		MASK	MPAC	+1	AND STORE RESULTS IN MPAC,+1.
0862	REF 751	LAST 1330		37,3713	56 155 0		XCH	MPAC	+1	
0863	REF 10	LAST 1330		37,3714	7 4346 0		MASK	LOW5		TEST LOW 5 BITS OF SCALER FOR THE FIRST
A0864										INTERVAL AFTER THE T1 INCREMENT
A0865										(NOW = 00000, SINCE BIT 5 ADDED).
0866	REF 430	LAST 1326		37,3715	10 000 0		CCS	A		IS IT 1ST INTERVAL AFTER T1 INCREMENT
0867	REF 752	LAST 1330		37,3716	24 156 0		INCR	MPAC	+2	NO
0868	REF 753	LAST 1330		37,3717	0 0156 0		TC	MPAC	+2	YES

R0869 POSTAND RECOVERS TIME AFTER STANDBY. THE SCALER IS SNAPSHOTTED AND THE
 R0870 TIME1 TIME2 COUNTER IS SET TO ZERO. THE LOW 5 BITS OF THE SCALER ARE
 R0871 INSPECTED TO INSURE COMPATABILITY BETWEEN THE SCALER READING AND THE
 R0872 CLEARING OF THE TIME COUNTER. IT THEN COMPUTES THE DIFFERENCE IN SCALER
 R0873 VALUES (IN DP) AND ADDS THIS TO THE PREVIOUSLY SNAPSHOTTED VALUES OF
 R0874 TIME1 TIME2 AND PLACES THIS NEW TIME INTO THE TIME1 TIME2 COUNTER.

0875	REF 1						COUNT*	\$\$/P05		
0876	REF 37	LAST 1329		37,3720	4 4741 0	POSTAND	CS	BIT11		RECOVER TIME AFTER STANDBY.
0877				37,3721	0 0006 1		EXTEND			
0878	REF 20	LAST 1329		37,3722	03 013 0		WAND	CHAN13		CLEAR STANDBY ENABLE BIT
0879				37,3723	0 0004 0		INHINT			
0880	REF 237	LAST 1330		37,3724	3 4755 1		CA	ZERO		
0881	REF 229	LAST 1330		37,3725	54 001 1		TS	L		
0882	REF 33	LAST 1329		37,3726	52 025 1		DXCH	TIME2		CLEAR TIME1 TIME2
0883	REF 2	LAST 1329		37,3727	0 3700 0		TC	SCALPREP		STORE SCALER IN MPAC, MPAC+1
0884	REF 2	LAST 1329		37,3730	0 3723 1		TC	POSTAND	+3	T1,T2,SCALER NOT COMPATIBLE
0885				37,3731	0 0006 1		EXTEND			T1,T2 AND SCALER OK
0886	REF 3	LAST 1329		37,3732	4 0317 0		DCS	SCALSAVE		
0887	REF 754	LAST 1330		37,3733	20 155 1		DAS	MPAC		FORM DP DIFFERENCE OF POSTSTANDBY SCALER

L IMU MODE SWITCHING ROUTINES

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0888	REF 56	LAST 1318	37,3734	3 4742 1	CAF	BIT10	MINUS PRESTANDBY SCALER AND SHIFT RIGHT
0889	REF 10	LAST 862	37,3735	0 7306 0	TC	SHORTMP	5 TO ALIGN BITS WITH TIME1TIME2.
0890	REF 238	LAST 1330	37,3736	3 4755 1	CAF	ZERO	
0891	REF 755	LAST 1330	37,3737	54 156 1	TS	MPAC +2	NEEDED FOR TP AGREE
0892	REF 16	LAST 1313	37,3740	0 7256 1	TC	TPAGREE	MAKE DP DIFF AGREE
0893	REF 756	LAST 1331	37,3741	10 154 0	CCS	MPAC	
0894	REF 1		37,3742	0 3747 0	TC	POSTCOM	IF DP DIFF NET +, NO SCALER OVERFLOW
0895	REF 2	LAST 1331	37,3743	0 3747 0	TC	POSTCOM	BETWEEN PRE AND POST STANDBY.
0896			37,3744	0 3745 1	TC	+1	IF DP DIFF NET -, SCALER OVERFLOWED. ADD
0897	REF 57	LAST 1331	37,3745	3 4742 1	CAF	BIT10	BIT 10 TO HIGH DIFF TO CORRECT.
0898	REF 757	LAST 1331	37,3746	26 154 0	ADS	MPAC	
0899			37,3747	0 0006 1	POSTCOM	EXTEND	C(MPAC,+1) IS MAGNITUDE OF DELTA SCALER.
0900	REF 4	LAST 1329	37,3750	3 0315 0	DCA	TIME2SAV	PRESTANDBY TIME1TIME2
0901	REF 758	LAST 1331	37,3751	20 155 1	DAS	MPAC	
0902	REF 17	LAST 1331	37,3752	0 7256 1	TC	TPAGREE	FORCE SIGN AGREEMENT
0903	REF 759	LAST 1331	37,3753	52 155 1	DXCH	MPAC	UPDATED VALUE FOR T1,T2.
0904	REF 34	LAST 1330	37,3754	20 025 1	DAS	TIME2	LOAD UPDATED VALUE INTO T1,T2, WITH
09045	REF 93	LAST 1329	37,3755	0 5516 0	TC	DDWFLAG	CLEAR NODOFLAG
09046	REF 6	LAST 1329	37,3756	00054 0	ADRES	NODOFLAG	
0905	REF 68	LAST 1326	37,3757	0 6001 0	TC	GOTCPOOH	

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0001				14,3711				BANK 14	
0002	REF	1		04,2000				SETLOC KEYRUPT	
0003				04,3215				BANK	
0004	REF	1						COUNT* 5\$/KEYUP	

0005	REF	9	LAST	1124	04,3215	54 016 1	KEYRUPT1	TS	BANKRUPT
0006	REF	351	LAST	1321	04,3216	56 002 0		XCH	Q
0007	REF	8	LAST	1124	04,3217	54 012 0		TS	QRUPT
0008	REF	2	LAST	451	04,3220	0 4400 1		TC	LODSAMPT
0009	REF	11	LAST	1330	04,3221	3 4346 1		CAF	LOW5
0010					04,3222	0 0006 1		EXTENO	
0011	REF	2	LAST	233	04,3223	02 015 1		RAND	MNKEYIN
0012	REF	6	LAST	1294	04,3224	54 073 1	KEYCOM	TS	RUPTREG4
0013	REF	26	LAST	914	04,3225	4 0101 0		CS	FLAGWR05
0014	REF	1			04,3226	7 4735 0		MASK	DSKYFBIT
0015	REF	27	LAST	1332	04,3227	26 101 0		AOS	FLAGWR05

TIME IS SNATCHED IN RUPT FOR NOUN 65.

CHECK IF KEYS 5M-1M ON

0016	REF	6	LAST	1094	04,3230	3 4355 0	ACCEPTUP	CAF	CHRPRID
0017	REF	28	LAST	1302	04,3231	0 5072 1		TC	NOVAC
0018	REF	66	LAST	471	0777			EBANK=	OSPCOUNT
0019	REF	1			04,3232	02077 0		2CADR	CHARIN
0019	REF	1			04,3233	60101 1			
0020	REF	7	LAST	1332	04,3234	3 0073 0		CA	RUPTREG4
0021	REF	24	LAST	1322	04,3235	50 064 0		INDEX	LOCCIR
0022	REF	760	LAST	1331	04,3236	54 154 0		TS	MPAC
0023	REF	22	LAST	989	04,3237	0 5270 1		TC	RESUME

(NOTE: RUPTREG4 = KEYTEMP1)

LEAVE 5 BIT KEY COE IN MPAC FOR CHARIN

L KEYRUPT, UPRUPT

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P0024 UPRUPT PROGRAM

0025	REF	10	LAST	1332	04,3240	54 016 1	UPRUPT	TS	BANKRUPT	
0026	REF	352	LAST	1332	04,3241	56 002 0		XCH	Q	
0027	RFF	9	LAST	1332	04,3242	54 012 0		TS	ORUPT	
0028	REF	3	LAST	1332	04,3243	0 4400 1		TC	LDOSAMPT	TIME IS SNATCHED IN RUPT FOR NOUN 65.
0029	RFF	239	LAST	1331	04,3244	3 4755 1		CAF	ZFRD	
0030	REF	2	LAST	237	04,3245	56 045 0		XCH	INLINK	
0031	RFF	2	LAST	169	04,3246	54 073 1		TS	KEYTEMP1	
0032	RFF	39	LAST	1279	04,3247	3 4751 0		CAF	BIT3	TURN ON UPACT LIGHT
0033					04,3250	0 0006 1		EXTEND		(BIT 3 OF CHANNFL 11)
0034	REF	34	LAST	1321	04,3251	05 011 1		WOR	DALMOUT	
0035	REF	12	LAST	1332	04,3252	3 4346 1	UPRPT1	CAF	LOW5	TEST FOR TRIPLE CHAR REDUNDANCY
0036	REF	3	LAST	1333	04,3253	7 0073 1		MASK	KEYTEMP1	LOW5 OF WORD
0037	REF	4	LAST	1333	04,3254	56 073 0		XCH	KEYTEMP1	LOW5 INTO KEYTEMP1
0038					04,3255	0 0006 1		EXTEND		
0039	RFF	58	LAST	1331	04,3256	7 4742 0		MP	BIT10	SHIFT RIGHT 5
0040	REF	1			04,3257	54 734 0		TS	KEYTEMP2	
0041	RFF	13	LAST	1333	04,3260	7 4346 0		MASK	LOW5	MID 5
0042	RFF	1			04,3261	6 3315 0		AD	H110	
0043	REF	1			04,3262	0 3312 1		TC	UPTTEST	
0044	RFF	59	LAST	1333	04,3263	3 4742 1		CAF	BIT10	
0045					04,3264	0 0006 1		EXTEND		
0046	REF	2	LAST	1333	04,3265	7 0734 0		MP	KEYTEMP2	SHIFT RIGHT 5
0047	REF	14	LAST	1333	04,3266	7 4346 0		MASK	LOW5	HIGH 5
0048					04,3267	4 0000 0		COM		
0049	REF	2	LAST	1333	04,3270	0 3312 1		TC	UPTTEST	
0050	REF	1			04,3271	4 3320 1	UPOK	CS	ELRCODF	CODE IS GOOD. IF CODE = 'ERROR RESET',
0051	REF	5	LAST	1333	04,3272	6 0073 0		AD	KEYTEMP1	CLEAR UPLOCKFL (SET BIT4 OF FLAGWRD7 = 0)
0052					04,3273	0 0006 1		EXTEND		IF CODE DOES NOT = 'ERROR RESET', ACCEPT
0053	REF	1			04,3274	1 3302 1		BZF	CLUPLOCK	CODE ONLY IF UPLOCKFL IS CLEAR (=0).
0054	REF	1			04,3275	3 4750 1		CAF	UPLOCBIT	TEST UPLOCKFL FOR 0 OR 1
0055	REF	24	LAST	897	04,3276	7 0103 1		MASK	FLAGWRD7	
0056	REF	431	LAST	1330	04,3277	10 000 0		CCS	A	
0057	REF	23	LAST	1332	04,3300	0 5270 1		TC	RFSUME	UPLOCKFL = 1
0058	REF	1			04,3301	0 3230 0		TC	ACCEPTUP	UPLOCKFL = 0
0059	REF	2	LAST	1333	04,3302	4 4750 0	CLUPLOCK	CS	UPLOCBIT	CLEAR UPLOCKFL (I.F., SET BIT 4 OF)
0060	REF	25	LAST	1333	04,3303	7 0103 1		MASK	FLAGWRD7	FLAGWRD7 = 0)
0061	REF	26	LAST	1333	04,3304	54 103 1		TS	FLAGWRD7	
0062	RFF	2	LAST	1333	04,3305	0 3230 0		TC	ACCEPTUP	
A0063										CODE IS BAD
0064	REF	27	LAST	1333	04,3306	4 0103 1	TMFAIL2	CS	FLAGWRD7	LOCK OUT FURTHER UPLINK ACTIVITY
0065	REF	3	LAST	1333	04,3307	7 4750 0		MASK	UPLOCBIT	(BY SETTING UPLOCKFL = 1) UNTIL
0066	REF	28	LAST	1333	04,3310	26 103 1		ADS	FLAGWRD7	'ERROR RESET' IS SENT VIA UPLINK.
0067	RFF	24	LAST	1333	04,3311	0 5270 1		TC	RESUMF	
0069	REF	6	LAST	1333	04,3312	6 0073 0	UPTTEST	AD	KEYTEMP1	

L KEYRUPT, UPRUPT

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0070	REF 432	LAST 1333	04,3313	10 000 0		CCS	A
0071	REF 1		04,3314	0 3306 1		TC	TMFAIL2
0072			04,3315	77740 1	HI10	OCT	77740
0073	REF 2	LAST 1334	04,3316	0 3306 1		TC	TMFAIL2
0074	REF 353	LAST 1333	04,3317	0 0002 0		TC	Q

0075			04,3320	00022 1	ELRCODE	OCT	22
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R0076 'UPLINK ACTIVITY LIGHT' IS TURNED OFF BY

R0077 1. VBRELDSP

R0078 2. ERROR RESET

R0079 3. UPDATE PROGRAM(P27) ENTERED BY V70,V71,V72,AND V73.

R0080

R0081 THE RECEPTION OF A BAD CODE(I.E CCC FAILURE) LOCKS OUT FURTHER UPLINK ACTIVITY BY SETTING BIT4 OF FLAGWRD7 = 1.

R0083 THIS INDICATION WILL BE TRANSFERRED TO THE GROUND BY THE DOWNLINK WHICH DOWNLINKS ALL FLAGWORDS.

R0085 WHEN UPLINK ACTIVITY IS LOCKED OUT ,IT CAN BE ALLOWED WHEN THE GROUND UPLINKS AND 'ERROR RESET' CODE.

R0087 (IT IS RECOMMENDED THAT THE 'ERROR LIGHT RESET' CODE IS PRECEDED BY 16 BITS THE FIRST OF WHICH IS 1 FOLLOWED

R0089 BY 15 ZEROES. THIS WILL FLIMINATE EXTRANEIOUS BITS FROM INLINK WHICH MAY HAVE BEEN LEFT OVER FROM THE ORIGINAL

R0091 FAILURE).

R0092 UPLINK ACTIVITY IS ALSO ALLOWED(UNLOCKED) DURING FRESH START WHEN FRESH START SETS BIT4 OF FLAGWRD7 = 0.

05124 REF 1 04,3321 4 4753 0 CS XDSPRIT

L DISPLAY INTERFACE ROUTINES

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R0001 DISPLAYS CAN BE CLASSIFIED INTO THE FOLLOWING CATEGORIES-

- R0002 1. PRIORITY DISPLAYS- DISPLAYS WHICH TAKE PRIORITY OVER ALL OTHER DISPLAYS. USUALLY THESE DISPLAYS ARE SENT
R0004 DUT UNDER CRITICAL ALARM CONDITIONS.
R0005 2. EXTENDED VERB DISPLAYS- ALL EXTENDED VERBS AND MARK ROUTINES SHOULD USE EXTENDED VERB (MARK) DISPLAYS.
R0007 3. NORMAL DISPLAYS- ALL MISSION PROGRAM DISPLAYS WHICH INTERFACE WITH THE ASTRONAUT DURING THE NORMAL
R0009 SEQUENCE OF EVENTS.
R0010 4. MISC. DISPLAYS- ALL DISPLAYS NOT HANDLED BY THE DISPLAY INTERFACEROUTINES. THESE INCLUDE SUCH DISPLAYS AS
R0012 MM DISPLAYS AND SPECIAL PURPOSE DISPLAYS HANDLED BY PINBALL.

R0013 5. ASTRONAUT INITIATED DISPLAYS- ALL DISPLAYS INITIATED EXTERNALLY.

R0014 THE FOLLOWING TERMS ARE USED TO DESCRIBE THE STATUS OF DISPLAYS-

- R0015 1. ACTIVE- THE DISPLAY WHICH IS (1) BEING DISPLAYED TO THE ASTRONAUT AND WAITING FOR A RESPONSE OR
R0017 (2) WAITING FIRST IN LINE FOR THE ASTRONAUT TO FINISH USING THE DSKY OR (3) BEING DISPLAYED ON THE DSKY
R0019 BUT NOT WAITING FOR A RESPONSE.
R0020 2. INACTIVE -A DISPLAY WHICH HAS (1) BEEN ACTIVE BUT WAS INTERRUPTED BY A DISPLAY OF HIGHER PRIORITY,
R0022 (2) BEEN PUT INTO THE WAITING LIST AT TIME IT WAS REQUESTED DUE TO THE FACT A HIGHER PRIORITY DISPLAY
R0024 WAS ALREADY GOING, (3) BEEN INTERRUPTED BY THE ASTRONAUT (CALLED A PINBRANCH CONDITION, SINCE THIS TYPE
R0026 OF INACTIVE DISPLAY IS USUALLY REACTIVATED ONLY BY PINBALL) OR (4) A DISPLAY WHICH HAS FINISHED BUT STILL
R0028 HAS INFO SAVED FOR RESTART PURPOSES.

R0029 DISPLAY PRIORITIES WORK AS FOLLOWS-

R0030 INTERRUPTS-

- R0031 1. THE ASTRONAUT CAN INTERRUPT ANY DISPLAY WITH AN EXTERNAL DISPLAY REQUEST.
R0033 2. INTERNAL DISPLAYS CAN NOT BE SENT DUT WHEN THE ASTRONAUT IS USING THE DSKY.
R0035 3. PRIORITY DISPLAYS INTERRUPT ALL OTHER TYPES OF INTERNAL DISPLAYS. A PRIORITY DISPLAY INTERRUPTING ANOTHER
R0037 PRIORITY DISPLAY WILL CAUSE AN ABORT UNLESS BIT14 IS SET FOR THE LINUS ROUTINE.
R0039 4. A MARK DISPLAY INTERRUPTS ANY NORMAL DISPLAY.
R0040 5. A MARK THAT INTERRUPTS A MARK COMPLETELY REPLACES IT.

R0041 ORDER OF WAITING DISPLAYS-

- R0042 1. ASTRONAUT EXTERNAL USE
R0043 2. PRIORITY
R0044 3. INTERRUPTED MARK
R0045 4. INTERRUPTED NORMAL

R0046 5. MARK TO BE REQUESTED (SEE DESCRIPTION OF ENDMARK)

R0047 6. MARK WAITING

R0048 7. NORMAL WAITING

L DISPLAY INTERFACE ROUTINES

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R0049 THE DISPLAY ROUTINES ARE INTENDED TO SERVE AS AN INTERFACE BETWEEN THE USER AND PINBALL. THE
 R0051 FOLLOWING STATEMENTS CAN BE MADE ABOUT NORMAL DISPLAYS AND PRIORITY DISPLAYS (A DESCRIPTION OF MARK ROUTINES
 R0053 WILL FOLLOW LATER):

- R0054 1. ALL ROUTINES THAT END IN R HAVE AN IMMEDIATE RETURN TO THE USER. FOR ALL FLASHING DISPLAYS THIS RETURN
 R0056 IS TO THE USERS CALL CADR +4. FOR THE ONLY NON FLASHING IMMEDIATE RETURN DISPLAY (GODSPR) THIS RETURN
 R0058 IS TO THE USERS CALLING LOC +1.
- R0059 2. ALL ROUTINES NOT ENDING IN R DO NOT DO AN IMMEDIATE RETURN TO THE USER.
- R0061 3. ALL ROUTINES THAT END IN R START A SEPARATE JOB (MAKEPLAY) WITH USERS JOB PRIORITY.
- R0063 4. ALL ROUTINES NOT ENDING IN R BRANCH DIRECTLY TO MAKEPLAY WHICH MAKES THESE DISPLAYS A PART OF THE
 R0065 USERS JOB.
- R0066 5. ALL DISPLAY ROUTINES ARE CALLED VIA BANKCALL.
- R0067 6. TO RESTART A DISPLAY THE USER WILL GENERALLY USE A PHASE OF ONE WITH DESIRED RESTART GROUP (SEE
 R0069 DESCRIPTION OF RESTARTS).
- R0070 7. ALL FLASHING DISPLAYS HAVE 3 RETURNS TO THE USER FROM ASTRONAUT RESPONSES. A TERMINATE (V34) BRANCHES
 R0072 TO THE USERS CALL CADR +1. A PROCEED (V33) BRANCHES TO THE USERS CALL CADR +2. AN ENTER OR RECYCLE
 R0074 (V32) BRANCHES TO THE USERS CALL CADR +3.
- R0075 8. ALL ROUTINES MUST BE USED UNDER EXECUTIVE CONTROL.

R0076 A DESCRIPTION OF EACH ROUTINE WITH AN EXAMPLE FOLLOWS:

R0077 GODSP IS USED TO DISPLAY A VERB NOUN ARRIVING IN A. NO RETURN IS MADE TO THE USER.

- R0079 1. GODSP IS NOT RESTARTABLE
 - R0080 2. A VERB PASTE WITH GODSP ALWAYS TURNS ON THE FLASH.
- | | | |
|-------|------|----------|
| A0081 | CAF | VXXNY |
| A0082 | TC | BANKCALL |
| A0083 | CADR | GODSP |

A0084	VXXNY	DCT	0XXYY
-------	-------	-----	-------

R0085 GODSPR IS THE SAME AS GODSP ONLY RETURN IS TO THE USER.

A0086	CAF	VXXNY
A0087	TC	BANKCALL
A0088	CADR	GODSPR

A0089	IMMEDIATE RETURN OF GODSPR
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R0090 GOFASH DISPLAYS A FLASHING VERB NOUN WITH NO IMMEDIATE RETURN TO THE USER. 3 RETURNS ARE POSSIBLE FROM
 R0092 THE ASTRONAUT (SEE NO. 7 ABOVE).

A0093	CAF	VXXNY	VXX NY WILL BE A FLASHING VERB NOUN.
A0094	TC	BANKCALL	
A0095	CADR	GOFASH	
A0096	...	...	TERMINATE RETURN
A0097	...	...	PROCEED RETURN
A0098	...	...	ENTER OR RECYCLE RETURN

R0099 GOPERF1 IS ENTERED WITH DESIRED CHECKLIST VALUE IN A. GOPERF1 WILL DISPLAY THIS VALUE IN R1 BY MEANS OF A

L DISPLAY INTEREACE RDUTINES

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R0101 V01 N25.A ELASHING PLEASE PEREORM DN CHECKLIST (V50 N25) IS THEN DISPLAYED. NO IMMEDIATE RETURN IS MADE TO
 R0103 USER (SEE NO. 7 ABOVE).

R0104 GOPERE1 BLANKS REGISTERS R2 AND R3

A0105	CAF	DCIXX	CODE FOR CHECKLIST VALUE XX
A0106	TC	BANKCALL	
A0107	CADR	GOPERE1	
A0108	...	...	TERMINATE RETURN
A0109	...	...	PROCEED RETURN
A0110	...	...	ENTER RETURN

R0111 GOPERE2 IS ENTERED WITH A VARIABLE NOUN AND V01 (V00 FOR N10 OR N11) IN A. GOPERE2 WILL FIRST DISPLAY THE
 R0113 REQUESTED NOUN BY MEANS OF A V01NYY OR A V00NYY. PLEASE PEREORM ON NOUN (V50 NYY) THEN BECOMES A ELASHING
 R0115 DISPLAY. NO IMMEDIATE RETURN IS MADE TO THE USER (SEE NO. 7 ABOVE).

R0116 GOPERE2 DOES NOT BLANK ANY REGISTERS

A0117	CAE	VXXNYY	VARIABLE NOUN YY. XX=00 OR 01.
A0118	TC	BANKCALL	
A0119	CADR	GOPERE2	
A0120	...	...	TERMINATE RETURN
A0121	...	...	PROCEED RETURN
A0122	...	...	ENTER RETURN

R0123 GOPERE3 IS USED FOR A PLEASE PEREORM ON A PROGRAM NUMBER. THE DESIRED PROGRAM NO. IS ENTERED IN A. GOPERE3
 R0125 DISPLAYS THE NO. BY MEANS OF A V06 N07 FOLLOWED BY A FLASHING V50 N07 FOR A PLEASE PEREORM. NO IMMEDIATE RETURN
 R0127 IS MADE TO THE USER (SEE NO. 7 ABOVE).

R0128 GOPERE3 BLANKS REGISTERS R2 AND R3

A0129	CAF	DECXX	REQUEST PEREORM ON PXX
A0130	TC	BANKCALL	
A0131	CADR	GOPERE3	
A0132	...	...	TERMINATE RETURN
A0133	...	...	PROCEED RETURN
A0134	...	...	ENTER RETURN

R0135 GOPERE4 IS USED FOR A PLEASE PERFORM ON AN OPTION. THE DESIRED OPTION IS ENTERED IN A AND STORED IN OPTION1.
 R0137 GOPERE4 DISPLAYS R1 AND R2 BY MEANS OF A V04N06 FOLLOWED BY A ELASHING V50N06 FOR A PLEASE PERFORM. NO
 R0139 IMMEDIATE RETURN IS MADE TO THE USER (SEE NO. 7 ABOVE).

A0140	CAF	DCIXX	REQUEST PERFORM ON OPTION XX
A0141	TC	BANKCALL	
A0142	CADR	GOPERE4	
A0143	...	...	TERMINATE RETURN
A0144	...	...	PROCEED RETURN
A0145	ENTER RETURN

R0146 GOPERE4 BLANKS REGISTER R3

L DISPLAY INTERFACE ROUTINES

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R0147 GODSPRET IS USED TO DISPLAY A VERB NOUN ARRIVING IN A WITH A RETURN TO THE USER AFTER THE DISPLAY HAS BEEN SENT
 R0149 OLT.

A0150 CAF VXXNYY
 A0151 TC BANKCALL
 A0152 CADR GODSPRET

A0153 RETURN TO USER

R0154 REGODSP IS USED TO DISPLAY A VERB NOUN ARRIVING IN A. REGODSP IS THE SAME AS GOOSP ONLY REGODSP REPLACES ANY
 R0156 ACTIVE NORMAL DISPLAY IF ONE WAS ACTIVE.

A0157 CAF VXXNYY
 A0158 TC BANKCALL
 A0159 CADR REGODSP

R0160 REFLASH IS THE SAME AS GOFLASH ONLY REFLASH REPLACES ANY ACTIVE NORMAL DISPLAY IF ONE WAS ACTIVE.

A0162 CAF VXXNYY VXX NYY WILL BE A FLASHING VERB NOUN
 A0163 TC BANKCALL
 A0164 CADR REFLASH
 A0165 TERMINATE RETURN
 A0166 PROCEED RETURN
 A0167 ENTER RETURN

R0168 GOFLASHR IS SAME AS GOFLASH ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +4.

A0170 CAF VXXNYY
 A0171 TC BANKCALL
 A0172 CADR GOFLASHR
 A0173 TERMINATE RETURN
 A0174 PROCEED RETURN
 A0175 ENTER OR RECYCLE RETURN

A0176 IMMEDIATE RETURN FROM GOFLASHR

R0177 GOPERF1R IS THE SAME AS GOPERF1 ONLY GOPERF1R HAS AN IMMEDIATE RETURN TOUSERS CALL CADR +4.

R0179 GOPERF1R BLANKS REGISTERS R2 AND R3

A0180 CAF OCTXX CODE FOR CHECKLIST VALUE XX.
 A0181 TC BANKCALL
 A0182 CADR GOPERF1R
 A0183 TERMINATE RETURN
 A0184 PROCEED RETURN
 A0185 ENTER RETURN

A0186 IMMEDIATE RETURN FROM GOPERF1R

R0187 GOPERF2R IS THE SAME AS GOPERF2 ONLY AN IMMEDIATE RETURN IS MADE TO USERS CALL CADR +4.

L DISPLAY INTERFACE ROUTINES

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R0189 GOPERF2R DCES NOT BLANK ANY REGISTERS

A0190	CAF	VXXNYY	VARIABLE NOUN YY REQUESTED. XX=00 OR 01
A0191	TC	BANKCALL	
A0192	CADR	GOPEPF2P	
A0193	...	...	TERMINATE RETURN
A0194	...	...	PROCEED RETURN
A0195	...	...	ENTER RETURN

A0196 IMMEDIATE RETURN HERE FROM GOPERF2R

R0197 GOPERF3R IS THE SAME AS GOPERF3 ONLY AN IMMEDIATE RETURN IS MADE TO USERS CALL CADR +4.

R0199 GOPERF3R BLANKS REGISTERS R2 AND R3

A0200	CAF	PROGXX	PERFORM PROGRAM XX
A0201	TC	BANKCALL	
A0202	CADR	GOPEF3R	
A0203	...	...	TERMINATE RETURN
A0204	...	...	PROCEED RETURN
A0205	...	...	ENTER RETURN

A0206 GOPERF3R IMMEDIATELY RETURNS HERE

R0207 GOPERF4R IS THE SAME AS GOPERF4 ONLY AN IMMEDIATE RETURN IS MADE TO USERS CALL CADR +4.

A0209	CAF	DCIXX	REQUEST PERFORM ON OPTIONXX
A0210	TC	BANKCALL	
A0211	CADR	GOPEF4P	
A0212	...	...	TERMINATE RETURN
A0213	...	...	PROCEED RETURN
A0214	...	...	ENTER RETURN

A0215 IMMEDIATE RETURN TO USER

R0216 GOPERF4R BLANKS REGISTER R3

R0217 REFLASHR IS THE SAME AS REFLASH ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +4.

A0219	CAF	VXXNYY	VXX NYY WILL BE A FLASHING VERB NOUN
A0220	TC	BANKCALL	
A0221	CADR	REFLASHR	
A0222	...	...	TERMINATE RETURN
A0223	...	...	PROCEED RETURN
A0224	...	...	ENTER RETURN

A0225 IMMEDIATE RETURN TO USER

R0226 REGODSPR IS THE SAME AS REGODSP ONLY A RETURN (IMMEDIATE) IS MADE TO THE USER.

L DISPLAY INTERFACE ROUTINES

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A0228
A0229
A0230CAF VXXNYY
TC BANKCALL
CADR REGODSPR

A0231

... ...

IMMEDIATE RETURN TO USER

L DISPLAY INTERFACE ROUTINES

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P0232 GOMARK IS USED TO DISPLAY A MARK VERB NOUN ARRIVING IN A. NO RETURN IS MADE TO THE USER.

R0234 GOXDSP = GOMARK

A0235	CAF	VXXNYY	VXXNYY CONTAINS VERB AND NOUN
A0236	TC	BANKCALL	
A0237	CADR	GOMARK	OTHER EXTENDED VERBS USE CADR GOXDSP

R0238 GOMARKR IS THE SAME AS GOMARK ONLY RETURN IS TO THE USER.

R0239 GOXDSPR = GOMARKR

A0240	CAF	VXXNYY	
A0241	TC	BANKCALL	
A0242	CADR	GOMARKR	OTHER EXTENDED VERBS USE CADR GOXDSPR

A0243 IMMEDIATE RETURN OF GOMARKR

R0244 GOMARKF DISPLAYS A FLASHING MARK VERB NOUN WITH NO IMMEDIATE RETURN TO THE USER. 3 RETURNS ARE POSSIBLE FROM
R0246 THE ASTRONAUT (SEE NO. 7 ABOVE).

R0247 GOXDSPF = GOMARKF

A0248	CAF	VXXNYY	VXXNYY WILL BE A FLASHING MARK VERB NOUN
A0249	TC	BANKCALL	
A0250	CADR	GOMARKF	OTHER EXTENDED VERBS USE CADR GOXDSPF
A0251	...	...	TERMINATE RETURN
A0252	...	...	PROCEED RETURN
A0253	...	...	ENTER OR RECYCLE RETURN

R0254 GOMARKER IS THE SAME AS GOMARKF ONLY AN IMMEDIATE RETURN IS MADE TO THE USER CALL CADR +4.

R0256 GOXDSPER = GOMARKER

A0257	CAF	VXXNYY	FLASHING MARK VERB NOUN
A0258	TC	BANKCALL	
A0259	CADR	GOMARKER	OTHER EXTENDED VERBS USE CADR GOXDSPER
A0260	...	...	TERMINATE RETURN
A0261	...	...	PROCEED RETURN
A0262	...	...	ENTER OR RECYCLE RETURN

A0263 IMMEDIATE RETURN TO THE USER

R0264 GOMARK1 IS USED FOR A PLEASE PERFORM ON A MARK REQUEST WITH ONLY 1 ASTRONAUT RETURN TO THE USER. NO IMMEDIATE
R0266 RETURN IS MADE. THE DESIRED MARK PLEASE PERFORM VERB AND DESIRED NOUN IS ENTERED IN A. GOMARK1 DISPLAYS R1, R2, R
R0268 MEANS OF A V05NYY FOLLOWED BY A FLASHING V5XNYY FOR A PLEASE PERFORM. THE ASTRONAUT WILL RESPOND WITH A MARK
R0270 OR MARK REJECT OR AN ENTER. THE ENTER IS THE ONLY ASTRONAUT RESPONSE THAT WILL COME BACK TO THE USER.

A0272	CAF	V5XNYY	X=1,2,3,4 Y= NOUN
A0273	TC	BANKCALL	

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A0274	CADR	GOMARK1	
A0275	ENTER RETURN
R0276	*** IF BLANKING DESIRED ON NON R ROUTINES, NOTIFY DISPLAYER.		
R0277	GOMARK1R IS THE SAME AS A GOMARK1 ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +2.		
A0279	CAF	V5XNYY	X=1,2,3,4 YY = NOUN
A0280	TC	BANKCALL	
A0281	CADR	GOMARK1R	
A0282	...	...	ASTRONAUT ENTER RETURN
A0283	...	...	IMMEDIATE RETURN TO USER
R0284	GOMARK2 IS THE SAME AS GOMARK1 ONLY 3 RETURNS ARE MADE TO THE USER FROM THE ASTRONAUT.		
A0286	CAF	V5XNYY	X=1,2,3,4 YY=NOUN
A0287	TC	BANKCALL	
A0288	CADR	GOMARK2	
A0289	...	...	TERMINATE RETURN
A0290	...	...	PROCEED RETURN
A0291	...	...	ENTER RETURN
R0292	GOMARK2R IS THE SAME AS GOMARK1R ONLY 3 ASTRONAUT RETURNS ARE MADE TO THE USER.		
A0294	CAF	V5XNYY	X=0,1,2,3,4 YY=NOUN
A0295	TC	BANKCALL	
A0296	CADR	GOMARK2R	
A0297	...	...	TERMINATE RETURN
A0298	...	...	PROCEED RETURN
A0299	...	...	ENTER RETURN
A0300	...	...	IMMEDIATE RETURN TO THE USER
R0301	GOMARK3 IS USED FOR A PLEASE PERFORM ON A MARK REQUEST WITH A 3 COMP. DEC DISPLAY. THE DESIRED MARK PLEASE		
R0303	PERFORM VERB AND NOUN ARE ENTERED IN A. GOMARK3 DISPLAYS R1, R2, R3 BY MFANS OF A V06NYY FOLLOWED BY A FLASHING		
R0305	V5XNYY FOR A PLEASE PERFORM. GOMARK3 HAS 3 ASTRONAUT RETURNS TO THE USER WITH NO IMMEDIATE RETURN.		
A0307	CAF	V5XNYY	X=1, 2,3,4 YY=NOUN
A0308	TC	BANKCALL	
A0309	CADR	GOMARK3	
A0310	...	...	TERMINATE RETURN
A0311	...	...	PROCEED RETURN
A0312	...	...	ENTER RETURN
R0313	GOMARK4 IS THE SAME AS GOMARK3 ONLY R2 AND R3 ARE BLANKED AND R1 IS DISPLAYED IN OCTAL.		
A0315	CAF	V5XNYY	X=1,2,3,4 YY=NOUN
A0316	TC	BANKCALL	
A0317	CADR	GOMARK4	
A0318	TERMINATE RETURN
A0319	PROCEED RETURN

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A0320	ENTER RETURN
R0321 R0323	EXDSPRET IS USED TO DISPLAY A VERB NOUN ARRIVING IN A WITH A RETURN MADE TO THE USER AFTER THE DISPLAY HAS BEEN SENT OUT.		
A0324 A0325 A0326	CAF TC CADR	VXXNYY BANKCALL EXDSPRET	
A0327	...	...	RETURN TO USER
R0328 R0330	KLEENEX CLEANS OUT ALL MARK DISPLAYS (ACTIVE AND INACTIVE). A RETURN IS MADE TO THE USER AFTER THE MARK DISPLAYS HAVE BEEN CLEANED OUT.		
A0331 A0332	TC CADR	BANKCALL KLEENEX	
A0333	...	...	RETURN TO USER
R0334	MARKBRAN IS A SPECIAL PURPOSE ROUTINE USED FOR SAVING JOB VAC AREAS (SEE DESCRIPTION OF MARKBRAN BELOW).		
A0336 A0337	TC CADR	BANKCALL MARKBRAN	
A0338	...	...	BAD RETURN IF MARK DISPLAY NOT ACTIVE
A0339 A0340	(GOOD RETURN TO IMMEDIATE RETURN LOC OF LAST ELASHING MARK R ROUTINE)		
R0341 R0343	PINBRNCH REESTABLISHES THE LAST ACTIVE FLASHING DISPLAY. IF THERE IS NO ACTIVE FLASHING DISPLAY, THE DSKY IS BLANKED AND CONTROL IS SENT TO ENDOFJOB.		
A0344 A0345	TC CADR	POSTJUMP PINBRNCH	
R0346 R0348	PRIODSP IS USED AS A PRIORITY DISPLAY. IT WILL DISPLAY A GOFASH TYPE DISPLAY WITH THREE POSSIBLE RETURNS FROM THE ASTRONAUT(SEE NO.7 ABOVE).		
R0349 R0351 R0352	THE MAIN PURPOSE OF PRIODSP IS TO REPLACE THE PRESENT DISPLAY WITH A DISPLAY OF HIGHER PRIORITY AND TO PROVIDE A MEANS FOR RESTORING THE OLD DISPLAY WHEN THE PRIORITY DISPLAY IS RESPONDED TO BY THE ASTRONAUT.		
R0353 R0355	THE FORMER DISPLAY IS RESTORED BY AN AUTOMATIC BRANCH TO WAKE UP THE OISPLAY THAT WAS INTERRUPTED BY THE PRIO DISPLAY.		
A0356 A0357 A0358 A0359 A0360	CAF TC CADR ...	VXXNYY BANKCALL PRIOOSP ...	VXXNYY WILL BE A FLASHING VERB NOUN TERMINATE RETURN PROCEED RETURN

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A0361	ENTER OR RECYCLE RETURN
R0362	PRIODSPR IS THE SAME AS PRIODSP ONLY AN IMMEDIATE RETURN IS MADE TO THE USERS CALL CADR +4.		
A0364	CAF	VXXNYY	VXXNYY WILL BE A FLASHING VERB NOUN
A0365	TC	BANKCALL	
A0366	CADR	PRIODSPR	
A0367	...	...	TERMINATE RETURN
A0368	...	...	PROCEED RETURN
A0369	...	...	ENTER OR RECYCLE RETURN
A0370	...	...	IMMEDIATE RETURN
R0371	PRIOLARM DCES A V05N09 PRIODSPR.		
R0372	CLEANDSP CLEANS OUT ALL NORMAL DISPLAYS (ACTIVE AND INACTIVE). A RETURN IS MADE TO THE USER AFTER NORMAL		
R0374	DISPLAYS ARE CLEANED OUT.		
A0375	TC	BANKCALL	
A0376	CADR	CLEANDSP	
A0377	RETURN TO USER

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P0378 GENERAL INFORMATION
R0379 -----

R0380 ALARM OR ABORT EXIT MODES--

A0381 PRIORIT TC ABORT
A0382 OCT 1502R0383 PRIORIT IS BRANCHED TO WHEN (1) A NORMAL DISPLAY IS REQUESTED AND ANOTHER NORMAL DISPLAY IS ALREADY ACTIVE
R0385 (REFLASH AND REGDSP ARE EXCEPTIONS) OR (2) A PRIORITY DISPLAY IS REQUESTED WHEN ANOTHER PRIORITY DISPLAY IS
R0387 ALREADY ACTIVE (A PRIORITY WITH LINUS BIT14 IS AN EXCEPTION).

R0388 ERASABLE INITIALIZATION REQUIRED--

R0389 ACCOMPLISHED BY FRESH START- 1. FLAGWRD4 (USED EXCLUSIVELY BY DISPLAY INTERFACE ROUTINES)
R0391 2. NVSAVE = NORMAL VERB AND NOUN REGISTER.
R0393 3. EBANKTEM = NORMAL INACTIVE FLAGWORD (ALSO CONTAINS NORMALS EBANK).R0395 5. RISAVE = MARKBRAN CONTROL WORD
R0396 4. RESTREG = PRIORITY 30 AND SUPERBANK 3.
R0398 OUTPUT--R0399 NVWORD = PRIO VERB AND NOUN
R0400 NVWORD +1(MARKNV) = MARK VERB AND NOUN
R0401 NVWORD +2(NVSAVE) = NORMAL VERB AND NOUNR0402 DSPFLG(EBANKSAV) = PRIO FLAGWORD (INCLUDING EBANK)
R0403 DSPFLG +1(MARKFBAN) = MARK FLAGWORD (INCLUDING EBANK)
R0404 DSPFLG +2(EBANKTEM) = NORMAL FLAGWORD (INCLUDING EBANK)R0405 CADREFLSH = PRIO USERS CALL CADR +1 LOCATION
R0406 CADREFLSH +1(MARKFLSH) = MARK USERS CALL CADR +1 LOCATION
R0407 CADREFLSH +2(TEMPFLSH) = NORMAL USERS CALL CADR +1 LOCATIONR0408 PRIOTIME = TIME EACH PRIO REQUEST FIRST SENT OUT
R0409 OPTION1 = DESIRED OPTION FROM GOPERF4
R0410 FLAGWRD4 = BIT INFO FOR CONTROL OF ALL DISPLAY ROUTINES
R0411 CSPTIME1 = R1 INFO FOR ASTRONAUT FROM PERFORM DISPLAYS(NORMAL)
R0412 SUBROUTINES USED-- NVSUB, FLAGUP, FLAGDOWN, ENDJOB, BLANKSUB, ABORT, JOBWAKE, JOBSLEEP, FINDVAC, PRIOCHNG,
R0414 JAMTERM, NVSUBBUSY, FLASHON, ENDIDLE, CHANG1, BANKJUMP, MAKECADR, NOVAC,
R0415 DEBRIS-- (STORED INTO)R0416 TEMPORARY TEMPORARIES- A, Q, L, MPAC +2, MPAC +3, MPAC +4, MPAC +5, MPAC +6, RUPTRFG2, RUPTRFG3, CYL,
R0418 EBANK, RUPTRFG4, LOC, BANKSFT, MODE, MPAC, MPAC +1 4, FACERFG
R0420 ERASABLES(SHARED AND USED WITH OTHER PROGRAMS) CADRSTOR, DSPLIST, LOC, DSPTIME1, OPTION1

R0422 FRASABLES(USED ONLY BY DISPLAY ROUTINES)- NVWORD,+1,+2, DSPFLG,+1,+2, CADREFLSH,+1,+2, PRIOTIME, FLAGWRD4,

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R0424 R1SAVE, MARK2PAC,

R0425 DEBRIS-- (USED BUT NOT STORED INTO)- NOUNREG, VERBREG, LOCCTR, MONSAVE1
 R0426 FLAGWRD DESCRIPTIONS--
 R0427 FLAGWRD4- SEE DESCRIPTION UNDER LOG SECTION ERASABLE ASSIGNMENTS

R0428 DSPFLG, DSPFLG+1, DSPFLG +2-

R0429 -----

R0430 BITS 1 BLANK R1

R0431 2 BLANK R2

R0432 3 BLANK R3

R0433 4 FLASHING DISPLAY REQUESTED

R0434 5 PERFORM DISPLAY REQUESTED

R0435 6 ----- EXDSPRET GODSPRET

R0436 7 PRIC DISPLAY -----

R0437 8 ----- DFC MARK PERFORM -----

R0438 9 EBANK

R0439 10 EBANK

R0440 11 EBANK

R0441 12 ----- V99PASTE

R0442 13 2ND PART OF PERFORM

R0443 15 REFLASH OR REDO ----- REFLASH OR REDO

R0444 15 ----- MARK REQUEST -----

R0445 RESTARTING DISPLAYS--

R0446 RULES FOR THE DSKY OPERATOR--

- R0447 1. PROCEED AND TERMINATE SERVE AS RESPONSES TO REQUESTS FOR OPERATOR RESPONSE (FLASHING V/N). AS LONG
 R0448 AS THERE IS ANY REQUEST AWAITING OPERATOR RESPONSE, ANY USE OF PROCEED OR TERMINATE WILL SERVE AS
 R0451 RESPONSES TO THAT REQUEST. CARE SHOULD BE EXERCISED IN ATTEMPTING TO KILL AN OPERATOR INITIATED MONITOR
 R0453 WITH PROCEED AND TERMINATE FOR THIS REASON.
 R0454 2. THE ASTRONAUT MUST RESPOND TO A PRIORITY DISPLAY NO SOONER THAN 2 SECONDS FROM THE TIME THE
 R0456 PROGRAM SENT OUT THE REQUEST FOR OPERATOR RESPONSE (THE ASTRONAUT WOULD SEE THIS DISPLAY FOR LESS TIME
 R0458 DUE TO TIME IT TAKES TO GET DISPLAY SENT OUT.) IF THE ASTRONAUT RESPONDS TOO SOON, THE PRIORITY DISPLAY
 R0460 IS SENT OUT AGAIN -- AND AGAIN UNTIL AN ACCUMULATED 2 SECS FROM THE TIME THE FIRST PRIORITY DISPLAY
 R0462 OUT. THE SAME 2 SEC. DELAY WILL OCCUR AT 163.84 SECS OR IN ANY MULTIPLE OF THAT TIME DUE TO PROGRAM
 R0464 CONSIDERATION.
 R0465 3. KEY RELEASE BUTTON--
 R0466 A) IF THE KEY RELEASE LIGHT IS ON, IT SIMPLY RELEASES THE KEYBOARD AND DISPLAY FOR INTERNAL USE.
 R0468 B) IF THE KEY RELEASE LIGHT IS OFF, AND IF SOME REQUEST FOR OPERATOR RESPONSE (FLASHING V/N) IS STILL
 R0470 AWAITING RESPONSE THEN IT RE-ESTABLISHES THE DISPLAYS THAT ORIGINALLY REQUESTED RESPONSE.
 R0472 IF AN OPERATOR WANTS THEREFORE TO RE-ESTABLISH BUT CONDITION (A) IS ENCOUNTERED, A SECOND DEPRESSION OF
 R0474 KEY RELEASE BUTTON MAY BE NECESSARY.
 R0475 4. IT IS IMPORTANT TO ANSWER ALL REQUESTS FOR OPERATOR RESPONSE.
 R0476 5. IT IS ALWAYS GOOD PRACTICE TO TERMINATE AN EXTENDED VERB BEFORE ASKING FOR ANOTHER ONE OR THE SAME ONE
 R0478 OVER AGAIN.

R0479 SPECIAL CONSIDERATIONS--

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R0480 1. MPAC +2 SAVED ONLY IN MARK DISPLAYS
R0481 2. GODSP(R), REGODSP(R), GOMARK(R) ALWAYS TURN ON THE FLASH IF ENTERED WITH A PASTE VERB REQUEST.
R0483 3. ALL NORMAL DISPLAYS ARE RESTARTABLE EXCEPT GODSP(R), REGODSP(R)
R0484 4. ALL EXTENDED VERBS WITH DISPLAYS SHOULD START WITH A TC TESTXACT AND FINISH WITH A TC ENDEXT.
R0486 5. GODSP(R) AND REGODSP(R) MUST BE IN THE SAME EBANK AND SUPERBANK AS THE LAST NORMAL DISPLAY RESTARTED
R0488 BY A .1 RESTART PHASE CHANGE.
R0489 6. IN ORDER TO SET UP A NON DISPLAY .1 RESTART POINT, THE USER MUST MAKE CERTAIN THAT RESTREG CONTAINS THE
R0491 CORRECT PRIORITY AND SUPERBANK AND THAT EBANKTEM CONTAINS THE CO
R0491 7. IF CLEANDSP IS RESTARTED VIA A .1 PHASE CHANGE, CAF ZERO SHOULD BE EXECUTED BEFORE THE TC BANKCALL.

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P0492 CALLING SEQUENCE FOR BLANKING

A0493

A0494

A0495

CAF

BITX

X=1,2,3 BLANK R1,R2,R3 RESPECTIVELY

TC

BLANKET

...

...

RETURN TO USER HERE

R0496 IN ORDER TO USE BLANKET CORRECTLY THE USER MUST USE A DISPLAY ROUTINE THAT ENDS IN R FIRST FOLLOWED BY THE CALL
 R0498 TO BLANKET AT THE IMMEDIATE RETURN LOC.

0499 5464 BLOCK 02
 0500 REF 1 4000 SETLOC FFTAG4
 0501 5464 BANK

0502 REF 1 COUNT* \$\$/DSPLA
 0503 REF 761 LAST 1332 5464 54 162 0 BLANKET TS MPAC +6
 0504 REF 1 5465 4 0160 1 CS PLAYTEM4
 0505 REF 762 LAST 1348 5466 7 0162 0 MASK MPAC +6
 0506 REF 763 LAST 1348 5467 50 161 1 INDEX MPAC +5
 0507 REF 2 LAST 1348 5470 26 160 1 ADS PLAYTEM4

0508 REF 354 LAST 1334 5471 0 0002 0 TC Q

0511 REF 51 LAST 1325 5472 0 4635 0 ENDMARK TC POSTJUMP
 0512 REF 1 5473 20204 0 CADR MARK END

05121 REF 240 LAST 1333 5474 3 4755 1 CLEARMRK CAF ZERO
 05122 REF 15 LAST 726 5475 55 044 1 TS EXT V8ACT

05123 5476 0 0004 0 INHINT
 05124 REF 59 LAST 1321 5477 4 4753 0 CS BIT1
 05125 REF 5 LAST 488 5500 7 0100 1 MASK FLAGWRD4
 05126 REF 6 LAST 1348 5501 54 100 1 TS FLAGWRD4

05127 5502 0 0003 1 RELINT
 05128 REF 355 LAST 1348 5503 0 0002 0 TC Q
 R0513 ***ALL EXTENDED VER8 ROUTINES THAT HAVE AT LEAST ONE FLASHING DISPLAY MUST TCF ENDMARK OR TCF ENDEXT WHEN
 R0515 FINISHED.

0516 10,2204 BANK 10
 0517 REF 1 10,2000 SETLOC DISPLAYS
 0518 10,2204 BANK

0519 REF 1 COUNT* \$\$/DSPLA
 R0520 NTERONLY IS USED TO DIFFERENTIATE THE MARK ROUTINE WITH ONLY ONE RETURN TO THE USER FROM THE MARKING ROUTINE WITH
 R0522 3 RETURNS TO THE USER. THIS ROUTINE IS ONLY USED BY GOMARK1 AND GOMARK1R.

05291 REF 1 10,2204 0 5474 0 MARKEND TC CLEARMRK
 05297 REF 1 10,2205 1 3274 1 TCF MARKCOVER

0530 REF 1 10,2206 54 155 1 GOMARK TS PLAYTEM1 ENTRANCE FOR MARK GODSP

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0531	REF	47	LAST 1311	10,2207	3 4735 1	GOMARS	CAF	BIT15	BIT15 SET FOR ALL MARK REQUESTS
0532	REF	1		10,2210	1 2353 1		TCF	GOFLASH2	
0533	RFF	241	LAST 1348	10,2211	3 4755 1	KLEENFX	CAF	ZERO	CLEAN OUT EXTENDED VERBS
0534	RFF	2	LAST 1348	10,2212	54 155 1	GOMARKF	TS	PLAYTEM1	ENTRANCE FOR MARK GOFLASH
0535	RFF	1		10,2213	3 2704 0		CAF	MARKFMSK	MARK, FLASH
0536	RFF	2	LAST 1349	10,2214	1 2353 1		TCF	GOFLASH2	
0539	REF	3	LAST 1349	10,2215	54 155 1	GOMARK2	TS	PLAYTEM1	MARK GOPERFS-3 AST. RETURNS
0540	REF	1		10,2216	3 3373 0	MARKFORM	CAF	MPEPFMSK	MARK, PERFORM, FLASH
0541	REF	3	LAST 1349	10,2217	1 2353 1		TCF	GOFLASH2	
0542	REF	4	LAST 1349	10,2220	54 155 1	GOMARK3	TS	PLAYTEM1	USED FOR 3COMP DECIMAL PERFORM
0543	REF	1		10,2221	3 3360 1		CAF	MARK3MSK	
0544	RFF	4	LAST 1349	10,2222	1 2353 1		TCF	GOFLASH2	
0545	REF	5	LAST 1349	10,2223	54 155 1	GOMARK4	TS	PLAYTEM1	
0546	REF	1		10,2224	3 3361 0		CAF	MARK4MSK	MARK, PERFORM, FLASH, BLANK
0547	REF	5	LAST 1349	10,2225	1 2353 1		TCF	GOFLASH2	
0548	REF	6	LAST 1349	10,2226	54 155 1	GOMARKR	TS	PLAYTEM1	ENTR+NCE FOR MARK GODSPR
0549	REF	48	LAST 1349	10,2227	3 4735 1		CAF	BIT15	
0550	REF	1		10,2230	1 2331 0		TCF	GODSPR2	
0551	REF	7	LAST 1349	10,2231	54 155 1	GOMARKER	TS	PLAYTEM1	ENTRANCE FOR MARK GOFLASHR
0552	RFF	2	LAST 1349	10,2232	3 2704 0		CAF	MARKFMSK	
0553	RFF	1		10,2233	1 2512 1		TCF	GODSPRS	
0559	REF	8	LAST 1349	10,2234	54 155 1	GOMARK2R	TS	PLAYTEM1	MARK GOPERFS-3 AST. PETS+ IMMEDIATE RFT.
0560	REF	2	LAST 1349	10,2235	3 3373 0		CAF	MPEPFMSK	MARK, PERFORM, FLASH
0561	REF	2	LAST 1349	10,2236	1 2512 1		TCF	GODSPRS	
05611	REF	9	LAST 1349	10,2237	54 155 1	GOMARK3R	TS	PLAYTEM1	
05612	RFF	2	LAST 1349	10,2240	3 3360 1		CAF	MARK3MSK	
05613	REF	3	LAST 1349	10,2241	1 2512 1		TCF	GODSPRS	
0562	REF	135	LAST 1323	10,2242	3 4753 1	MAKEMARK	CAF	ONE	
0563	RFF	1		10,2243	0 2610 1		TC	COPIES	
0564	RFF	7	LAST 1348	10,2244	3 0100 0		CA	FLAGWRD4	IS NORM OR PRIO BUSY OR WAITING
0565	RFF	1		10,2245	7 3374 0		MASK	OCT34300	
0566	REF	433	LAST 1334	10,2246	10 000 0		CCS	A	
0567	REF	1		10,2247	1 2305 1		TCF	CHKPRIO	
0568	RFF	8	LAST 1349	10,2250	3 0100 0		CA	FLAGWRD4	IS MARK SLEEPING DUE TO ASTRO BUSY
0569	REF	1		10,2251	7 4743 1		MASK	MRKNVBIT	
0570				10,2252	0 0006 1		EXTEND		

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0571	REE	1		10,2253	1 2255 0		BZF	MARKRLAY	NO
0572	REF	147	LAST 1205	10,2254	1 5155 1		TCF	ENDDFJOB	
0594				10,2255	0 0004 0	MARKRLAY	INHINT		
0595	REF	22	LAST 1279	10,2256	4 4756 0		CS	FIVE	RESET MARK OVER NORM, SET MARK
0596	REF	9	LAST 1349	10,2257	7 0100 1		MASK	FLAGWRD4	
05965	REE	136	LAST 1349	10,2260	6 4753 1		AD	ONE	
0597	REF	10	LAST 1350	10,2261	54 100 1		TS	FLAGWRD4	
0598				10,2262	0 0003 1		RELINT		
0599	REF	1		10,2263	4 1071 1	GOGOMARK	CS	MARKFLAG	PERFORM
0600	REE	43	LAST 1330	10,2264	7 4747 0		MASK	BIT5	
0601	REF	434	LAST 1349	10,2265	10 000 0		CCS	A	
0602	REF	1		10,2266	1 2271 0		TCF	MARKCOP	
0603	REE	1		10,2267	4 0370 1		CS	MARKNV	
0604	REE	2	LAST 1350	10,2270	54 370 1		TS	MARKNV	
0605	REF	137	LAST 1350	10,2271	3 4753 1	MARKCOP	CAE	ONE	MARK INDEX
0606	REE	1		10,2272	1 2471 0		TCE	RRIORLAY	
0607	REE	1		10,2273	3 0165 0	CORYTOGO	CA	MRAC2SAV	
0608	REF	764	LAST 1348	10,2274	54 156 1		TS	MRAC +2	
0609	REE	1		10,2275	50 164 1	CORYRACS	INDEX	CORINDEX	
0610	REF	1		10,2276	3 3404 1		CAF	PRIOOCT	
0611	REF	1		10,2277	54 162 0		TS	GENMASK	
0612	REE	2	LAST 1350	10,2300	50 164 1		INDEX	COPINDEX	
0613	REF	1		10,2301	3 1070 1		CAF	EBANKSAV	
0614	REE	1		10,2302	54 160 1		TS	TEMPOR2	ACTIVE EBANK AND FLAG
0615	REF	62	LAST 1325	10,2303	54 003 0		TS	EBANK	
0616	REE	356	LAST 1348	10,2304	0 0002 0		TC	Q	
R0617	PINCHEK CHECKS TO SEE IF THE CURRENT MARK REQUEST IS MADE BY THE ASTRONAUT WHILE INTERRUPTING A GOPLAY DISRLAY								
R0619	(A NORMAL OR A RRIO). IF THE ASTRONAUT TRIES TO MARK DURING A PRIO, THE CHECK FAIL LIGHT GOES ON AND THE MARK								
R0621	REQUEST IS ENDED. IF HE TRIES TO MARK DURING A NORM, THE MARK IS ALLOWED. IN THIS CASE THE NORM IS PUT TO SLEER								
R0623	UNTIL ALL MARKING IS EINISHED.								
R0624	IF THE MARK REQUEST COMES FROM THE PROGRAM DURING A TIME THE ASTRONAUT IS NOT INTERRUPTING A NORMAL OR A								
R0626	PRIO, THE MARK REQUEST IS RUT TO SLEER UNTIL THE +RESENT ACTIVE DISPLAY IS RESPONDED TO BY THE ASTRONAUT.								
0628	REF	11	LAST 1350	10,2305	3 0100 0	CHKPRIO	CA	FLAGWRD4	MARK ATTEMPT DURING RRIO
0629	REE	1		10,2306	7 3127 1		MASK	OCT24100	
0630	REF	435	LAST 1350	10,2307	10 000 0		CCS	A	
0631	REF	1		10,2310	1 3327 0		TCE	MARSLEFR	
0632	REF	12	LAST 1350	10,2311	4 0100 1		CS	FLAGWRD4	

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0633	REF	1		10,2312	7 4751 1		MASK	MKOVBIT	SET MARK OVER NORM
0634				10,2313	0 0004 0		INHINT		
0635	REF	13	LAST 1350	10,2314	26 100 1		ADS	FLAGWRD4	
0636	RFF	1		10,2315	1 2407 1		TCF	SETNCRM	
0637	REF	3	LAST 1350	10,2316	3 0370 0	MARKPERF	CA	MARKNV	
0638	REF	1		10,2317	7 4144 0		MASK	VERBMASK	
0639	REF	1		10,2320	1 2773 1		TCF	NV50DSP	
0640	REF	10	LAST 1349	10,2321	54 155 1	GODSP	TS	PLAYTEM1	
0641	REF	242	LAST 1349	10,2322	3 4755 1	GODSP2	CAF	ZERO	
0642	REF	6	LAST 1349	10,2323	1 2353 1		TCF	GOFLASH2	
0643	REF	11	LAST 1351	10,2324	54 155 1	GODSPRET	TS	PLAYTEM1	ENTRANCE FOR A GODSP WITH A PASTE
0644	REF	56	LAST 1321	10,2325	3 4746 0		CAF	BIT6	SET BIT6 TO GO BACK TO USER AFTER NVSUB
0645	REF	7	LAST 1351	10,2326	1 2353 1		TCF	GOFLASH2	
0646	REF	12	LAST 1351	10,2327	54 155 1	GODSPR	TS	PLAYTEM1	
0647	REF	243	LAST 1351	10,2330	3 4755 1	GODSPR1	CAF	ZERO	
0648	REF	3	LAST 1348	10,2331	54 160 1	GODSPR2	TS	PLAYTEM4	
0649	REF	244	LAST 1351	10,2332	3 4755 1		CAF	ZERO	* DONT MOVE
0650	REF	1		10,2333	1 2514 1		TCF	GODSPRS1	

R0651 CLEANDSP IS USED FOR CLEARING OUT A NORMAL DISPLAY THAT IS PRESENTLY ACTIVE OR A NORMAL DISPLAY THAT IS
 R0653 SET UP TO BE STARTED OR RESTARTED.

R0654 NORMALLY THE USER WILL NOT NEED TO USE THIS ROUTINE SINCE A NEW NORMAL DISPLAY AUTOMATICALLY CLEARS OUT AN
 R0656 OLD DISPLAY.

R0657 CALLING SEQUENCE FOR CLEANDSP-

A0658							TC	BANKCALL	
A0659							CADR	CLEANDSP	
0660	REF	245	LAST 1351	10,2334	3 4755 1	CLEANDSP	CAF	ZERO	
0661	REF	13	LAST 1351	10,2335	54 155 1	REFLASH	TS	PLAYTEM1	
0662	REF	1		10,2336	3 3357 0		CAF	REDOMASK	FLASH AND PERMIT
0663	REF	8	LAST 1351	10,2337	1 2353 1		TCF	GOFLASH2	
0664	REF	14	LAST 1351	10,2340	54 155 1	REFLASHR	TS	PLAYTEM1	
0665	REF	2	LAST 1351	10,2341	3 3357 0		CAF	REDOMASK	FLASH AND PERMIT
0666	REF	4	LAST 1349	10,2342	1 2512 1		TCF	GODSPRS	

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0667	REF	15	LAST 1351	10,2343	54 155 1	REGODSP	TS	PLAYTEM1	
0668	REF	83	LAST 1319	10,2344	3 4736 1		CAF	BIT14	
0669	REF	9	LAST 1351	10,2345	1 2353 1		TCF	GOFFLASH2	
0670	REF	16	LAST 1352	10,2346	54 155 1	REGODSPR	TS	PLAYTEM1	
0671	REF	84	LAST 1352	10,2347	3 4736 1		CAF	BIT14	
0672	REF	2	LAST 1349	10,2350	1 2331 0		TCF	GODSPR2	
0673	REF	17	LAST 1352	10,2351	54 155 1	GOFFLASH	TS	PLAYTEM1	
0674	REF	51	LAST 1326	10,2352	3 4750 1		CAF	BIT4	LEAVE ONLY FLASH BIT SFT
0675	REF	4	LAST 1351	10,2353	54 160 1	GOFFLASH2	TS	PLAYTEM4	
0676	REF	1		10,2354	0 2575 1		TC	SAVELOCS	
0677				10,2355	0 0003 1		RELINT		
0678	REF	1		10,2356	1 2421 0		TCF	MAKEPLAY	BRANCH DIRECT WITH NO SEPARATE JOB CALL
0679	REF	18	LAST 1352	10,2357	54 155 1	PRIODSPR	TS	PLAYTEM1	
0680	REF	1		10,2360	3 3376 0		CAF	BITS7+4	
0681	REF	5	LAST 1351	10,2361	1 2512 1		TCF	GODSPRS	
0682	REF	19	LAST 1352	10,2362	54 155 1	PRIODSP	TS	PLAYTEM1	
0683	REF	2	LAST 1352	10,2363	3 3376 0	SETPRIO	CAF	BITS7+4	
0684	REF	10	LAST 1352	10,2364	1 2353 1		TCF	GOFFLASH2	
0685	REF	246	LAST 1351	10,2365	3 4755 1	MAKEPRIO	CAF	ZERO	
0686	REF	3	LAST 1350	10,2366	54 164 0		TS	COPINDEX	
0687	REF	1		10,2367	0 3247 0		TC	LINUSCHR	
0688	REF	1		10,2370	1 2375 0		TCF	HIPRIO	LINUS RETURN
0689	REF	14	LAST 1351	10,2371	3 0100 0		CA	FLAGWRD4	
0690	REF	1		10,2372	7 3415 0		MASK	OCT20100	IS PRIO IN ENDIDLE OR BUSY
0691	REF	436	LAST 1350	10,2373	10 000 0		CCS	A	
0692	REF	1		10,2374	1 2450 0		TCF	PRIOBORT	YES, ABORT
0693	REF	15	LAST 1352	10,2375	3 0100 0	HIPRIO	CA	FLAGWRD4	MARK ACTIVE
0694	REF	1		10,2376	7 5642 0		MASK	OCT40400	
0695				10,2377	0 0006 1		EXTEND		
0696	REF	1		10,2400	1 2403 0		BZF	ASKIFNRM	NO
0697	REF	247	LAST 1352	10,2401	3 4755 1	SETMARK	CAF	ZERO	
0698	REF	1		10,2402	1 2647 1		TCF	JOBXCHS	
0699	REF	16	LAST 1352	10,2403	3 0100 0	ASKIFNRM	CA	FLAGWRD4	NORMAL ACTIVE

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0700	REF	1		10,2404	7 3413 0		MASK	DCT10200	BITS 13+8
0701				10,2405	0 0006 1		EXTEND		
0702	REF	1		10,2406	1 2411 0		BZF	OKTCOPY	NO
0703	REF	138	LAST 1350	10,2407	3 4753 1	SFTNORM	CAF	ONE	
0704	REF	2	LAST 1352	10,2410	1 2647 1		TCF	JDBXCHS	
0705	REF	1		10,2411	0 2607 1	OKTCOPY	TC	COPYNORM	
0706	REF	1		10,2412	0 3060 1		TC	WITCHONE	
0707	REF	8	LAST 1322	10,2413	0 5137 1		TC	JORWAKE	
0708	REF	1		10,2414	0 3075 0		TC	XCHTOEND	
0709	REF	20	LAST 1298	10,2415	3 0025 0	REDOPRIO	CA	TIME1	SAVE TIME PRIODSP SENT OUT
0710	REF	1		10,2416	55 165 0		TS	PRIOTIME	
0711	REF	248	LAST 1352	10,2417	3 4755 1	KEEPPRIO	CAF	ZERO	START UP PRIO DISPLAY
0712	REF	2	LAST 1350	10,2420	1 2471 0		TCF	PRIOPLAY	
0713	REF	33	LAST 1325	10,2421	3 0167 1	MAKEPLAY	CA	PRIORITY	SAVE USERS PRIORITY
07131	REF	3	LAST 1325	10,2422	7 7724 0		MASK	PRI037	
07132	REF	1		10,2423	54 163 1		TS	USERPRIO	
07133	REF	1		10,2424	3 7720 0		CAF	PRI033	RAISE PRIORITY FOR FAST JOBS AFTER WAKE
07134	REF	15	LAST 895	10,2425	0 5146 1		TC	PRI0CHNG	
07135	REF	5	LAST 1352	10,2426	3 0160 0		CA	PLAYTEM4	IS IT MARK OR PRIO OR NORM
0714	REF	1		10,2427	7 3375 1		MASK	BIT515+7	
0715	REF	437	LAST 1352	10,2430	10 000 0		CCS	A	
0716	REF	1		10,2431	1 2365 1		TCF	MAKEPRIO	ITS PRIO
0717	REF	1		10,2432	1 2434 1		TCF	IFLEGAL	
0718	REF	1		10,2433	1 2242 0		TCF	MAKEMARK	ITS MARK
0719	REF	87	LAST 1323	10,2434	3 4752 0	IFLEGAL	CAF	TWO	
0720	REF	4	LAST 1352	10,2435	54 164 0		TS	COPINDEX	
0721	REF	2	LAST 1352	10,2436	0 3247 0		TC	LINUSCHR	
0722	REF	1		10,2437	1 2452 1		TCF	OKTOPLAY	LINUS RETURN
0723	REF	3	LAST 245	10,2440	4 1072 1		CS	EBANKTFM	
0724	REF	52	LAST 1352	10,2441	7 4750 0		MASK	BIT4	
0725	REF	438	LAST 1353	10,2442	10 000 0		CCS	A	
0726	REF	2	LAST 1353	10,2443	1 2452 1		TCF	OKTOPLAY	NO
0727	REF	17	LAST 1352	10,2444	3 0100 0		CA	FLAGWR04	WAS NORM ASLEEP
0728	REF	1		10,2445	7 3366 0		MASK	NBUSMASK	ARE ANY NORMS ASLEEP
0729				10,2446	0 0006 1		EXTEND		
0730	REF	3	LAST 1353	10,2447	1 2452 1		BZF	OKTOPLAY	NO

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0731	REF	6	LAST	1325	10,2450	0 5652 0	PRIORORT	TC	POOD00	
0732					10,2451	01502 1		OCT	1502	
0733	REF	1			10,2452	0 2611 0	OKTOPLAY	TC	COPIES2	
07331	REF	2	LAST	1353	10,2453	3 0163 0		CA	USERPRIO	
07332					10,2454	0 0006 1		EXTEND		
07333	REF	25	LAST	1293	10,2455	04 007 1		RDR	SUPERBNK	
07334	REF	3	LAST	242	10,2456	54 366 0		TS	RESTREG	
0737	REF	18	LAST	1353	10,2457	3 0100 0		CA	FLAGWRD4	PRIOR OR MARK GOING
0738	REF	1			10,2460	7 3367 1		MASK	PMMASK	
0739	REF	439	LAST	1353	10,2461	10 000 0		CCS	A	
0740	REF	1			10,2462	1 2627 1		TCF	GOSLEEPS	YES
0741					10,2463	1 2465 0		TCF	+2	
0742	RFF	2	LAST	1354	10,2464	1 2627 1		TCF	GOSLEEPS	MARK GOING
R0743	COULD	PUT	NORM	BUSY	CHECK	HERE	TO	SAVE	TIME	
0744	REF	2	LAST	1353	10,2465	0 3060 1		TC	WITCHONE	IS IT NVSUB BUSY, ENDIDLE OR NOONE
0745	REF	9	LAST	1353	10,2466	0 5137 1		TC	JOBWAKE	
0746	REF	2	LAST	1353	10,2467	0 3075 0		TC	XCHTDEND	
0747	REF	88	LAST	1353	10,2470	3 4752 0	PLAYJUM1	CAF	TWO	
0748	REF	5	LAST	1353	10,2471	54 164 0	PRIOPLAY	TS	COPIINDEX	
0749	REF	1			10,2472	1 2743 1		TCF	GCPLAY	
0750	REF	20	LAST	1352	10,2473	54 155 1	EXDSPRET	TS	PLAYTEM1	
0751	REF	1			10,2474	3 7733 1		CAF	BIT15+6	
0752	REF	11	LAST	1352	10,2475	1 2353 1		TCF	GOFLASH2	
0753	REF	2	LAST	943	10,2476	55 045 0	GOPERF1	TS	NORMTEM1	STORE DESIRED CHECKLIST VALUE
0754	REF	1			10,2477	3 3351 0		CAF	VOIN25	USED TO DISPLAY CHECKLIST VALUE IN R1
0755	REF	21	LAST	1354	10,2500	54 155 1	GOPERFS	TS	PLAYTEM1	
0756	REF	1			10,2501	3 3350 1		CAF	PERFMASK	LEAVE ONLY FLASH, PERFORM, BLANKING
0757	REF	12	LAST	1354	10,2502	1 2353 1		TCF	GOFLASH2	
0758	REF	22	LAST	1354	10,2503	54 155 1	GOPERF2	TS	PLAYTEM1	DESIRED VERB-NOUN TO DISPLAY R1,R2,R3
0759	REF	1			10,2504	3 3354 0		CAF	PERF2MSK	
0760	REF	13	LAST	1354	10,2505	1 2353 1		TCF	GOFLASH2	
0764	REF	1			10,2506	0 2570 1	GOPERF4	TC	PURRS4	
0765	RFF	14	LAST	1354	10,2507	1 2353 1		TCF	GCFLASH2	

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0766	REF	23	LAST 1354	10,2510	54 155 1	GOELASHR	TS	PLAYTEM1	
0767	REF	53	LAST 1353	10,2511	3 4750 1	CAF	BIT4	LEAVE ONLY FLASH BIT SET	
0768	REF	6	LAST 1353	10,2512	54 160 1	GODSPRS	TS	PLAYTEM4	
0769	REF	38	LAST 1318	10,2513	3 6244 0	CAF	THREE		
0770				10,2514	0 0004 0	GODSPRS1	INHINT		IMMEDIATE RETURN IS CALL CADR +4
0771	REF	14	LAST 1322	10,2515	54 072 0	TS	RUPTREG3		
0772	REF	34	LAST 1353	10,2516	3 0167 1	CA	PRIORITY	MAKE DISPLAY ONE HIGHER THAN USER	
0773	REF	4	LAST 1353	10,2517	7 7724 0	MASK	PRI037		
0774	REF	11	LAST 1107	10,2520	54 063 0	TS	NEWPRIO		
07741	REF	7	LAST 1355	10,2521	3 0160 0	CA	PLAYTEM4	IS THIS A FLASHING R DISPLAY	
07742	REF	54	LAST 1355	10,2522	7 4750 0	MASK	BIT4		
07743	REF	440	LAST 1354	10,2523	10 000 0	CCS	A		
07744	REF	1		10,2524	1 2532 0	TCF	VACDSP	YES, MAKE DISPLAY JOB A VAC	
07745	REF	12	LAST 1355	10,2525	3 0063 1	CA	NEWPRIO	NO, MAKE DISPLAY JOB A NOVAC	
07746	REF	29	LAST 1332	10,2526	0 5072 1	TC	NOVAC		
07747	REF	7	LAST 786	E7,1467		EBANK	WHOCARES		
07748	REF	2	LAST 1352	10,2527	024 21 1	2CADR	MAKE PLAY		
07748				10,2530	20067 1				
07749	REF	1		10,2531	1 2540 0	TCF	BOTHJOBS		
0775	REF	42	LAST 1325	10,2532	3 0006 1	VACDSP	CA	BRANK	
0776				10,2533	0 0006 1		EXTEND		
0777	REF	26	LAST 1354	10,2534	04 007 1	RDR	SUPERBNK		
0778	REF	230	LAST 1330	10,2535	54 001 1	TS	L		
0779	REF	1		10,2536	3 3412 0	CAF	MAKEGEN		
0780	REF	3	LAST 382	10,2537	0 5116 1	TC	SPVAC		
0781	REF	2	LAST 1352	10,2540	0 2575 1	BOTHJOBS	TC	SAVELOCS	COPY TEMPS INTO PERMANENT REGISTERS
0782				10,2541	0 0006 1		EXTEND		SAVE NVWORD AND USERS MPAC +2
0783	REF	765	LAST 1350	10,2542	3 0156 0	DCA	MPAC +1		
0784	REF	25	LAST 1332	10,2543	50 064 0	INDEX	LOCCTR		
0785	REF	766	LAST 1355	10,2544	52 156 1	DXCH	MPAC +1		
0786				10,2545	0 0006 1		FXTEND		SAVE USERS CADR, ELACS AND EBANK
0787	REF	767	LAST 1355	10,2546	3 0160 0	DCA	MPAC +3		
0788	REF	26	LAST 1355	10,2547	50 064 0	INDEX	LOCCTR		
0789	REF	768	LAST 1355	10,2550	52 160 1	DXCH	MPAC +3		
0790	REF	27	LAST 1355	10,2551	3 0064 0	CA	LOCCTR		
0791	REF	769	LAST 1355	10,2552	54 161 0	TS	MPAC +5		
0792	REF	1		10,2553	0 2602 1	TC	SAVELOCR		
0793				10,2554	0 0003 1		RELINT		

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0794	REF	19	LAST 1288	10,2555	1 4640 0	TCF	BANKJUMP	CALL CADR +4
0795	REF	3	LAST 1354	10,2556	55'045 0	GOPERF1R TS	NORMTEM1	DESIRED CHECKLIST VALUE
0796	REF	2	LAST 1354	10,2557	3 3351 0	CAF	VOIN25	DISPLAYS CHECKLIST VALUE IN R1
0797	REF	24	LAST 1355	10,2560	54 155 1	GOPERFRS TS	PLAYTEM1	
0798	REF	2	LAST 1354	10,2561	3 3350 1	CAF	PERFMASK	LEAVE ONLY FLASH, PERFORM, BLANKING
0799	REF	6	LAST 1352	10,2562	1 2512 1	TCF	GDSPRS	
0800	REF	25	LAST 1356	10,2563	54 155 1	GOPERF2R TS	PLAYTEM1	DESIRED VERB-NDUN TO DISPLAY R1,R2,R3
0801	RFF	2	LAST 1354	10,2564	3 3354 0	CAF	PERF2MSK	
0802	REF	7	LAST 1356	10,2565	1 2512 1	TCF	GDSPRS	
0806	RFF	2	LAST 1354	10,2566	0 2570 1	GOPERF4R TC	PURRS4	
0807	RFF	8	LAST 1356	10,2567	1 2512 1	TCF	GDSPRS	
0808	REF	8	LAST 972	10,2570	55'144 0	PURRS4 TS	OPTION1	DESIRED OPTION CODE
0809	REF	1		10,2571	3 3355 1	CAF	VO4N06	
0810	REF	26	LAST 1356	10,2572	54 155 1	TS	PLAYTEM1	
0811	REF	1		10,2573	3 3356 1	CAF	PERF4MSK	FLASH,PERFORM AND BLANK R3
0812	REF	357	LAST 1350	10,2574	0 0002 0	TC	Q	
0813				10,2575	0 0004 0	SAVELOCS	INHINT	
0815	REF	1		10,2576	4 3365 0	CS	ICT3400	ERANK BITS
0816	RFF	8	LAST 1355	10,2577	7 0160 1	MASK	PLAYTEM4	
0817	RFF	63	LAST 1350	10,2600	6 0003 1	AD	ERANK	
0818	RFF	9	LAST 1356	10,2601	54 160 1	TS	PLAYTEM4	
0819	REF	358	LAST 1356	10,2602	22 002 0	SAVELOCR LXCH	Q	
0820	REF	14	LAST 1324	10,2603	0 4645 1	TC	MAKECADR	
0821	REF	1		10,2604	54 157 0	TS	PLAYTEM3	
0822	REF	15	LAST 1355	10,2605	6 0072 1	AD	RUPTRFG3	NOT USED FOR NON R ROUTINES
0823	REF	231	LAST 1355	10,2606	0 0001 0	TC	L	
0824	REF	249	LAST 1353	10,2607	3 4755 1	COPYNORM CAF	ZFRD	
0825	REF	6	LAST 1354	10,2610	54 164 0	COPIES TS	COPINDEX	
0826				10,2611	0 0004 0	COPIES2 INHINT		
0827	REF	10	LAST 1356	10,2612	3 0160 0	CA	PLAYTEM4	FLAGWORD
0828	REF	7	LAST 1356	10,2613	50 164 1	INDEX	COPINDEX	
0829	REF	2	LAST 1350	10,2614	55'070 0	TS	ERANKSAV	EQUIV TO DSPFLG

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0830	REE	1		10,2615	7 3403 1		MASK	CADRMASK	ELASH AND GODSPRET
0831				10,2616	0 0006 1		EXTEND		
0832	REF	1		10,2617	1 2623 0		BZF	SKIPADD	
0833	REE	2	LAST 1356	10,2620	3 0157 1		CA	PLAYTEM3	
0834	REF	8	LAST 1356	10,2621	50 164 1		INDEX	COPINDEX	
0835	REF	2	LAST 210	10,2622	54 372 0		TS	CADR ELSH	
0836	REF	27	LAST 1356	10,2623	3 0155 0	SKIPADD	CA	PLAYTEM1	VERB NOUN
0837	REF	9	LAST 1357	10,2624	50 164 1		INDEX	COPINDEX	
0838	REF	2	LAST 752	10,2625	54 367 1		TS	NVWORD	
0842	REE	1		10,2626	1 3104 0		TCF	RELINTQ	
0843	REF	10	LAST 1357	10,2627	50 164 1	GOSLEEPS	INDEX	COPINDEX	
0844	REE	2	LAST 1350	10,2630	3 3404 1		CA	PRIOCT	
0845	REF	1		10,2631	7 2633 1		MASK	WAITMASK	
0846	REF	1		10,2632	0 3416 1		TC	UPENT2	
0847				10,2633	03004 0	WAITMASK	OCT	3004	
0848	REF	139	LAST 1353	10,2634	4 4753 0		CS	ONE	
0849	REF	11	LAST 1357	10,2635	6 0164 1		AD	COPINDEX	
0850	REE	1		10,2636	54 154 0		TS	FACEREG	
0851	REF	2	LAST 1357	10,2637	50 154 1	XCHSLEEP	INDEX	FACEREG	
0852	REE	1		10,2640	3 3363 1		CAF	WAKECADR	
0853				10,2641	0 0004 0		INHINT		
0854	REF	10	LAST 1354	10,2642	0 5137 1		TC	JOBWAKE	FIND CADR IN JOB AREA
0855	REE	3	LAST 1354	10,2643	0 3075 0		TC	XC4TOEND	CAUSES AWAKENED JOB TO GO TO ENDOEJOB
0858	REE	3	LAST 1357	10,2644	50 154 1		INDEX	FACEREG	REPLACE SAME CADR BUT NEW JOB AREA
0859	REE	2	LAST 1357	10,2645	3 3363 1		CAE	WAKECADR	
0860	REF	7	LAST 1324	10,2646	1 5133 1		TCF	JOBSLEEP	
0861	REE	4	LAST 1357	10,2647	54 154 0	JO8XCHS	TS	FACEPEG	CONTROLS TYPE OE DISPLAY PUT TO SLEEP
0862	REE	3	LAST 1354	10,2650	0 3060 1		TC	WITCHONE	
0863	REE	11	LAST 1357	10,2651	0 5137 1		TC	JOBWAKE	
0864	REF	5	LAST 1357	10,2652	3 0154 1		CA	FACERFG	
0865	REE	28	LAST 1355	10,2653	50 064 0		INDEX	LOCCTR	
0866	REE	6	LAST 1357	10,2654	54 154 0		TS	FACEREG	
0867	REE	1		10,2655	3 2670 1		CAE	XCHQADD	
0868	REF	1		10,2656	0 3076 0		TC	XCHNYLOC	
0869	REE	7	LAST 1357	10,2657	50 154 1		INDEX	FACEREG	
0870	REE	1		10,2660	3 3405 0		CA	MARKOCT	
0871	REE	1		10,2661	7 3407 0		MASK	IDLESLEP	
0872	REF	1		10,2662	0 3434 1		TC	DOWNENT2	
0873				10,2663	74004 0	IDLEMASK	OCT	74004	* DONT MOVE

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0874	REF	8	LAST	1357	10,2664	50 154 1	INDEX	FACEREG	8IT SHOWS PRI0 INTERRUPTED NORM OR MARK
0875	REF	44	LAST	1350	10,2665	3 4747 1	CA	BIT5	8IT5 FOR MARK, 8IT4 FOR NORMAL
0876	REF	29	LAST	1316	10,2666	6 4751 0	AD	FOUR	
0877	REF	2	LAST	1357	10,2667	0 3416 1	TC	UPENT2	FLAG ROUTINE DOES RELINT
0878	REF	1			10,2670	02637 1	XCHQADD	GENADR	* DONT MOVE
0879	REF	19	LAST	1354	10,2671	3 0100 0	CA	FLAGWRD4	
0880	REF	2	LAST	1351	10,2672	7 4751 1	MASK	MKDVBIT	MARK OVER NORM ?
0881	REF	441	LAST	1355	10,2673	10 000 0	CCS	A	
0882	REF	2	LAST	1350	10,2674	0 2255 1	GENMARK	TC	MARKPLAY
0883	REF	2	LAST	1353	10,2675	1 2411 0	TCF	OKTOCOPY	USED AS GENADR FOR JOBWAKE
0884	REF	250	LAST	1356	10,2676	3 4755 1	MARKWAKE	CAF	ZEPO
0885	REF	2	LAST	1350	10,2677	54 160 1	WAKEPLAY	TS	TEMPOR2
0886	REF	3	LAST	1358	10,2700	50 160 0	INDEX	TEMPOR2	
0887	REF	1			10,2701	3 3377 1	CA	BIT5+11	
0888	REF	30	LAST	1358	10,2702	6 4751 0	AD	FOUR	
0889	REF	2	LAST	1357	10,2703	0 3434 1	TC	DOWNENT2	
0890					10,2704	40010 1	MARKFMSK	OCT	400I0
									***DONT MOVE
0891	REF	4	LAST	1358	10,2705	50 160 0	INDEX	TEMPOR2	
0892	REF	3	LAST	1357	10,2706	3 3363 1	CAF	WAKECADR	
0893					10,2707	0 0004 0	INHINT		
0894	REF	12	LAST	1357	10,2710	0 5137 1	TC	JOBWAKE	
0895	REF	1			10,2711	1 3210 0	TCF	ENDRET	
R0896	ALL .1 RESTARTS BRANCH DIRECTLY TO INITDSP. NORMAL DISPLAYS ARE THE ONLY DISPLAYS ALLOWED TO USE .1 RESTARTS								
R0898	INITDSP FIRST RESTORES THE EBANK AND THE SUPERBANK TO THE MOST RECENT NORMAL EBANK AND SUPERBANK.								
R0900	IF THE MOST RECENT NORMAL DISPLAY REQUEST WAS NOT FINISHED, CONTROL IS SENT BACK TO THE LAST NORMAL USER.								
R0902	OTHERWISE THE NORMAL DISPLAY SET UP IN THE NORMAL DISPLAY REGS IS STARTED UP IMMEDIATELY.								
0904	REF	4	LAST	1353	10,2712	3 1072 0	INITDSP	CA	EBANKTEM
0905	REF	64	LAST	1356	10,2713	54 003 0	TS	EBANK	RESTORE MOST RECENT NORMAL EBANK
0906	REF	4	LAST	1354	10,2714	3 0366 1	CA	RESTREG	SUPERBANK AND JOB PRIORITY
0907	REF	1			10,2715	0 4727 1	TC	SUPFRSW	RESTORE SUPERBANK
0908	REF	5	LAST	1355	10,2716	7 7724 0	MASK	PRI037	
0909	REF	16	LAST	1353	10,2717	0 5146 1	TC	PRI0CHNG	
0910	REF	39	LAST	1355	10,2720	4 6244 1	CS	THREE	
0911	REF	3	LAST	246	10,2721	6 0374 1	AD	TEMPFLSH	
0912	REF	20	LAST	1356	10,2722	1 4640 0	TCF	BANKJUMP	
0913					10,2723	0 0003 1	PINBRNCH	RELINT	FOR G0PIN USERS
09135	REF	1			10,2724	3 1073 1	CA	MARK2PAC	NEEDED TO SAVE MPAC +2 FOR MARK USERS
0914	REF	770	LAST	1355	10,2725	54 156 1	TS	MPAC +2	ONLY
0915	REF	20	LAST	1358	10,2726	3 0100 0	CA	FLAGWRD4	PINBRANCH CONDITION

L		DISPLAY INTERFACE ROUTINES				USER'S PAGE NO. 25		EO 53	
0916	REF 1			10,2727	7 7737 1	MASK	PINMASK		
0917	REF 442	LAST 1358		10,2730	10 000 0	CCS	A		
0918				10,2731	1 2734 1	TCF	+3		
0919	REF 1			10,2732	1 3344 0	TCF	EPASER	** NOTHING IN ENDIOLE	
0920	REF 3	LAST 1358		10,2733	1 2255 0	TCF	MARKPLAY		
0921	REF 69	LAST 1329		10,2734	0 5504 0	NORMBNCH TC	UPFLAG	SET PINBRANCH BIT	
0922	REF 1			10,2735	00105 0	AORES	PINPFLG		
0923	REF 1			10,2736	3 4736 1	CAF	PRIDDBIT	PRI0 INTERRUPTED	
0924	REF 21	LAST 1358		10,2737	7 0100 1	MASK	FLAGWRO4		
0925	REF 443	LAST 1359		10,2740	10 000 0	CCS	A		
0926	REF 1			10,2741	1 2417 0	TCF	KEEPPRI0		
0927	REF 1			10,2742	1 2470 1	TCF	PLAYJUM1		
0928	REF 1			10,2743	0 2275 0	NVDSP TC	COPYPACS		
09281	REF 5	LAST 1358		10,2744	3 0160 0	CA	TEMPOR2	SET UP BLANK BITS FOR NVMONOPT IN CASE	
09282	REF 22	LAST 1325		10,2745	7 4757 1	MASK	SEVEN	USER REQUESTS BLANKING MONITOR	
09283	REF 232	LAST 1356		10,2746	54 001 1	TS	L		
0929	REF 50	LAST 1316		10,2747	4 4737 1	CS	BIT13		
0930	REF 12	LAST 1357		10,2750	50 164 1	INDEX	COPINDEX		
0931	REF 1			10,2751	7 1070 0	MASK	DSPFLG		
0932	REF 13	LAST 1359		10,2752	50 164 1	INOEX	COPINDEX		
0933	REF 2	LAST 1359		10,2753	55 070 0	TS	DSPFLG		
0934	REF 41	LAST 1325		10,2754	7 4744 0	MASK	BIT8	BIT8 SET IF OFC MARK PERFORM OISPLAY	
0935	REF 22	LAST 1065		10,2755	54 141 1	TS	ITEM1		
0936	REF 771	LAST 1358		10,2756	3 0156 0	CA	MPAC +2		
0937	REF 2	LAST 1350		10,2757	54 165 1	TS	MPAC2SAV		
0938	REF 2	LAST 1358		10,2760	55 073 0	TS	MARK2PAC	* FOR OISK ONLY *	
0939	REF 14	LAST 1359		10,2761	50 164 1	INDEX	COPINDEX		
0940	REF 3	LAST 1357		10,2762	10 367 1	CCS	NVWORO		
0941	REF 1			10,2763	1 2772 0	TCF	NVDSP1		
0942	REF 1			10,2764	1 3106 1	TCF	CLEANENO		
0943	REF 4	LAST 1351		10,2765	4 0370 1	CS	MARKNV		
0944	REF 5	LAST 1359		10,2766	54 370 1	TS	MARKNV	IN CASE MARKPLAY AWAKENED AFTER SLEEPING	
0945	REF 12	LAST 1320		10,2767	7 6073 1	MASK	LOW7		
0946	REF 1			10,2770	6 3370 0	AD	VOSNOOM1		
0947	REF 23	LAST 1359		10,2771	6 0141 0	AD	TFM1		
0948	REF 140	LAST 1357		10,2772	6 4753 1	NVDSP1 AD	ONE		
0949	REF 1			10,2773	0 4155 1	TC	NVMCNOPT		
0950	REF 1			10,2774	1 3120 0	TCF	REST	IF BUSY	
0951	REF 6	LAST 481		10,2775	0 4433 1	TC	FLASHOFF	IN CASE OF EXTENDED VERB NON FLASH	
0952	REF 1			10,2776	0 2273 0	TC	COPYTOGO	MPACS DESTROYED BY NVSUB	

L DISPLAY INTERFACE ROUTINES										USER'S PAGE NO. 26		E0 S3
0953	REF	94	LAST	1331	10,2777	0 5516 0	TC	DOWNFLAG	UNSET SLEEPING BITS			
0954	REF	1			10,3000	00102 1	ADRES	MRKNVFLG				
09541	REF	95	LAST	1360	10,3001	0 5516 0	TC	DOWNFLAG				
09542	REF	1			10,3002	00103 0	ADRES	NRNVFLG				
09543	REF	96	LAST	1360	10,3003	0 5516 0	TC	DOWNFLAG				
09544	REF	1			10,3004	00104 1	ADRES	PRONVFLG				
0955	REF	6	LAST	1359	10,3005	3 0160 0	BLANKCHK	CA TEMPOR2	BLANK BITS 1,2,3 IF SET			
0956	REF	2	LAST	452	10,3006	0 4255 1	TC	BLANKSUB				
0957	REF	1			10,3007	1 2743 1	TCF	NVDSP				
0958	RFF	45	LAST	1358	10,3010	3 4747 1	PERFCHK	CAF BIT5	BIT 5 FOR PERFORM			
0959	REF	7	LAST	1360	10,3011	7 0160 1	MASK	TEMPOR2				
0960	REF	444	LAST	1359	10,3012	10 000 0	CCS	A	IS THIS A GOPERF DISPLAY			
0961	REF	1			10,3013	1 3036 0	TCF	ISTOP2ND	YES			
0962	REF	55	LAST	1355	10,3014	3 4750 1	GOANIDLE	CAF BIT4				
0963	REF	8	LAST	1360	10,3015	7 0160 1	MASK	TEMPOR2				
0964	REF	445	LAST	1360	10,3016	10 000 0	CCS	A				
0965	REF	1			10,3017	1 3133 1	TCF	FLASHSUB	IT IS			
0966	REF	9	LAST	1360	10,3020	4 0160 1	CS	TEMPOR2	IS THIS A GODSPRET			
0967	REF	57	LAST	1351	10,3021	7 4746 1	MASK	BIT6				
0968	RFF	446	LAST	1360	10,3022	10 000 0	CCS	A				
0969	REF	1			10,3023	1 3030 0	TCF	ISITN00				
09691	REF	15	LAST	1359	10,3024	50 164 1	INDEX	COPINDEX				
09692	REF	3	LAST	1357	10,3025	3 0372 1	CA	CADR FLSH				
09693	REF	772	LAST	1359	10,3026	54 157 0	TS	MPAC +3				
09694	REF	1			10,3027	1 3226 0	TCF	ENDIT				
0972	REF	16	LAST	1360	10,3030	50 164 1	ISITN00	INDEX COPINDEX	IS THIS A PASTE			
0973	REF	4	LAST	1359	10,3031	3 0367 0	CA	NWORD				
0974	REF	13	LAST	1359	10,3032	7 6073 1	MASK	LOW7	CHECK MADE FOR PINBRNCH AND PRIO ON MARK			
0975					10,3033	0 0006 1	EXTEND					
0976	REF	2	LAST	1360	10,3034	1 3133 1	BZF	FLASHSUB	YES, ASSUME PASTE ALWAYS ON FLASH			
0977	REF	148	LAST	1350	10,3035	1 5155 1	TCF	ENDOFJOB	NOT FLASH, NOT GOPERF, THEREFORE EXIT			
0978	REF	10	LAST	1360	10,3036	3 0160 0	ISTOR2ND	CA TEMPOR2				
0979	REF	51	LAST	1359	10,3037	7 4737 1	MASK	BIT13				
0980	REF	447	LAST	1360	10,3040	10 000 0	CCS	A				
0981	REF	1			10,3041	1 3014 0	TCF	GOANIDLE	SECOND			
0982	REF	52	LAST	1360	10,3042	3 4737 0	CA	BIT13				
0983	RFF	17	LAST	1360	10,3043	50 164 1	INDEX	COPINDEX				
0984	REF	3	LAST	1359	10,3044	27 070 0	ADS	DSPFLG				
09845					10,3045	22 007 0	ZL					
0985					10,3046	0 0006 1	EXTEND		IS IT MARK			
0986	REF	1			10,3047	6 2316 1	BZMF	MARK PERF	YES			

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0987	REF	46	LAST	1296	10,3050	7 4740 1		MASK	8IT12	
09871					10,3051	0 0006 1		EXTEND		
09872	REF	1			10,3052	1 3056 0		BZF	V50PASTE	
09874	RFE	2	LAST	752	10,3053	4 1067 0		CS	NVWORD1	NVWORD1= -0 IS V97. NVWORD1= -400 IS V99
098741	REF	1			10,3054	6 3414 0		AD	V97N00	
09875	REF	2	LAST	1351	10,3055	1 2773 1		TCF	NV50DSP	
0988	REF	1			10,3056	3 3353 1	V50PASTE	CAF	V50N00	
0989	REF	3	LAST	1361	10,3057	1 2773 1		TCF	NV50DSP	DISPLAY SECOND PART OF GOPERF
0990	REF	46	LAST	1360	10,3060	4 4747 0	WITCHONE	CS	BIT5	TURN OFF KEY RELEASE LIGHT
0991					10,3061	0 0006 1		EXTEND		
0992	REF	35	LAST	1333	10,3062	03 011 1		WAND	DSALMOUT	
0993	RFE	22	LAST	1359	10,3063	3 0100 0		CA	FLAGWRD4	
0994	REF	1			10,3064	7 3371 0		MASK	NVBUSMSK	IS IT NVSUB ASLEEP
0995	RFE	448	LAST	1360	10,3065	10 000 0		CCS	A	
0996	REF	141	LAST	1359	10,3066	3 4753 1		CAE	ONE	
0997	REF	233	LAST	1359	10,3067	54 001 1		TS	L	
0998	REF	251	LAST	1358	10,3070	3 4755 1		CAE	ZERO	
0999	REF	234	LAST	1361	10,3071	50 001 0		INDEX	L	
1000	REF	11	LAST	471	10,3072	57 042 0		XCH	CADPSTOR	
1001					10,3073	0 0004 0		INHINT		
1002	REF	359	LAST	1356	10,3074	0 0002 0		TC	Q	
1003	REF	6	LAST	461	10,3075	3 4217 1	XCHTOEND	CAF	FNDINST	TC ENDOFJOB REPLACES GENADR IN LOC FOR
1004	REF	29	LAST	1357	10,3076	56 064 0	XCHNYLOC	XCH	LOCCTR	WAS THIS ADDRESS SLEEPING
1005					10,3077	0 0006 1		EXTEND		
1006	REF	2	LAST	1357	10,3100	6 3104 1		BZMF	RELINTQ	NO
1007	REF	30	LAST	1361	10,3101	56 064 0		XCH	LOCCTR	YES
1008	REF	31	LAST	1361	10,3102	50 064 0		INDEX	LOCCTR	
1009	REF	44	LAST	1322	10,3103	54 164 0		TS	LOC	
1010					10,3104	0 0003 1	RELINTQ	RELINT		
1011	REF	360	LAST	1361	10,3105	0 0002 0		TC	Q	BACK TO USER
1012	REF	4	LAST	889	10,3106	3 7717 1	CLEANEND	CAE	PRI032	ONE LOWER THAN DISPLAYS SLEEPING
1014	REF	42	LAST	1302	10,3107	0 5105 0		TC	FINDVAC	
1015	RFE	2	LAST	226	0371			EBANK=	NVSAVE	
1016	REF	1			10,3110	04231 0		2CADR	JANTERM	
1016	REF	1			10,3111	04060 0				
1017	REF	3	LAST	1360	10,3112	1 3134 0		TCF	FLASHSUB +1	
1018	REF	23	LAST	1361	10,3113	3 0100 0	ISITPRIO	CA	FLAGWRD4	
1019	REF	1			10,3114	7 3141 1		MASK	ITISMASK	IS PINBRFLG, MARKIDFLG SET
1020					10,3115	0 0006 1		EXTEND		
1021	REF	2	LAST	1352	10,3116	1 2450 0		BZF	PRI0BORT	
1022	RFE	149	LAST	1360	10,3117	1 5155 1		TCF	FND0FJOB	

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1023	REF	12	LAST	1361	10,3120	11'042	1	REST	CCS	CADRSTOR	IS SOMEONE IN ENDIDLF
1024	REF	150	LAST	1361	10,3121	1 5155	1		TCF	FNDOFJOB	YES
1025	REF	1			10,3122	1 3124	1		TCF	RESTSLEP	
1026	REF	151	LAST	1362	10,3123	1 5155	1		TCF	FNDOFJOB	
1027	RFF	2	LAST	1350	10,3124	3 0162	1	RESTSLEP	CA	GENMASK	SFT NVSLEEP BITS
1028	REF	1			10,3125	7 3372	0		MASK	ASTROMSK	
1029	REF	3	LAST	1358	10,3126	0 3416	1		TC	UPENT2	
1030					10,3127	24100	0	OCT24100	OCT	24100	*** DONT MOVE
1031	REF	18	LAST	1360	10,3130	50 164	1		INDEX	COPINDEX	
1032	RFF	1			10,3131	3 3362	0		CAF	NVCADR	
1033	REF	2	LAST	477	10,3132	0 4442	1		TC	NVSUBUSY	BUSY OR ABORT IF ILLEGAL
1034	REF	4	LAST	460	10,3133	0 4427	1	FLASHSUB	TC	FLASHON	
1035	REF	19	LAST	1362	10,3134	3 0164	1		CA	COPINDEX	COPINDEX DESTROYED BY ENDIDLE
1036	REF	1			10,3135	54 157	0		TS	COPMPAC	
1037	REF	3	LAST	1362	10,3136	3 0162	1		CA	GENMASK	
1038	RFF	1			10,3137	7 2663	1		MASK	IDLFMASK	
1039	RFF	4	LAST	1362	10,3140	0 3416	1		TC	UPENT2	
1040					10,3141	40040	1	ITISMASK	OCT	40040	*** ENDIDLE ALLOW *** DONT MOVE
1041	RFF	2	LAST	237	10,3142	3 1074	0		CA	RISAVF	IS THIS A REPFAT AND RETURN DISPLAY
1042	REF	20	LAST	1362	10,3143	50 164	1		INDEX	COPINDEX	
1043	RFF	40	LAST	1333	10,3144	7 4751	1		MASK	BIT3	
1044	RFF	449	LAST	1361	10,3145	10 000	0		CCS	A	
1045	REF	1			10,3146	1 3233	1		TCF	UNSETRI	YES
1046	REF	13	LAST	1362	10,3147	11'042	1		CCS	CADRSTOR	SEE IF SOMEONE ALRFADY IN ENDIDLE
1047	REF	1			10,3150	1 3113	0		TCF	ISITPRIO	
1048					10,3151	1 3153	1		TCF	+2	
1049	RFF	2	LAST	1362	10,3152	1 3113	0		TCF	ISITPRIO	
1050	RFF	1			10,3153	0 4207	0		TC	ENDIDLE	
1051	RFF	1			10,3154	1 3245	0	IDLFRET1	TCF	TERMATF	
1052	RFF	1			10,3155	1 3264	0		TCF	PROCEED	ENDIDLE RETURNS HERE ON PROCEED
1053	REF	1			10,3156	4 3401	0		CS	LOWLCAD	
1054	RFF	773	LAST	1360	10,3157	6 0154	1		AD	MPAC	VERBREG
1055					10,3160	0 0006	1		EXTEND		
1056	REF	450	LAST	1362	10,3161	26 000	0		DIM	A	
1057					10,3162	0 0006	1		EXTEND		
1058	RFF	1			10,3163	1 3334	1		BZF	LOADITIS	V21 OR V22 OR V23 ON DSKY
1059	REF	89	LAST	1354	10,3164	3 4752	0	OKTOFNT	CAF	TWO	
1060	RFF	1			10,3165	54 161	0	ENDOUT	TS	OUTHERE	

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1061	REF	24	LAST	1361	10,3166	3 0100 0	CA	FLAGW04	CHECK NATURE OF ENOIOLE RETURN
1062	REF	2	LAST	1294	10,3167	7 4101 1	MASK	OCT60000	
1063	REF	451	LAST	1362	10,3170	10 000 0	CCS	A	
1064	REF	1			10,3171	1 3174 1	TCF	TIMECHEK	PRI0 ENOIOLE RETURN
1065	REF	1			10,3172	1 3302 1	TCF	NORMRET	NORMAL ENOIOLE RETURN
1066	REF	1			10,3173	1 3266 1	TCF	MARKRET	MARK ENOIOLE RETURN
1067	REF	21	LAST	1353	10,3174	4 0025 1	TIMECHEK	CS	TIMF1
1068	REF	2	LAST	1353	10,3175	6 1165 1	AD	PRIOTIME	
1069	REF	452	LAST	1363	10,3176	10 000 0	CCS	A	
1070					10,3177	4 0000 0	COM		
1071	REF	3	LAST	1299	10,3200	6 7730 1	AD	OCT37776	
1072	REF	142	LAST	1361	10,3201	6 4753 1	AO	ONE	
1073	REF	1			10,3202	6 3457 1	AD	-2SEC	
1074					10,3203	0 0006 1	EXTEND		
1075	REF	2	LAST	1359	10,3204	6 2417 1	BZMF	KEEPPRI0	
1076	REF	2	LAST	1363	10,3205	1 3302 1	TCF	NORMRET	
1084	REF	143	LAST	1363	10,3206	3 4753 1	NORMWAKE	CAF	ONE
1085	REF	1			10,3207	1 2677 1	TCF	WAKEPLAY	
1086	REF	2	LAST	1362	10,3210	10 161 0	ENDRET	CCS	OUTHERE
1087	REF	144	LAST	1363	10,3211	6 4753 1	AD	ONE	
1088					10,3212	1 3214 1	TCF	+2	NORMAL ENOIOLE EXIT
1089	REF	152	LAST	1362	10,3213	1 5155 1	TCF	ENDOFJOB	
1090	REF	2	LAST	1362	10,3214	50 157 1	INDEX	COPMPAC	
1091	REF	4	LAST	1360	10,3215	6 0372 1	AD	CAORFLSH	
1092	REF	774	LAST	1362	10,3216	54 157 0	TS	MPAC +3	
1093	REF	4	LAST	1362	10,3217	3 0162 1	CA	GENMASK	REMOVE ENOIOLE AND PINBRANCH BITS
1094	REF	1			10,3220	7 3222 1	MASK	PINIDMSK	
1095	REF	3	LAST	1358	10,3221	0 3434 1	IC	DOWNENT2	
1096					10,3222	74044 1	PINIDMSK	OCT	74044
1097	REF	40	LAST	1358	10,3223	4 6244 1	CS	THREE	BLANK EVERYTHING EXCEPT MM
1098	REF	2	LAST	278	10,3224	0 4154 0	TC	NVSUB	
1099					10,3225	1 3226 0	TCF	+1	
1100	REF	3	LAST	1354	10,3226	3 0163 0	ENDIT	CA	USERPRI0
1101	REF	6	LAST	1358	10,3227	7 7724 0	MASK	PRI037	RETURN TO USERS PRIORITY
1102	REF	17	LAST	1358	10,3230	0 5146 1	TC	PRI0CHNG	
1103	REF	775	LAST	1363	10,3231	3 0157 1	CA	MPAC +3	
1104	REF	21	LAST	1358	10,3232	1 4640 0	TCF	BANK JUMP	
1105	REF	21	LAST	1362	10,3233	50 164 1	UNSFTRI	INDEX	COPINOEX
1106	REF	41	LAST	1362	10,3234	4 4751 1	CS	BIT3	RESET REPEAT AND RETURN REQUEST
1107	REF	3	LAST	1362	10,3235	7 1074 1	MASK	RISAVE	
1108	REF	4	LAST	1363	10,3236	55*074 1	TS	RISAVE	

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1109	RFF	252	LAST	1361	10,3237	3 4755 1	CAF	ZERO	*** 205 ONLY MAPKBRAN USERS IN
1110	REF	2	LAST	1358	10,3240	0 4727 1	TC	SUPFRSW	SUPERBANK 0
1111	REF	41	LAST	1363	10,3241	3 6244 0	CAF	THREE	RETURN TO USERS IMMEDIATE RETURN LOC
1112	REF	22	LAST	1363	10,3242	50 164 1	IMMEORET	INOEX	COPINOEX
1113	RFF	5	LAST	1363	10,3243	6 0372 1	AD	CADPFLSH	
1114	REF	22	LAST	1363	10,3244	1 4640 0	TCF	BANK JUMP	
1115	REF	253	LAST	1364	10,3245	3 4755 1	TERMATE	ZERO	ASTRONAUT TERMINATE (V34) RETURNS TO
1116	REF	1			10,3246	1 3165 1	TCF	ENDOUT	
1117	REF	11	LAST	1356	10,3247	4 0160 1	LINUSCHR	CS	PLAYTEM4
1118	REF	85	LAST	1352	10,3250	7 4736 0		MASK	BIT14
1119	REF	453	LAST	1363	10,3251	10 000 0		CCS	A
1120	REF	5	LAST	1288	10,3252	1 6736 1	TCF	Q+1	NO
1121	REF	3	LAST	1357	10,3253	4 0157 0	CS	PLAYTEM3	YES, IS IT ALREAAY IN ENOIOLE
1122	REF	23	LAST	1364	10,3254	50 164 1	INDEX	COPINDEX	
1123	REF	6	LAST	1364	10,3255	6 0372 1	AD	CADRFLSH	
1124					10,3256	0 0006 1	EXTEND		
1125					10,3257	1 3261 0	BZF	+2	YES
1126	REF	361	LAST	1361	10,3260	0 0002 0	TC	Q	NO
1127	REF	12	LAST	483	10,3261	11'012 1	CCS	DSPLCK	IS THE ASTRONAUT BUSY
1128	REF	153	LAST	1363	10,3262	0 5155 0	TC	ENDOFJOB	ENO THE NEW DISPLAY, ITS ALREADY ACTIVE
1129	REF	362	LAST	1364	10,3263	0 0002 0	TC	Q	
R1130	MORE LOGIC COULD BE INCORPORATED HERE TO MAKE SURE A RECYCLE IS A RECYCLE AND CONVERSLY THAT A LOAD IS A LOAD.								
1132	REF	145	LAST	1363	10,3264	3 4753 1	PROCEED	CAF	ONE
1133	REF	2	LAST	1364	10,3265	1 3165 1	TCF	ENDOUT	ASTRONAUT PROCEED (V33) RETURNS
R1138	LASTPLAY CHECKS TO SEE IF (1) THE LAST NORMAL DISPLAY WAS EITHER INTERRUPTED BY A PRIO OR A MARK (MARK								
R1140	COULD ONLY HAPPEN DURING PINBRANCH) OR IF (2) THE LAST NORMAL DISPLAY WAS REQUESTED WHILE A HIGHER PRIORITY								
R1142	DISPLAY WAS GOING RESULTING IN THE NORMAL BEING PUT TO SLEEP.								
R1143	IF EITHER OF THE ABOVE 2 CONDITIONS EXISTS, THE NORMAL DISPLAY IS AWAKENED TO GO TO PLAYJUM1 WHICH STARTS								
R1145	UP THE MOST RECENT VALID NORMAL DISPLAY. IF THESE 2 CONDITIONS DO NOT EXIST, CONTROL GOES TO PLAYJUM1 WHICH IS								
R1147	STARTED IMMEDIATELY WITH THE ASSUMPTION THAT THE MOST RECENT NORMAL DISPLAY IS ALREADY IN-ENDDLE(DURING A								
R1149	PINBRANCH) OR THAT A RESTART HAS OCCURRED AND THE DISPLAY CAN BE STARTED AS A .I RESTART.								
1163	REF	27	LAST	1306	10,3266	4 6241 1	MARKRET	CS	SIX
1164	REF	25	LAST	1363	10,3267	7 0100 1		MASK	FLAGWR04
1165					10,3270	0 0004 0		INHINT	
1166	REF	26	LAST	1364	10,3271	54 100 1	TS	FLAGWRD4	*** MAY MOVE DISPLAY FLAGWORD OUT OF
1167					10,3272	0 0003 1	RELINT		INHINT REALM
1168	REF	2	LAST	1358	10,3273	1 3210 0	TCF	ENDRET	
1169	REF	2	LAST	1317	10,3274	3 7746 0	MARKOVER	CAF	MINUS1
1170	REF	3	LAST	1363	10,3275	54 161 0	TS	OUTHERE	RUPTREG2 IS - MEANS ENDOFJOB TO ENORET

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1171	REE	27	LAST 1364	10,3276	3 0100 0	CA	ELAGWRD4	IS ENOIOELG SFT
1172	REF	12	LAST 1288	10,3277	7 4355 1	MASK	PRI030	IS NORMAL OR PRI0 IN ENOIOELG
1173	REF	454	LAST 1364	10,3300	10 000 0	CCS	A	
1174	REE	1		10,3301	1 2734 1	TCE	NORM8NCH	
1175	REF	28	LAST 1365	10,3302	3 0100 0	NORMRET	CA	FLAGWRD4
1176	REE	2	LAST 1358	10,3303	7 3377 0	MASK	8ITS5+11	IS MARK SLEEPING
1177	REF	455	LAST 1365	10,3304	10 000 0	CCS	A	OR WAITING
1178	REF	1		10,3305	1 2676 0	TCF	MARKWAKE	
1179	REE	29	LAST 1365	10,3306	3 0100 0	CA	ELAGWRD4	NO
1180	REF	1		10,3307	7 3400 1	MASK	8ITS4+10	IS NORMAL INTERRUPTED OR WAITING
1181	REF	456	LAST 1365	10,3310	10 000 0	CCS	A	
1182	REF	1		10,3311	1 3206 1	TCF	NORMWAKE	YES
1183	REE	5	LAST 1358	10,3312	3 1072 0	CA	EBANKTEM	NO, WAS IT A ELASH REQUEST
1184	REE	4	LAST 1325	10,3313	7 4771 0	MASK	OCT50	OR A GOOSPRET
1185	REF	457	LAST 1365	10,3314	10 000 0	CCS	A	
1186	REE	3	LAST 1364	10,3315	1 3210 0	TCE	ENDRET	YES
1187	REE	3	LAST 1361	10,3316	3 0371 1	CA	NVSAVE	
1188				10,3317	0 0006 1	EXTEND		
1189	REE	4	LAST 1365	10,3320	1 3210 0	BZE	ENDRET	
1190	REF	5	LAST 481	10,3321	3 5025 0	CAF	PRI015	
1191				10,3322	0 0004 0	INHINT		
1192	REE	30	LAST 1355	10,3323	0 5072 1	TC	NOVAC	
1193	REF	5	LAST 1360	0367		EBANK=	NVWORD	
1194	REE	2	LAST 1359	10,3324	02470 0	2CAOP	PLAYJUMI	
1194				10,3325	20060 0			
1195	REF	5	LAST 1365	10,3326	1 3210 0	TCE	ENDRET	
1196	REF	30	LAST 1365	10,3327	3 0100 0	MARSLEEP	CA	FLAGWRD4
1197	REE	3	LAST 1365	10,3330	7 3377 0	MASK	8ITS5+11	IS MARK ALREADY IN
1198	REE	458	LAST 1365	10,3331	10 000 0	CCS	A	
1199	REF	154	LAST 1364	10,3332	1 5155 1	TCE	ENDOFJOP	YES
11991	REF	3	LAST 1354	10,3333	1 2627 1	TCF	GOSLEEPS	
1200	REF	3	LAST 1363	10,3334	50 157 1	LOADITIS	INDEX	COMPAC
1201	REF	6	LAST 1365	10,3335	3 0367 0	CA	NVWORD	
1202	REE	14	LAST 1360	10,3336	7 6073 1	MASK	LOW7	
1203				10,3337	4 0000 0	COM		
1204	REE	776	LAST 1363	10,3340	6 0155 0	AD	MPAC +1	NOUNREG
1205				10,3341	0 0006 1	EXTEND		
1206	REF	1		10,3342	1 3164 0	BZE	OKTOENT	NO, THEN LOAD IS VALID
1207	REE	6	LAST 837	10,3343	1 2723 1	TCF	PINBRNCH	YES, ACCEPT LOAD BUT ASK FOR LAST AGAIN
1208	REF	42	LAST 1364	10,3344	4 6244 1	ERASER	CS	THREE
1209	REF	3	LAST 1363	10,3345	0 4154 0	TC	NVSUB	BLANK EVERYTHING EXCEPT MM
1210	REF	155	LAST 1365	10,3346	1 5155 1	TCE	ENDOFJOP	

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1211	REF 156	LAST 1365	10,3347	1 5155 1	TCF	ENDOFJOB	
1212			10,3350	00036 1	PERFMASK	OCT 0036	FLASH,PERFORM,BLANK R2 AND R3
1213			10,3351	00231 1	V01N25	VN 00125	
1214			10,3352	01407 0	V06N07	VN 00607	GOPERF3 VN DISPLAY BEFORE V50
1215			10,3353	14400 0	V50N00	VN 5000	
1216			10,3354	00030 1	PERF2MSK	OCT 00030	FLASH, PERFORM
1217			10,3355	01006 0	V04N06	VN 00406	
1218			10,3356	00014 1	PERF4MSK	OCT 14	FLASH, BLANK R3
1219	REF 7	LAST 1365	10,2723		GOAGIN	EQUALS PINBRNCH	
1220			10,3357	20010 1	REDOMASK	OCT 20010	BITS 4 AND 14
1221			10,3360	40230 1	MARK3MSK	OCT 40230	MARK,DECIMAL NOUN, PERFORM,FLASH
1222			10,3361	40036 0	MARK4MSK	OCT 40036	MARK,PERFORM,FLASH,BLANK 2 AND 3
1223	REF 1		10,3362	20415 0	NVCADR	CADR REDOPRIO	
1224	REF 4	LAST 1359	10,3363	20255 1	WAKECADR	CADR MARKPLAY	
1225	REF 3	LAST 1365	10,3364	20470 0		CADR PLAYJUM1	
1226			10,3365	03400 0	OCT3400	OCT 3400	EBANK MASK
1227			10,3366	11210 1	NBUSMASK	OCT 11210	
1228			10,3367	66521 1	PMMASK	OCT 66521	
1229	REF 4	LAST 459	4144		VERBMASK	= MID7	(OCT 37600)
1230			10,3370	01177 1	V05N00M1	OCT 1177	V05 MINUS ONE
1231	REF 1		10,2206		GOXDSP	EQUALS GOMARK	
1232	REF 1		10,2226		GOXDSPR	EQUALS GOMARKR	
1233	REF 12	LAST 712	10,2212		GOXDSPF	EQUALS GOMARKF	
1234	REF 5	LAST 501	10,2231		GOXDSPFR	EQUALS GOMARKFR	
1235	REF 2	LAST 268	5472		ENDEXT	EQUALS ENDMARK	
1236	REF 14	LAST 1106	0165		MPAC2SAV	EQUALS BANKSET	
1238			10,3371	00700 0	NVBUSMSK	OCT 700	
12385			10,3372	00704 1	ASTROMSK	OCT 704	
1239			10,3373	40030 0	MPERFMSK	OCT 40030	BIT 15,5,4 FOR MARK,PERFORM,FLASH
1240			10,3374	34300 0	OCT34300	OCT 34300	
1241			10,3375	40100 1	BITS15+7	OCT 40100	
1242			10,3376	00110 1	BITS7+4	OCT 110	
1243	REF 3	LAST 1356	1070		DSPFLG	EQUALS EBANKSAV	
1244	REF 1		1071		MARKFLAG	EQUALS MARKEBAN	
1245	REF 6	LAST 1365	1072		SAVEFLAG	EQUALS EBANKTEM	
1246			10,3377	02020 1	BITS5+11	OCT 2020	* DONT MOVE
1247			10,3400	01010 1	BITS4+10	OCT 1010	* DONT MOVE
1249			10,3401	00026 0	LOWLOAD	DEC 22	
1250			10,3402	77730 0	BUSYMASK	OCT 77730	
1252			10,3403	00050 1	CADRMASK	OCT 50	
1253	REF 4	LAST 1308	7737		PINMASK	EQUALS 13,14,15	
1254	REF 2	LAST 1360	10,2743		GOPLAY	EQUALS NVDSP	
A1255					PRIOSAVE	EQUALS RISAVE	
1256	REF 777	LAST 1365	0157		COPMPAC	EQUALS MPAC +3	
1257	REF 778	LAST 1366	0160		TEMPOR2	EQUALS MPAC +4	
1258	REF 779	LAST 1366	0161		OUTHERE	EQUALS MPAC +5	
1259	REF 45	LAST 1361	0164		COPINDEX	EQUALS LOC	
1260	REF 35	LAST 1072	0163		USERPRIO	EQUALS MODF	

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1261	REF 780	LAST 1366	0162		GENMASK	EQUALS	MPAC +6	
1262			10,3404	20144 1	PRI0OCT	OCT	20144	PRI0
1263			10,3405	42424 0	MARKOCT	OCT	42424	MARK
1264			10,3406	11254 1		OCT	11254	NORM
1265			10,3407	74704 1	IDLESLEP	OCT	74704	
1266			10,3410	67777 1	OCT67777	OCT	67777	
1267	REF 14	LAST 733	5464		LINUS	EQUALS	BLANKET	
1268	REF 781	LAST 1367	0154		FACEREG	EQUALS	MPAC	
1269	REF 782	LAST 1367	0155		PLAYTEM1	EQUALS	MPAC +1	
1270	REF 783	LAST 1367	0157		PLAYTEM3	EQUALS	MPAC +3	
1271	REF 784	LAST 1367	0160		PLAYTEM4	EQUALS	MPAC +4	
1273			10,3411	40420 0	OCT40420	OCT	40420	
1274	REF 3	LAST 1355	10,3412	02421 1	MAKEGEN	GENADR	MAKEPLAY	
1275			10,3413	10200 1	OCT10200	OCT	10200	
1276			10,3414	30200 0	V97N00	VN	09700	PASTE FOR V97 OR V99
12761			10,3415	20100 1	OCT20100	OCT	20100	

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0001				10,3416				BANK	10		
0002	REF	2	LAST 1348	10,2000				SETLOC	DISPLAYS		
0003				10,3416				BANK			
0004	RFF	2	LAST 1348 TO	1368:	650	650*		COUNT*	\$/DSPLA		
0005	REF	235	LAST 1361	10,3416	54	001 1	UPENT2	TS	L	WHICH FLAGWORD IS IT	
0006	RFF	4	LAST 1297	10,3417	7	4757 1		MASK	OCT7		
0007	REF	236	LAST 1368	10,3420	56	001 0		XCH	L	SAVE IN L FOR INDEXING	
0008	RFF	3	LAST 1280	10,3421	7	5660 0		MASK	OCT77770	OBTAIN THE BIT INFORMATION	
0009				10,3422	0	0004 0		INHINT		PREVENT INTERRUPTS	
0010	REF	57	LAST 1319	10,3423	54	061 1		TS	ITEMPI	STORE THE BIT INFORMATION TEMPORARIALY	
0011	RFF	227	LAST 1368	10,3424	50	001 0		NDX	L		
0012	REF	30	LAST 963	10,3425	4	0074 0		CS	FLAGWRDO		
0013	RFF	58	LAST 1368	10,3426	7	0061 1		MASK	ITEMPI		
0014	RFF	238	LAST 1368	10,3427	50	001 0		NDX	L		
0015	REF	31	LAST 1368	10,3430	26	074 0		ADS	FLAGWRDO		
0016				10,3431	0	0003 1		RFLINT		RELEASE INTERRUPT INHIBIT	
0017	RFF	363	LAST 1364	10,3432	24	002 0		INCR	Q	OBTAIN THE CORRECT RETURN ADDRESS	
0018	RFF	364	LAST 1368	10,3433	0	0002 0		TC	Q	RETURN	
0019	REF	239	LAST 1368	10,3434	54	001 1	DOWNENT2	TS	L	WHICH FLAGWORD IS IT	
0020	REF	5	LAST 1368	10,3435	7	4757 1		MASK	OCT7		
0021	REF	240	LAST 1368	10,3436	56	001 0		XCH	L	SAVE IN L FOR INDEXING	
0022	RFF	4	LAST 1368	10,3437	7	5660 0		MASK	OCT77770	OBTAIN THE 8IT INFORMATION	
0023				10,3440	4	0000 0		COM		START TO PROCESS THE INFORMATION	
0024				10,3441	0	0004 0		INHINT		PREVENT INTERRUPTS	
0025	REF	241	LAST 1368	10,3442	50	001 0		NDX	L		
0026	REF	32	LAST 1368	10,3443	7	0074 0		MASK	FLAGWRDO		
0027	RFF	242	LAST 1368	10,3444	50	001 0		NDX	L		
0028	REF	33	LAST 1368	10,3445	54	074 0		TS	FLAGWRDO		
0029				10,3446	0	0003 1		RFLINT		RELEASE INTERRUPT INHIBIT	
0030	RFF	365	LAST 1368	10,3447	24	002 0		INCR	Q	OBTAIN THE CORRECT RETURN ADDRESS	
0031	RFF	366	LAST 1368	10,3450	0	0002 0		TC	Q	RETURN	
0032	REF	23	LAST 1359	4757			OCT7	EQUALS	SEVEN		

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P0033
 R0034 UPFLAG AND DOWNFLAG ARE ENTIRELY GENERAL FLAG SETTING AND CLEARING SUBROUTINES. USING THEM, WHETHER OR
 R0036 NOT IN INTERRUPT, ONE MAY SET OR CLEAR ANY SINGLE, NAMED BIT IN ANY ERASABLE REGISTER, SUBJECT OF COURSE TO
 R0038 ERANK SETTING. A "NAMED" BIT, AS THE WORD IS USED HERE, IS ANY BIT WITH A NAME FORMALLY ASSIGNED BY THE YUL
 R0040 ASSEMBLER.

R0041 AT PRESENT THE ONLY NAMED BITS ARE THOSE IN THE FLAGWORDS. ASSEMBLER CHANGES WILL MAKE IT POSSIBLE TO
 R0043 NAME ANY BIT IN ERASABLE MEMORY.

R0044 CALLING SEQUENCES ARE AS FOLLOWS:-

R0045	TC	UPFLAG	TC	DOWNFLAG
R0046	ADRES	NAME OF FLAG	ADRES	NAME OF FLAG

R0047 RETURN IS TO THE LOCATION FOLLOWING THE "ADRES" ABOUT .58 MS AFTER THE "TC".

R0049 UPON RETURN A CONTAINS THE CURRENT FLAGWORD SETTING.

0050			5504		BLOCK 02	
0051	REF	3	LAST 1288	4000	SETLOC FFTAG1	
0052			5504		BANK	
0053	REF	1			COUNT* \$\$/FLAG	
0054	REF	367	LAST 1368	5504 3 0002 0	UPFLAG CA 0	
0055	REF	2	LAST 750	5505 0 5522 1	TC DEBIT	
0056				5506 4 0000 0	COM	+(15 - BIT)
0057				5507 0 0006 1	EXTEND	
0058	REF	16	LAST 1021	5510 04 001 1	RDR LCHAN	SET BIT
0059	REF	59	LAST 1368	5511 50 061 0	COMFLAG INDEX ITFMP1	
0060	REF	34	LAST 1368	5512 54 074 0	TS FLAGWORD0	
0061	REF	27	LAST 1294	5513 22 063 1	LXCH ITMP3	
0062				5514 0 0003 1	RELINT	
0063	REF	243	LAST 1368	5515 0 0001 0	TC L	
0064	REF	368	LAST 1369	5516 3 0002 0	DOWNFLAG CA 0	
0065	REF	3	LAST 1369	5517 0 5522 1	TC DEBIT	
0066	REF	244	LAST 1369	5520 7 0001 1	MASK L	RESET BIT
0067	REF	2	LAST 750	5521 1 5511 0	TCF CDMFLAG	
0068	REF	146	LAST 1364	5522 6 4753 1	DEBIT AD ONE	GET DE BITS
0069				5523 0 0004 0	INHINT	
0070	REF	28	LAST 1369	5524 54 063 0	TS ITMP3	
0071	REF	2	LAST 1087	5525 3 4762 0	CA LOW4	DEC15
0072	REF	60	LAST 1369	5526 54 061 1	TS ITFMP1	
0073	REF	29	LAST 1369	5527 50 063 1	INDEX ITMP3	
0074				5530 2 7777 0	CA 0 -1	ADRES
0075	REF	245	LAST 1369	5531 54 001 1	TS L	
0076	REF	254	LAST 1364	5532 3 4755 1	CA ZERO	

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0077				5533	0 0006 1	EXTEND		
0078	REF	61	LAST 1369	5534	10 061 1	DV	ITEMP1	A = FLAGWRD, L = (15 - BIT)
0079	REF	62	LAST 1370	5535	52 062 1	DXCH	ITEMP1	
0080	REF	63	LAST 1370	5536	50 061 0	INDEX	ITEMP1	
0081	REF	35	LAST 1369	5537	3 0074 1	CA	FLAGWRD0	
0082	REF	246	LAST 1369	5540	54 001 1	TS	L	CURRENT STATE
0083	REF	26	LAST 1318	5541	50 062 0	INDEX	ITEMP2	
0084	REF	49	LAST 1349	5542	4 4735 0	CS	BIT15	-(15 - BIT)
0085	REF	369	LAST 1369	5543	0 0002 0	TC	Q	

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P0086 DELAYJOB- A GENERAL ROUTINE TO DELAY A JOB A SPECIFIC AMOUNT OF TIME BEFORE PICKING UP AGAIN.

R0088 ENTRANCE REQUIREMENTS...

A0089		CAF	DT	DELAY JOB FOR DT CENTISECS
A0090		TC	BANK CALL	
A0091		CADR	DELAYJOB	

0092		06,3715	BANK	06
0093	REF 1	00,2000	SETLOC	DELAYJOB
0094		00,3735	BANK	

P0095 THIS MUST REMAIN IN BANK 0 *****

0096	REF 1		COUNT*	\$/DELAY
0097		00,3735 0 0004 0	DELAYJOB	INHINT
0098	REF 370 LAST 1370	00,3736 54 002 1	TS	Q STORE DELAY OT IN Q FOR OLY -1 IN

0099	REF 1	00,3737 3 4752 0	CAF	DELAYNUM	WAITLIST
0100	REF 52 LAST 1320	00,3740 54 070 1	TS	RUPTREG1	
0101	REF 459 LAST 1365	00,3741 50 000 1	INOEX	A	
0102	REF 4 LAST 237	00,3742 3 1326 1	CA	DELAYLOC	IS THIS DELAYLOC AVAILABLE
0103		00,3743 0 0006 1	EXTEND		
0104	REF 1	00,3744 1 3752 0	BZF	OK20ELAY	YES

0105	REF 53 LAST 1371	00,3745 10 070 1	CCS	RUPTREG1	NO, TRY NEXT DELAYLOC
0106	REF 1	00,3746 1 3740 0	TCF	DELLOOP	

0107	REF 28 LAST 1325	00,3747 52 134 0	DXCH	BUF2	
0108	REF 7 LAST 1324	00,3750 0 5710 1	TC	BAILCUT1	NO AVAILABLE LOCS.
0109		00,3751 01104 0	OCT	1104	

0110	REF 1	00,3752 3 3772 0	OK20ELAY	CA	TCSLEEP	SET WAITLIST IMMEDIATE RETURN
0111	REF 7 LAST 1127	00,3753 54 061 1	TS	WAITEXIT		

0112	REF 30 LAST 1100	00,3754 3 0004 0	CA	FBANK	
0113	REF 54 LAST 1371	00,3755 6 0070 0	AO	RUPTREG1	STORE BBANK FOR TASK CALL
0114	REF 247 LAST 1370	00,3756 54 001 1	TS	L	

0115	REF 1	00,3757 3 3773 1	CAF	WAKECAD	STORE CAOR FOR TASK CALL
0116	REF 2 LAST 1114	00,3760 1 5211 1	TCF	DLY2 -1	DLY IS IN WAITLIST ROUTINE

0117	REF 15 LAST 1356	00,3761 0 4645 1	TCGETCAD	TC	MAKECADR	GET CALLERS FCADR
------	------------------	------------------	----------	----	----------	-------------------

0118	REF 55 LAST 1371	00,3762 50 070 0	INOEX	RUPTREG1	
0119	REF 5 LAST 1371	00,3763 55 326 0	TS	DELAYLOC	SAVE DELAY CAORS

0120	REF 8 LAST 1357	00,3764 0 5133 0	TC	JOBSLEEP	
------	-----------------	------------------	----	----------	--

0121	REF 255 LAST 1369	00,3765 3 4755 1	WAKER	CAF	ZERO	
0122	REF 43 LAST 1355	00,3766 50 006 1	INOEX	BBANK		
0123	REF 6 LAST 1371	00,3767 57 326 1	XCH	DELAYLOC	MAKE DELAYLOC AVAILABLE	

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0124	REF	13	LAST 1358	00,3770	0 5137 1	TC	JOBWAKE
0125	REF	79	LAST 1322	00,3771	0 5261 1	TC	TASKOVER
0126	REF	1		00,3772	03757 1	TCSLEEP	GENADR TCGETCAD -2
0127	REF	1		00,3773	03765 0	WAKECAD	GENADR WAKER

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P0128 GENTRAN, A BLOCK TRANSFER ROUTINE.

R0129 WRITTEN BY D. EYLES

R0130 MOD 1 BY KERNAN

UTILITYM REV 17 11/18/67

R0132 MOD 2 BY SCHULENBERG (REMOVE RELINT) SKIPPER REV 4 2/28/68

R0133 THIS ROUTINE IS USEFULL FOR TRANSFERING N CONSECUTIVE ERASABLE OR FIXED QUANTITIES TO SOME OTHER N
 R0135 CONSECUTIVE ERASABLE LOCATIONS. IF BOTH BLOCKS OF DATA ARE IN SWITCHABLE EBANKS, THEY MUST BE IN THE SAME ONE.

R0137 GENTRAN IS CALLABLE IN A JOB AS WELL AS A RUPT. THE CALLING SEQUENCE IS:

A0139		I	CA	N-1	# OF QUANTITIES MINUS ONE.
A0140		I +1	TC	GENTRAN	IN FIXED-FIXED.
A0141		I +2	ADRES	L	STARTING ADRES OF DATA TO BE MOVED.
A0142		I +3	ADRES	M	STARTING ADRES OF DUPLICATION BLOCK.
A0143		I +4			RETURNS HERE.

R0144 GENTRAN TAKES 25 MCT'S (300 MICROSECONDS) PER ITEM + 5 MCT'S (60 MICS) EOR ENTERING AND EXITING.

R0146 A, L AND ITEMPL ARE NOT PRESERVED.

0147		5544	BLOCK 02
0148	REF 2 LAST 1348	4000	SETLOC FFTAG4
0149		5544	BANK

0150	REF 64 LAST 1370	0061	EBANK= ITEMPL
------	------------------	------	---------------

0151	REF 1		COUNT* \$\$/TRAN
------	-------	--	------------------

0152		5544	0 0004 0	GENTRAN	INHINT		
0153	REF 65 LAST 1373	5545	54 061 1		TS	ITEMPL	SAVE N-1.
0154	REF 371 LAST 1371	5546	50 002 0		INDEX	Q	C(Q) = ADRES L.
0155		5547	6 0000 1		AD	0	ADRES (L + N - 1).
0156	REF 460 LAST 1371	5550	50 000 1		INDEX	A	
0157		5551	3 0000 1		CA	0	C(ABOVE).
0158	REF 248 LAST 1371	5552	54 001 1		TS	L	SAVE DATA.
0159	REF 66 LAST 1373	5553	3 0061 0		CA	ITEMPL	
0160	REF 372 LAST 1373	5554	50 002 0		INDEX	Q	
0161		5555	6 0001 0		AD	1	ADRES (M + N - 1).
0162	REF 461 LAST 1373	5556	50 000 1		INDEX	A	
0163		5557	22 000 1		LXCH	0	STUFF IT.
0164	REF 67 LAST 1373	5560	10 061 1		CCS	ITEMPL	LOOP UNTIL N-1 = 0.
0165	REF 2 LAST 312	5561	1 5545 1		TCF	GENTRAN +1	
0166	REF 5 LAST 1288	5562	1 6740 0		TCF	Q+2	RETURN TO CALLER.

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P0167 B50FF ZERO BIT 5 OF EXTVBACT, WHICH IS SET BY TESTXACT.

R0168 MAY BE USED AS NEEDED BY ANY EXTENDED VERB WHICH HAS DONE TESTXACT

0170	REF	1					COUNT*	\$/EXTVB
0171	REF	47	LAST 1361	5563	4 4747 0	B50FF	CS	BIT5
0172	REF	16	LAST 1348	5564	7 1044 1		MASK	EXTVBACT
0173	REF	17	LAST 1374	5565	55 1044 1		TS	EXTVBACT
0174	REF	157	LAST 1366	5566	0 5155 0		TC	ENDOFJOB

L ALARM AND ABORT

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R0001 THE FOLLOWING SUBROUTINE MAY BE CALLED TO DISPLAY A NON-ABORTIVE ALARM CONDITION. IT MAY BE CALLED
 R0003 EITHER IN INTERRUPT OR UNDER EXECUTIVE CONTROL.

R0004 CALLING SEQUENCE IS AS FOLLOWS:

R0005 TC ALARM
 R0006 OCT AAANN ALARM NO. NN IN GENERAL AREA AAA.
 R0007 (RETURNS HERE)

0008 5567 BLOCK 02
 0009 REF 1 4000 SETLOC FFTAG7
 0010 5567 BANK

0011 REF 8 LAST 484 0375 EBANK= FAILREG

0012 REF 1 COUNT* \$\$/ALARM
 R0013 ALARM TURNS ON THE PROGRAM ALARM LIGHT, BUT DOES NOT DISPLAY.

0014 5567 0 0004 0 ALARM INHINT

0015 REF 373 LAST 1373 5570 3 0002 0 CA 0
 0016 REF 4 LAST 1280 5571 55'363 1 ALARM2 TS ALMCADR
 0017 REF 374 LAST 1375 5572 50 002 0 INDEX Q
 0018 5573 3 0000 1 CA 0
 0019 REF 249 LAST 1373 5574 54 001 1 BORTENT TS L

0020 REF 44 LAST 1371 5575 3 0006 1 PRIORIT CA BBANK
 0021 5576 0 0006 1 +1 EXTEND
 0022 REF 27 LAST 1355 5577 04 007 1 ROR SUPFRBNK
 0023 REF 5 LAST 1375 5600 55'364 0 TS ALMCADR +1 ADD SUPER BITS.

0024 REF 375 LAST 1375 5601 3 0002 0 LARMENT CA 0
 0025 REF 68 LAST 1373 5602 54 061 1 TS ITFMP1 STORE RETURN FOR ALARM

0026 REF 9 LAST 1375 5603 10 375 1 CHKFAIL1 CCS FAILREG
 0027 REF 1 5604 1 5607 1 TCF CHKFAL2 YES TRY NEXT REG
 0028 REF 10 LAST 1375 5605 22 375 0 LXCH FAILREG
 0029 REF 1 5606 1 5621 0 TCF PROGLARM TURN ALARM LIGHT ON FOR FIRST ALARM

0030 REF 11 LAST 1375 5607 10 376 1 CHKFAIL2 CCS FAILREG +1
 0031 REF 1 5610 1 5613 1 TCF FAIL 3
 0032 REF 12 LAST 1375 5611 22 376 0 LXCH FAILREG +1
 0033 REF 1 5612 1 5624 0 TCF MULTFXIT

0034 REF 13 LAST 1375 5613 3 0377 1 FAIL3 CA FAILREG +2
 0035 REF 30 LAST 1123 5614 7 4733 0 MASK POSMAX
 0036 REF 462 LAST 1373 5615 10 000 0 CCS A
 0037 REF 1 5616 1 5630 0 TCF MULTFAIL
 0038 REF 14 LAST 1375 5617 22 377 1 LXCH FAILREG +2
 0039 REF 2 LAST 1375 5620 1 5624 0 TCF MULTFXIT

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0040	REF	47	LAST	1311	5621	4 1036	1	PROGLARM	CS	DSPTAB +11D	
0041	REF	2	LAST	1352	5622	7 5642	0		MASK	OCT40400	
0042	REF	48	LAST	1376	5623	27 036	1		ADS	DSPTAB +11D	
0043	REF	69	LAST	1375	5624	56 061	0	MULTEXIT	XCH	ITEMP1	OBTAIN RETURN ADDRESS IN A
0044					5625	0 0003	1		RELINT		
0045	REF	463	LAST	1375	5626	50 000	1		INDEX	A	
0046					5627	0 0001	0		TC	1	
0047	REF	250	LAST	1375	5630	3 0001	0	MULTFAIL	CA	L	
0048	REF	50	LAST	1370	5631	6 4735	1		AD	BIT15	
0049	REF	15	LAST	1375	5632	54 377	0		TS	FAILREG +2	
0050	REF	3	LAST	1375	5633	1 5624	0		TCF	MULTEXIT	
R0051	PRIOLARM DISPLAYS V05N09 VIA PRIODSPR WITH 3 RETURNS TO THE USER FROM THE ASTRONAUT AT CALL LOC +1,+2,+3 AND										
R0053	AN IMMEDIATE RETURN TO THE USER AT CALL LOC +4. EXAMPLE FOLLOWS,										
A0054								CAF	OCTXX	ALARM CODE	
A0055								TC	BANKCALL		
A0056								CADR	PRIOLARM		
A0057								...	...
A0058								...	...
A0059								...	...	ASTRONAUT RETURN	
A0060								TC	PHASCHNG	IMMEDIATE RETURN TO USER. RESTART	
A0061								OCT	X.1	PHASE CHANGE FOR PRIO DISPLAY	
0062					10,3451			BANK	10		
0063	REF	3	LAST	1368	10,2000			SETLOC	DISPLAYS		
0064					10,3451			BANK			
0065	REF	3	LAST	1368 TO	1369:	27	677*	COUNT*	\$/DSPLA		
0066					10,3451	0 0004	0	PRIOLARM	INHINT		* * * KEEP IN DISPLAY ROUTINES BANK
0067	REF	251	LAST	1376	10,3452	54 001	1	TS	L		SAVE ALARM CODE
0068	REF	29	LAST	1371	10,3453	3 0133	0	CA	BUF2		2 CADR OF PRIOLARM USER
0069	REF	6	LAST	1375	10,3454	55 363	1	TS	ALMCADR		
0070	REF	30	LAST	1376	10,3455	3 0134	1	CA	BUF2 +1		
0071	REF	1			10,3456	0 5576	0	TC	PRIODENT +1		* LEAVE L ALONE
0072					10,3457	77467	1	-2SEC	DEC	-200	*** DONT MOVE
0073	REF	6	LAST	928	10,3460	3 5006	1	CAF	V05N09		
0074	REF	2	LAST	525	10,3461	1 2357	0	TCF	PRIODSPR		
0075					5634			BLOCK	02		
0076	REF	2	LAST	1375	4000			SETLOC	FFTAG7		
0077					5634			BANK			
0078	REF	2	LAST	1375 TO	1376:	37	37*	COUNT*	\$/ALARM		
0079					5634	0 0004	0	BAILOUT	INHINT		
0080	REF	376	LAST	1375	5635	3 0002	0	CA	0		

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0081	REF 7	LAST 1376	5636	55'363 1	TS	ALMCADR	
0082	REF 377	LAST 1376	5637	50 002 0	INDEX	Q	
0083			5640	3 0000 1	CAF	0	
0084	REF 1		5641	0 5574 1	TC	BORTENT	
0085			5642	40400 1	OCT40400	OCT 40400	
0086			5643	0 0004 0	INHINT		
0087	REF 90	LAST 1362	5644	3 4752 0	WHIMPER	CA TWO	
0088	REF 23	LAST 1288	5645	6 0005 1	AD	Z	
0089	REF 2	LAST 830	5646	54 017 0	TS	BRUPT	
0090			5647	5 0017 1	RESUME		
0091	REF 52	LAST 1348	5650	0 4635 0	TC	POSTJUMP	RESUME SENDS CONTROL HERE
0092	REF 2	LAST 832	5651	12766 0	CADR	ENEMA	
0093			5652	0 0004 0	POOD00	INHINT	
0094	REF 378	LAST 1377	5653	3 0002 0	CA	Q	
0095	REF 8	LAST 1377	5654	55'363 1	ABORT2	TS ALMCADR	
0096	REF 379	LAST 1377	5655	50 002 0	INDEX	Q	
0097			5656	3 0000 1	CAF	0	
0098	REF 2	LAST 1377	5657	0 5574 1	TC	BORTENT	
0099			5660	77770 1	OCT 77770	OCT 77770	DON'T MOVE
0100	REF 2	LAST 1091	5661	3 4765 1	CAE	OCT35	4.35SPOT FOR G0P00000
0101	REF 252	LAST 1376	5662	54 001 1	TS	L	
0102			5663	4 0000 0	COM		
0103	REF 9	LAST 866	5664	52 761 0	DXCH	-PHASE4	
0104			5665	0 0004 0	G0P00000	INHINT	
0105	REF 29	LAST 1333	5666	3 0103 0	CA	FLAGWRD7	IS SERVICER CURRENTLY IN OPERATION?
0106	REF 3	LAST 295	5667	7 4746 1	MASK	V37FLBIT	
0107	REF 464	LAST 1376	5670	10 000 0	CCS	A	
0108	REF 1		5671	1 5675 1	TCF	STRTIDLE	
0109	REF 303	LAST 1329	5672	0 4616 1	TC	BANKCALL	
0110	REF 2	LAST 227	5673	12643 0	CADR	MR.KLEAN	
0111	REF 2	LAST 866	5674	1 5644 0	TCF	WHIMPER	
0112	REF 53	LAST 1377	5675	0 4635 0	STRTIDLE	TC POSTJUMP	PUT SERVICER INTO ITS "GROUND" STATE
0113	REF 1		5676	65711 0	CADR	SERVIDLE	AND PROCEED TO G0T0P00H.
0114			5677	0 0004 0	CCSHOLE	INHINT	
0115	REF 380	LAST 1377	5700	3 0002 0	CA	Q	
0116	REF 1		5701	0 5654 0	TC	ABORT2	
0117			5702	01103 1	OCT1103	OCT 1103	
0118			5703	0 0004 0	CURTAINS	INHINT	
0119	REF 381	LAST 1377	5704	3 0002 0	CA	Q	
0120	REF 2	LAST 1280	5705	0 5571 1	TC	ALARM2	
0121			5706	00217 0	OCT217	OCT 00217	
0122	REF 9	LAST 1377	5707	0 1363 0	TC	ALMCADR	RETURN TO USER
0123			5710	0 0004 0	BAILOUT1	INHINT	
0124	REF 10	LAST 1377	5711	53'364 0	DXCH	ALMCADR	
0125	REF 1		5712	3 5734 1	CAF	ADR40400	
0126	REF 70	LAST 1376	5713	54 061 1	BOTHABRT	TS ITEMP1	

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0127	REF 382	LAST 1377	5714	50 002 0		INDEX	Q	
0128			5715	3 0000 1		CAF	Q	
0129	REF 253	LAST 1377	5716	54 001 1		TS	L	
0130	REF 1		5717	1 5603 0		TCF	CHKFAIL1	
0131			5720	0 0004 0	POOD001	INHINT		
0132	REF 11	LAST 1377	5721	53*364 0		DXCH	ALMCADR	
0133	REF 1		5722	3 5733 0		CAF	ADR77770	
0134	REF 1		5723	1 5713 0		TCF	BOTHA8RT	

0135			5724	0 0004 0	ALARM1	INHINT		
0136	REF 12	LAST 1378	5725	53*364 0		DXCH	ALMCADR	
0137			5726	0 0004 0	ALMNCADR	INHINT		
0138	REF 383	LAST 1378	5727	50 002 0		INDEX	Q	
0139			5730	3 0000 1		CA	Q	
0140	REF 254	LAST 1378	5731	54 001 1		TS	L	
0141	REF 1		5732	1 5601 1		TCF	LARMENT	

0142	REF 5	LAST 1368	5733	1 5660 0	ADR77770	TCF	DCI77770	
0143	REF 3	LAST 1376	5734	1 5642 0	ADR40400	TCF	DCT40400	
0144	REF 158	LAST 1374	5155		DOALARM	EQUALS	ENDOFJOB	

R0145 CALLING SEQUENCE FOR VARALARM

A0146						CAF	(ALARM)	
A0147						TC	VARALARM	

R0148	VARALARM TURNS ON PROGRAM ALARM LIGHT BUT DOES NOT DISPLAY							
0149			5735	0 0004 0	VARALARM	INHINT		

0150	REF 255	LAST 1378	5736	54 001 1		TS	L	SAVE USFRS ALARM CODE
0151	REF 384	LAST 1378	5737	3 0002 0		CA	Q	SAVE USERS Q
0152	REF 13	LAST 1378	5740	55*363 1		TS	ALMCADR	
0153	REF 2	LAST 1376	5741	0 5575 0		TC	PRIORIENT	
0154			5742	00014 1	OCT14	OCT	14	DONT MOVE
0155	REF 14	LAST 1378	5743	0 1363 0		TC	ALMCADR	RETURN TO USER
0156	REF 3	LAST 1377	5644		ABORT	EQUALS	WHIMPER	

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R0001 PROGRAM NAME: P27
R0002 WRITTEN BY: KILROY/ DE WOLF

R0003 MOD NO: 6
R0004 MOD BY: KILROY
R0005 DATE: 01DEC67

R0006 LCG SECTION: UPDATE PROGRAM.

R0007 FUNCT. DESCR: P27 (THE UPDATE PROGRAM) PROCESSES COMMANDS AND DATA
R0008 INSERTIONS REQUESTED BY THE GROUND VIA UPLINK.
R0009 THE P27 PROGRAM WILL ACCEPT UPDATES
R0010 ONLY DURING P00 FOR THE LM, AND ONLY DURING P00,
R0011 P02, AND FRESH START FOR THE CSM

R0012 CALLING SEQ: PROGRAM IS INITIATED BY UPLINK ENTRY OF VERBS 70, 71, 72 AND 73.

R0014 SUBROUTINES: TESTXACT, NEWMODEFX, NEWMODEX +3, GOXDSPE, BANKCALL, FINDVAC, INTPRET, INSTALL, TPAGREE,
R0016 INTWAKEU, ENDEXT, POSTJUMP, FALTON, NEWPHASE, PHASCHNG

R0017 NORMAL EXIT: TC ENDEXT

R0018 ALARM/ABORT: TC FALTON FOLLOWED BY TC ENDEXT

R0019 RESTARTS: P27 IS RESTART PROTECTED IN TWO WAYS...
R0020 1. PRIOR TO VERIFLAG INVERSION(WHICH IS CAUSED BY THE GROUND/ASTRONAUT'S VERIFICATION OF UPDATE
R0022 DATA BY SENDING A V33E WHEN V21N02 IS FLASHING)---
R0023 NO PROTECTION EXCEPT PRE-P27 MODE IS RESTORED, COAST + ALIGN DOWNLIST IS SELECTED AND UPLINK
R0025 ACTIVITY LIGHT IS TURNED OFF.(JUST AS IF A V34F WAS SENT DURING P27 DATA LOADS).
R0027 V70,V71,V72 OR V73 WILL HAVE TO BE COMPLETELY RESENT BY USER.
R0029 2. AFTER VERIFLAG INVERSION(WHEN UPDATE OF THE SPECIFIED ERASABLES IS BEING PERFORMED)---
R0031 PROTECTED AGAINST RESTARTS.

R0032 DEBRIS: UPBUFF (20D) TEMP STORAGE FOR ADDRESSES AND CONTENTS.
R0033 UPVERB (1) VERB NUMBER MINUS 70D (E.G. FOR V72, UPVERB = 72D - 70D = 2)
R0035 UPOLDMOD (1) FOR MAJOR MODE INTERRUPTED BY P27.
R0036 COMPNUMB (1) TOTAL NUMBER OF COMPONENTS TO BE TRANSMITTED.
R0038 UPCOUNT (1) ACTUAL NUMBER OF COMPONENTS RECEIVED.
R0039 UPTEMP (1) SCRATCH, BUT USUALLY CONTAINS COMPONENT NUMBER TO BE CHANGED DURING VERIFY CYCLE

R0041 INPUT:

R0042 ENTRY: DESCRIPTION

R0043 V70EXXXXXXEXXXXXE (LIFTOFF TIME INCREMENT) DOUBLE PRECISION OCTAL TIME INCREMENT, XXXXX XXXXX,
R0045 IS ADDED TO TEPHEM, SUBTRACTED FROM AGC CLOCK(TIME2,TIME1), SUBTRACTED FROM CSM STATE
R0047 VECTOR TIME(TETCSM) AND SUBTRACTED FROM LFM STATE VECTOR TIME(TFTLEM).
R0049 THE DP OCTAL TIME INCREMENT IS SCALED AT 2(20).

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R0050 V71E1IEAAAAE (CONTIGUOUS BLOCK UPDATE) 11-2 OCTAL COMPONENTS,XXXXX,
 R0051 XXXXXE ARE LOADED INTO ERASABLE STARTING AT ECADR, AAAA.
 R0052 XXXXXE IT IS .GE. 3 .AND. .LE. 200.,
 R0053 AND (AAAA + 11 - 3) DOES NOT PRODUCE AN ADDRESS IN THE
 R0054 9 NEXT BANK
 R0055 . SCALING IS SAME AS INTERNAL REGISTERS.

R0056 V72E1IE (SCATTER UPDATE) (11-1)/2 OCTAL COMPONENTS,XXXXX, ARE
 R0057 AAAAEXXXXXE LOADED INTO ERASABLE LOCATIONS, AAAA.
 R0058 AAAAEXXXXXE 11 IS .GE. 3 .AND. .LE. 190, AND MUST BE 000.
 R0060 . SCALING IS SAME AS INTERNAL REGISTERS.

R0061 V73EXXXXXEXXXXXE (OCTAL CLOCK INCREMENT) DOUBLE PRECISION OCTAL TIME
 R0062 INCREMENT XXXXX XXXXX, IS ADDED TO THE AGC CLOCK, IN
 R0063 CENTISECONDS SCALED AT 12128.
 R0064 THIS LOAD IS THE OCTAL EQUIVALENT OF V55.

R0065 OUTPUT: IN ADDITION TO THE ABOVE REGISTER LOADS, ALL UPDATES
 R0066 COMPLEMENT BIT3 OF FLAGWORD7.

R0067 ADDITIONAL NOTES: VERB 71, JUST DEFINED ABOVE WILL BE USED TO PERFORM BUT NOT LIMITED TO THE FOLLOWING UPDATES--

R0069 1. CSM/LM STATE VECTOR UPDATE
 R0072 2. REFSMMAT UPDATE

R0073 THE FOLLOWING COMMENTS DELINEATE EACH SPECIAL UPDATE----

R0074 1. CSM/LM STATE VECTOR UPDATE(ALL DATA ENTRIES IN OCTAL)

ENTRIES:	DATA DEFINITION:	SCALE FACTORS:
R0075 V71E	CONTIGUOUS BLOCK UPDATE VERB	
R0078 21E	NUMBER OF COMPONENTS FOR STATE VECTOR UPDATE	
R0080 AAAAE	ECADR OF 'UPSVFLAG'	
R0082 XXXXXE	STATE VECTOR IDENTIFIER: 00001 FOR CSM, 77776 FOR LEM - EARTH SPHERE OF INFLUENCE SCALING	
R0083	00002 FOR CSM, 77775 FOR LEM - LUNAR SPHERE OF INFLUENCE SCALING	
R0084 XXXXXEXXXXXE	X POSITION	
R0086 XXXXXEXXXXXE	Y POSITION	
R0088 XXXXXEXXXXXE	Z POSITION	
R0090 XXXXXEXXXXXE	X VELOCITY	
R0092 XXXXXEXXXXXE	Y VELOCITY	
R0094 XXXXXEXXXXXE	Z VELOCITY	
R0096 XXXXXEXXXXXE	TIME FROM AGC CLOCK ZERO	
R0098 V33E	VERB 33 TO SIGNAL THAT THE STATE VECTOR IS READY TO BE STORED.	

R0144 2. REFSMMAT(ALL DATA ENTRIES IN OCTAL)
 R0145 ENTRIES: DATA DEFINITIONS:

SCALE FACTORS:

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R0147	V71E	CONTIGUOUS BLOCK UPDATE VERB	
R0148	24E	NUMBER OF COMPONENTS FOR REFSMMAT UPDATE	
R0150	AAAAE	ECADR OF 'REFSMMAT'	
R0152	XXXXXXXXXXE	ROW 1 COLUMN 1	2(-1)
R0154	XXXXXXXXXXE	ROW 1 COLUMN 2	2(-1)
R0156	XXXXXXXXXXE	ROW 1 COLUMN 3	2(-1)
R0158	XXXXXXXXXXE	ROW 2 COLUMN 1	2(-1)
R0160	XXXXXXXXXXE	ROW 2 COLUMN 2	2(-1)
R0162	XXXXXXXXXXE	ROW 2 COLUMN 3	2(-1)
R0164	XXXXXXXXXXE	ROW 3 COLUMN 1	2(-1)
R0166	XXXXXXXXXXE	ROW 3 COLUMN 2	2(-1)
R0168	XXXXXXXXXXE	ROW 3 COLUMN 3	2(-1)
R0170	V33E	VERB 33 TO SIGNAL THAT REFSMMAT IS READY TO BE STORED.	

0171				07,3746			BANK	07	
0172	REF	7	LAST	312	43,2000		SETLOC	EXTVERBS	
0173					43,3732		BANK		
0174	REF	4	LAST	980	F3,1706		EBANK=	TEPHEN	
0175	REF	1					COUNT*	55/P27	
0176	REF	1			43,3732	3 4755 1	V70UPDAT	CAF	UP70
0177	REF	2	LAST	277	43,3733	1 3741 1	TCF	V73UPDAT	+1
									COMES HERE ON V70E
0178	REF	1			43,3734	3 4753 1	V71UPDAT	CAF	JP71
0179	REF	3	LAST	1381	43,3735	1 3741 1	TCF	V73UPDAT	+1
									COMES HERE ON V71E
0180	REF	1			43,3736	3 4752 0	V72UPDAT	CAF	JP72
0181	REF	4	LAST	1381	43,3737	1 3741 1	TCF	V73UPDAT	+1
									COMES HERE ON V72E
0182	REF	1			43,3740	3 6244 0	V73UPDAT	CAF	UP73
									COMES HERE ON V73E
0183	REF	1			43,3741	55'166 0	+1	TS	UPVERBSV
									SAVE UPVERB UNTIL IT'S OK TO ENTER P27
0184	REF	19	LAST	314	43,3742	0 2076 1	TC	TESTXACT	
A0185									GRAB DISPLAY IF AVAILABLE, OTHERWISE TURN*OPERATOR ERROR* ON AND TERMINATE JOB
0186	REF	21	LAST	1288	43,3743	3 1011 0		CA	MODREG
0187					43,3744	0 0006 1		EXTEND	
0188					43,3745	1 3750 1		BZF	+3
0189	REF	54	LAST	1377	43,3746	0 4635 0	UPERROR	TC	POSTJUMP
0190	REF	1			43,3747	11703 0		CADR	JPERROUT +2
									GO TO COMMON UPDATE PROGRAM EXIT
0191	REF	22	LAST	1381	43,3750	31'011 0		CAE	MODREG
01915	REF	1			43,3746		CKMDMORE	=	UPERROR
0192	REF	2	LAST	120	43,3751	55'171 0		TS	JPOLDMOD
									UPDATE ALLOWED, SAVE CURRENT MAJOR MODE

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0193	REF	2	LAST	1381	43,3752	31'166 1	CAE	UPVFRBSV	SET UPVERB TO INDICATE TO P27
0194	REF	2	LAST	120	43,3753	55'172 0	TS	UPVERB	WHICH EXTENDED VFRB CALLED IT.
0195	REF	147	LAST	1369	43,3754	3 4753 1	CAF	ONE	
0196	RFF	2	LAST	120	43,3755	55'173 1	TS	UPCOUNT	INITIALIZE UPCOUNT TO 1
0197	REF	55	LAST	1381	43,3756	0 4635 0	TC	POSTJUMP	LEAVE EXTENDED VERB BANK AND
0198	REF	1			43,3757	11322 1	CADR	UPPART2	GO TO UPDATE PROGRAM(P27) BANK.
0211	REF	256	LAST	1371	4755		UP70	EQUALS ZFRD	
0212	REF	148	LAST	1382	4753		UP71	EQUALS ONE	
0213	REF	91	LAST	1377	4752		UP72	EQUALS TWO	
0214	REF	43	LAST	1365	6244		UP73	EQUALS THREE	
0215					04,3322			BANK 04	
0216	REF	2	LAST	1221	04,2000			SETLOC UPDATE2	
0217					04,3322			BANK	
0218	REF	1						COUNT* \$\$/P27	
0219					04,3322		UPPART2	EQUALS	UPDATE PROGRAM - PART 2
0220	RFF	115	LAST	1329	04,3322	0 5353 1	TC	PHASCHNG	SET RESTART GROUP 6 TO RESTORE OLD MODE
0221					04,3323	07026 1	OCT	07026	AND DOWNLIST AND EXIT IF RESTART OCCURS.
0222					04,3324	30000 1	OCT	30000	PRIORITY SAME AS CHRPRIO
0223	REF	4	LAST	219	1174			EBANK= UPBUFF	
0224	REF	1			04,3325	03633 1	2CADR	UPOUT +1	
0224	REF	1			04,3326	10102 0			
0225	RFF	149	LAST	1382	04,3327	3 4753 1	CAF	ONE	
0226	REF	10	LAST	987	04,3330	54 332 1	TS	DNLSTCOD	DOWNLIST
0227	REF	6	LAST	806	04,3331	0 5311 1	TC	NEWMODFX	SET MAJOR MODE = 27
0228					04,3332	00033 1	DEC	27	
0229	REF	3	LAST	1382	04,3333	51'172 1	INDEX	UPVERB	BRANCH DEPENDING ON WHETHER THE UPDATE
0230					04,3334	1 3335 0	TCF	+1	VFRB REQUIRES A FIXED OR VARIABLE NUMBER
0231					04,3335	1 3340 1	TCF	+3	V70 FIXED. (OF COMPONENTS.
0232	REF	1			04,3336	1 3343 1	TCF	OHWELL1	V71 VARIABLE - GO GET NO. OF COMPONENTS
0233	REF	2	LAST	1382	04,3337	1 3343 1	TCF	OHWELL1	V72 VARIABLE - GO GET NO. OF COMPONENTS
0234	REF	92	LAST	1382	04,3340	3 4752 0	CA	TWO	V73 (AND V70) FIXED
0235	REF	3	LAST	219	04,3341	55'170 1	TS	COMPNUMB	SET NUMBER OF COMPONENTS TO 2.
0236	REF	1			04,3342	1 3366 0	TCF	OHWELL2	GO GET THE TWO UPDATE COMPONENTS
0237	REF	1			04,3343	3 3436 0	OHWELL1	CAF	* REQUEST USER TO SEND NUMBER *
0238	REF	785	LAST	1367	04,3344	54 156 1		TS	* OF COMPONENTS PARAMETER(11). *
0239	REF	1			04,3345	3 3437 1	+2	CAF	(CK4V32 RETURNS HERE IF V32 ENCOUNTERED)
0240	RFF	304	LAST	1377	04,3346	0 4616 1		TC	BANKCALL
									DISPLAY A FLASHING V21N01

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0241	REF	10	LAST	725	04,3347	20212	1	CADR	GDXDSPF	TO REQUEST II.
0242	REF	1			04,3350	1 3633	0	TCF	JPOUT4	V34 TERMINATE UPDATE(P27) RETURN
0243	REF	3	LAST	1382	04,3351	1 3345	1	TCF	OHWELL1 +2	
0244	REF	1			04,3352	0 3427	0	TC	CK4V32	DATA DR V32 RETURN
0245	REF	54	LAST	1279	04,3353	4 4752	1	CS	RIT2	
0246	REF	5	LAST	1382	04,3354	6 1174	1	AD	UPBUFF	IS II(NUMBER OF COMPONENTS PARAMETER)
0247					04,3355	0 0006	1	EXTEND		.GE. 3 AND .LE. 200.
0248	REF	4	LAST	1383	04,3356	6 3345	0	BZMF	OHWELL1 +2	
0249	REF	6	LAST	1383	04,3357	4 1174	0	CS	UPBUFF	
0250	RFF	1			04,3360	6 4362	1	AD	UP21	
0251					04,3361	0 0006	1	EXTEND		
0252	REF	5	LAST	1383	04,3362	6 3345	0	BZMF	OHWELL1 +2	
0253	REF	7	LAST	1383	04,3363	31'174	1	CAE	UPBUFF	
0254	REF	4	LAST	1382	04,3364	55'170	1	TS	CDMPNUMB	SAVE II IN COMPNUMB

R0257 UPBUFF LOADING SEQUENCE

02571	REF	3	LAST	1382	04,3365	25'173	0	INCR	UPCOUNT	INCREMENT COUNT OF COMPONENTS RECEIVED.
0258	REF	1			04,3366	3 3603	0	CAF	ADUPBFM1	CALCULATE LOCATION(ECADR) IN UPBUFF
0259	REF	4	LAST	1383	04,3367	6 1173	0	AD	UPCOUNT	WHERE NEXT COMPONENT SHOULD BE STORED.
0260	REF	786	LAST	1382	04,3370	54 156	1	+2	TS	PLACE ECADR INTO R3.
0261	REF	2	LAST	1382	04,3371	3 3437	1	+3	CAF	(CK4V32 RETURNS HERE IF V32 ENCOUNTERED)
0262	REF	305	LAST	1382	04,3372	0 4616	1	TC	BANKCALL	DISPLAY A FLASHING V21N01
0263	REF	11	LAST	1383	04,3373	20212	1	CADR	GDXDSPF	TO REQUEST DATA.
0264	REF	2	LAST	1383	04,3374	1 3633	0	TCF	UPDUT4	V34 TERMINATE UPDATE(P27) RETURN.
0265	RFF	2	LAST	1382	04,3375	1 3371	0	TCF	OHWELL2 +3	V33 PROCEED RETURN
0266	REF	2	LAST	1383	04,3376	0 3427	0	TS	CK4V32	DATA OR V32 RETURN
0267	REF	5	LAST	1383	04,3377	4 1173	1	CS	UPCOUNT	HAVE WE FINISHED RECEIVING ALL
0268	REF	5	LAST	1383	04,3400	6 1170	0	AD	CDMPNUMB	THE DATA WE EXPECTED.
0269					04,3401	0 0006	1	EXTEND		
0270	REF	1			04,3402	6 3404	1	BZMF	UPVERIFY	YES- GO TO VERIFICATION SEQUENCE
0272	REF	3	LAST	1383	04,3403	1 3365	0	TCF	OHWELL2 -1	NO- REQUEST ADDITIONAL DATA.

R0273 VERIFY SEQUENCE

0274	RFF	1			04,3404	3 3435	0	UPVERIFY	CAF	ADUPTMP	PLACE ECADR WHERE COMPONENT NO. INDEX
0275	REF	787	LAST	1383	04,3405	54 156	1		TS	MPAC +2	IS TO BE STORED INTO R3.
0276	REF	1			04,3406	3 3440	1		CAF	UPVRFYV	(CK4V32 RETURNS HERE IF V32 ENCOUNTERED)
0277	REF	306	LAST	1383	04,3407	0 4616	1		TC	BANKCALL	DISPLAY A FLASHING V21N02 TO REQUEST
0278	REF	12	LAST	1383	04,3410	20212	1		CADR	GDXDSPF	DATA CORRECTION OR VERIFICATION.
0279	REF	3	LAST	1383	04,3411	1 3633	0		TCF	UPDUT4	V34 TERMINATE UPDATE(P27) RETURN
0280	REF	1			04,3412	1 3441	1		TCF	UPSTORE	V33 DATA SENT IS GOOD. GO STORE IT.
0281	REF	3	LAST	1383	04,3413	0 3427	0		TC	CK4V32	COMPONENT NO. INDEX OR V32 RETURN
0282	REF	4	LAST	120	04,3414	3 1167	0		CA	UPTMP	DDES THE COMPONENT NO. INDEX JUST SENT
0283					04,3415	0 0006	1		EXTEND		SPECIFY A LEGAL COMPONENT NUMBER?
0284	REF	2	LAST	1383	04,3416	6 3404	1		BZMF	UPVERIFY	NO, IT IS NOT POSITIVE NONZERO
0285	REF	5	LAST	1383	04,3417	4 1167	1		CS	UPTFMP	
0288	REF	6	LAST	1383	04,3420	6 1170	0		AD	CDMPNUMB	

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0289 REF 60 LAST 1348 04,3421 6 4753 1
 0290 04,3422 0 0006 1
 0291 REF 3 LAST 1383 04,3423 6 3404 1
 0292 REF 2 LAST 1383 04,3424 3 3603 1
 0293 REF 6 LAST 1383 04,3425 6 1167 0
 0294 REF 4 LAST 1383 04,3426 1 3370 1

AO 8IT1
 EXTEND
 BZMF UPVERIFY
 CAF AOUPEFMI
 AO JPTMP
 TCF JHWELL2 +2

NO
 YES- BASED ON THE COMPONENT NO. INOFX
 CALCULATE THE ECADR OF LOCATION IN
 UP8UFF WHICH USER WANTS TO CHANGE.

0295 REF 2 LAST 1382 04,3633

UPOUT4

EQUALS UPOUT +1

COMES HERE ON V34 TO TERMINATE UPDATE

R0296 CHECK FOR VER8 32 SEQUENCE

0297 REF 788 LAST 1383 04,3427 4 0154 0 CK4V32
 0298 REF 58 LAST 1360 04,3430 7 4746 1
 0299 REF 465 LAST 1377 04,3431 10 000 0
 0300 REF 385 LAST 1378 04,3432 0 0002 0
 0301 REF 386 LAST 1384 04,3433 50 002 0
 0302 04,3434 717771 0

CS MPAC
 MASK 8IT6
 CCS A
 TC Q
 INOEX Q
 TC Q -6

ON DATA RETURN FROM 'GOXOSPF'
 ON DATA RETURN FROM "GOXOSP"& THE CON-
 TENTS OF MPAC = VER8. SO TEST FOR V32.
 IT'S NOT A V32, IT'S DATA. PROCEED.
 V32 ENCOUNTERED - GO BACK AND GET DATA

0305 REF 7 LAST 1384 04,3435 01167 0
 0306 REF 8 LAST 1383 04,3436 01174 1
 0307 04,3437 05201 1
 0308 04,3440 05202 1
 0309 REF 3 LAST 1094 4362
 03121 REF 23 LAST 1350 4756

AOUPTMP AORES JPTMP
 ADUPBUFF ADRES UPBUFF
 UPLOADNV VN 2101
 UPVRFYNV VN 2102
 UP21 = MD1
 UPOTPHAS EQUALS FIVE

ADDRESS OF TEMP STORAGE FOR CORRECTIONS
 ADDRESS OF UPDATE DATA STORAGE BUFFER
 VERB 21 NOUN 01
 VERB 21 NOUN 02
 DEC 21 = MAX NO OF COMPONENTS +1

R0313 PRE-STORE AND FAN TO APPROPRIATE BRANCH SEQUENCE

0314 04,3441

UPSTORE

EQUALS

GROUND HAS VERIFIED UPDATE. STORE DATA.

0315 04,3441 0 0004 0

INHINT

0316 REF 30 LAST 1377 04,3442 30 103 0
 0317 REF 256 LAST 1378 04,3443 56 001 0
 0318 REF 1 04,3444 3 4751 0
 0319 04,3445 0 0006 1
 0320 REF 17 LAST 1369 04,3446 06 001 0
 0321 REF 31 LAST 1384 04,3447 54 103 1

CAE FLAGWRD7
 XCH L
 CAF VERIFBIT
 EXTEND
 RXOR LCHAN
 TS FLAGWRD7

INVERT VERIFLAG(BIT3 OF FLAGWRD7) TO
 INDICATE TO THE GROUND(VIA DOWNLINK)
 THAT THE V33 (WHICH THE GROUND SENT TO
 VERIFY THE UPDATE) HAS BEEN SUCCESSFULLY
 RECEIVED BY THE UPDATE PROGRAM

0322 REF 116 LAST 1382 04,3450 0 5353 1
 0323 04,3451 04026 1
 0324 04,3452 0 0004 0

TC PHASCHNG
 OCT 04026
 INHINT

SET RESTART GROUP 6 TO RECD THE UPDATE
 DATA STORE IF A RESTART OCCURS.
 (BECAUSE PHASCHNG DID A RELINT)

0325 REF 93 LAST 1382 04,3453 4 4752 1
 0326 REF 4 LAST 1382 04,3454 6 1172 1
 0327 04,3455 0 0006 1
 0328 REF 1 04,3456 6 3465 0

CS TWO
 AO UPVERB
 EXTEND
 BZMF UPFNOVAC

GO TO UPFNOVAC IF INSTALL IS REQUIRED,
 THAT IS, IF IT'S A V70 - V72.
 GO TO UPEN073 IF IT'S A V73.

R0330 VER 8 73 BRANCH

L UPDATE PROGRAM				USER'S PAGE NO. 7 E3 S4				
0331				04,3457	0 0006 1	UPEN073	EXTEND	V73-PERFORM DP OCTAL AGC CLOCK INCREMENT
0332	REF	9	LAST 1384	04,3460	3 1175 0		DCA UP3UFF	
0333	REF	10	LAST 1385	04,3461	53'205 0		DXCH UPBUFF +8D	
0334	REF	1		04,3462	0 3510 0		TC TIME010L	
0335	REF	8	LAST 837	04,3463	0 4364 1		TC FALTCN	ERROR- TURN ON *OPERATOR ERROR* LIGHT
0336	REF	3	LAST 1384	04,3464	0 3633 1		TC UPDUT +1	GO TO COMMON UPDATE PROGRAM EXIT
0337	REF	7	LAST 1332	04,3465	3 4355 0	UPFNOVAC	CAF CHRPRID	(USE EXTENDED VERB PRIORITY)
0338	REF	43	LAST 1361	04,3466	0 5105 0		TC FINOVAC	GET VAC AREA FOR 'CALL INSTALL'
0339	REF	5	LAST 1381	F3,1706			EBANK= TEPHEM	
0340	REF	1		04,3467	03472 0		2CAOR UPJOB	(NOTE: THIS WILL ALSO SET EBANK FOR
0340	REF	1		04,3470	10103 1			
0341	REF	159	LAST 1378	04,3471	0 5155 0		TC ENDOFJOB	'TEPHEM' UPOATE BY V70)
0342	REF	234	LAST 1257	04,3472	0 6036 1	UPJOB	TC INTPRET	THIS COULD BE A STATE VECTOR UPDATE--SO
0343				04,3473	77624 1		CALL	WAIT(PUT JOB TO SLEEP) IF ORBIT INT(01)
0344	REF	37	LAST 1219	04,3474	27412 0		INTSTALL	IS IN PROGRESS--OR--GRAB 01 AND RETURN
A0345								TO UPWAKE IF 01 IS NOT IN PROGRESS.
0346				04,3475	77776 1	UPWAKE	EXIT	
0347	REF	117	LAST 1384	04,3476	0 5353 1		TC PHASCHNG	RESTART PROTECT(GROUP 6)
0348				04,3477	04026 1		OCT 04026	
0350	REF	70	LAST 1359	04,3500	0 5504 0		TC UPFLAG	SET INTEGRATION RESTART BIT
0351	REF	5	LAST 1238	04,3501	00236 0		ADRES REINTFLG	
0352				04,3502	0 0004 0		INHINT	
0355				04,3503		UPPART3	EQUALS	
0356	REF	5	LAST 1384	04,3503	51'172 1		INDEX UPVERB	BRANCH TO THE APPROPRIATE UPDATE VERB
0357				04,3504	1 3505 0		TCF +1	ROUTINE TO ACTUALLY PERFORM THE UPOATE
0358	REF	1		04,3505	1 3644 0		TCF UPEN070	V70
0359	REF	1		04,3506	1 3553 0		TCF UPEND71	V71
0360	REF	1		04,3507	1 3605 0		TCF UPEN072	V72
R0361								ROUTINE TO INCREMENT CLOCK(TIME2,TIME1) WITH CONTENTS OF DP WORD AT UPBUFF.
0363				04,3510	0 0006 1	TIMEDIDL	EXTEND	
0364	REF	8	LAST 1384	04,3511	23'167 0		QXCH UPTMP	SAVE Q FOR RETURN
0365	REF	257	LAST 1382	04,3512	3 4755 1		CAF ZERO	ZERO AND SAVE TIME2,TIME1
0366				04,3513	22 007 0		ZL	
0367	REF	35	LAST 1331	04,3514	52 025 1		DXCH TIME2	
0368	REF	11	LAST 1385	04,3515	53'217 0		OXCH UPBUFF +180	STORE IN CASE OF OVERFLOW
0369	REF	1		04,3516	3 4756 1		CAF UPDTPHAS	00
0370	REF	257	LAST 1384	04,3517	54 001 1		TS L	A
0371				04,3520	4 0000 0		COM	QUICK
03711	REF	5	LAST 866	04,3521	52 765 1		OXCH -PHASE6	PHASCHNG

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0372			04,3522	0 0004 0	TIMEDIOR INHINT			
0373	REF 258	LAST 1385	04,3523	3 4755 1	CAF	ZERO		
0374			04,3524	22 007 0	ZL			PICK UP INCREMENTER(AND ZERO
0375	REF 789	LAST 1384	04,3525	54 156 1	TS	MPAC +2		IT IN CASE OF RESTARTS) AND
0376	REF 12	LAST 1385	04,3526	53'205 0	DXCH	UPBUFF +8D		STORE IT
0377	REF 790	LAST 1386	04,3527	52 155 1	DXCH	MPAC		INTO MPAC FOR TPAGREE.
0378			04,3530	0 0006 1	EXTEND			
0379	RFF 13	LAST 1386	04,3531	3 1217 1	DCA	JPBUFF +18D		
0380	REF 791	LAST 1386	04,3532	20 155 1	OAS	MPAC		FORM SUM IN MPAC
0381			04,3533	0 0006 1	EXTEND			
0382	REF 1		04,3534	1 3543 1	BZF	DELTATOK		TEST FOR OVERFLOW
0383	REF 259	LAST 1386	04,3535	3 4755 1	CAF	ZERO		
0384	REF 14	LAST 1386	04,3536	53'217 0	DXCH	UPBUFF +18D		OVERFLOW, RESTORE OLD VALUE OF CLOCK
0385	REF 36	LAST 1385	04,3537	20 025 1	OAS	TIME2		AND TURN ON OPERATOR ERROR
0386	REF 118	LAST 1385	04,3540	0 5353 1	TC	PHASCHNG		RESTART PROTECT(GROUP 6)
0387			04,3541	04026 1	OCT	04026		
0388	REF 9	LAST 1385	04,3542	0 1167 0	TC	UPTEMP		GO TO ERROR EXIT
0389	REF 18	LAST 1331	04,3543	0 7256 1	DELTATOK	TC	TPAGREE	FORCE SIGN AGREEMENT
0390	REF 792	LAST 1386	04,3544	52 155 1	DXCH	MPAC		
0391	REF 37	LAST 1386	04,3545	20 025 1	OAS	TIME2		INCREMENT TIME2,TIME1
0392	REF 119	LAST 1386	04,3546	0 5353 1	TC	PHASCHNG		RESTART PROTECT(GROUP 6)
0393			04,3547	04026 1	OCT	04026		
0394			04,3550	0 0004 0	INHINT			
0395	REF 10	LAST 1386	04,3551	51'167 0	INDEX	UPTEMP		(COOED THIS WAY FOR RESTART PROTECTION)
0396			04,3552	0 0001 0	TC	1		NORMAL RETURN
R0397		VERB 71 BRANCH						
0402	REF 15	LAST 1386	04,3553	31'175 0	UPEN071	CAF	UPBUFF +1	SET FBANK
0403	REF 65	LAST 1358	04,3554	54 003 0	TS		FBANK	AND
0404	REF 19	LAST 1318	04,3555	7 4357 0	MASK	LOWR		CALCULATE
0405	REF 11	LAST 1386	04,3556	55'167 1	TS	UPTEMP		S-RFG VALUE OF RECEIVING AREA
0406	REF 5	LAST 1318	04,3557	6 7744 1	AD	NEG3		IN THE PROCESS OF
0407	REF 7	LAST 1383	04,3560	6 1170 0	AO	COMPNUM8		PERFORMING
0408			04,3561	0 0006 1	EXTEND			THIS UOATE
0409	REF 1		04,3562	1 3570 1	BZF	STORLP71		WILL WE
0410	REF 34	LAST 1326	04,3563	7 4743 1	MASK	BIT9		OVERFLOW
0411	REF 466	LAST 1384	04,3564	10 000 0	CCS	A		INTO THE NEXT FBANK....
0412	REF 2	LAST 1381	04,3565	1 3701 0	TCF	UPERROUT		YES
0413	REF 6	LAST 1386	04,3566	3 7744 1	CA	NEG3		NO- CALCULATE NUMBER OF
0414	REF 8	LAST 1386	04,3567	6 1170 0	AO	COMPNUM8		WORDS TO BE STORED MINUS ONE
0415	REF 793	LAST 1386	04,3570	54 154 0	STORLP71	TS	MPAC	SAVE NO. OF WORDS REMAINING MINUS ONE

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0416	REF 467	LAST 1386	04,3571	50 000 1		INDEX A	TAKE NEXT UPDATF WORD FROM
0417	REF 16	LAST 1386	04,3572	3 1176 0		CA JP8UFF +2	UP8UFF AND
0418	REF 258	LAST 1385	04,3573	54 001 1		TS L	SAVE IT IN L
0419	REF 754	LAST 1386	04,3574	3 0154 1		CA MPAC	CALCULATE NEXT
0420	REF 12	LAST 1386	04,3575	6 1167 0		AD UPTEMP	RECEIVING ADDRESS
0421	REF 468	LAST 1387	04,3576	50 000 1		INDEX A	
0422			E3,1400			EBANK= 1400	
0423			04,3577	23'400 1		LXCH 1400	UPDATE THE REGISTER BY CONTENTS OF L
0424	REF 6	LAST 1385	E3,1706			EBANK= TEPHEM	
0425	REF 795	LAST 1387	04,3600	10 154 0		CCS MPAC	ARE THERE ANY WORDS LEFT TO BE STORED
0426	REF 2	LAST 1386	04,3601	1 3570 1		TCF STORLP71	YES
0427	REF 4	LAST 1385	04,3602	1 3632 1		TCF UPOUT	NO- THEN EXIT UPDATE PROGRAM
0428	REF 17	LAST 1387	04,3603	01173 0	ADUP8FMI	ADRES UP8UFF -1	SAME AS ADUP8UFF BUT LESS 1 (DON'T MOVE)
0429	REF 5	LAST 1387	04,3604	1 3632 1		TCF UPOUT	NO- EXIT UPDATE(HERE WHEN COMPNUMB = 3)

R0430 VER8 72 BRANCH

0431	REF 61	LAST 1384	04,3605	3 4753 1	UPEND72	CAF 8IT1	HAVE AN ODD NO. OF COMPONENTS
0432	REF 9	LAST 1386	04,3606	7 1170 1		MASK COMPNUM8	BEFN SENT FOR A V72 UPDATE...
0433	REF 469	LAST 1387	04,3607	10 000 0		CCS A	
0434			04,3610	1 3612 0		TCF +2	YES
0435	REF 3	LAST 1386	04,3611	1 3701 0		TCF UPERROUT	ERROR- SHOULD BE ODD NO. OF COMPONENTS
0451	REF 55	LAST 1383	04,3612	4 4752 1		CS 8IT2	
0452	REF 10	LAST 1387	04,3613	6 1170 0		AD COMPNUM8	
0453	REF 756	LAST 1387	04,3614	54 154 0	LDLOOP72	TS MPAC	NOW PERFORM THE UPDATE
0454	REF 470	LAST 1387	04,3615	50 000 1		INDEX A	
0455	REF 18	LAST 1387	04,3616	31'175 0		CAE UP8UFF +1	PICK UP NEXT UPDATF WORD
0456	REF 471	LAST 1387	04,3617	22 000 1		LXCH A	
0457	REF 797	LAST 1387	04,3620	10 154 0		CCS MPAC	SET POINTER TO ECADR(MUST BE CCS)
0458	REF 798	LAST 1387	04,3621	54 154 0		TS MPAC	
0459	REF 472	LAST 1387	04,3622	50 000 1		INDEX A	
0460	REF 19	LAST 1387	04,3623	31'175 0		CAE UP8UFF +1	PICK UP NEXT ECADR OF REG TO BE UPDATED
0461	REF 66	LAST 1386	04,3624	54 003 0		TS EBANK	SET EBANK
0462	REF 20	LAST 1386	04,3625	7 4357 0		MASK LOW8	ISOLATE RELATIVE ADDRESS
0463	REF 473	LAST 1387	04,3626	50 000 1		INDEX A	
0464			E3,1400			EBANK= 1400	
0465			04,3627	23'400 1		LXCH 1400	UPDATE THE REGISTER BY CONTENTS OF L
0466	REF 7	LAST 1387	E3,1706			EBANK= TEPHEM	
0467	REF 799	LAST 1387	04,3630	10 154 0		CCS MPAC	ARE WE THROUGH THE V72 UPDATF...
0468	REF 1		04,3631	1 3614 0		TCF LDLOOP72	NO

R0469 NORMAL FINISH OF P27

0470			04,3632		UPOUT	EQUALS	
0471	REF 1		04,3632	0 3106 0		TC INTWAKFU	RELEASE GRAB OF DR8ITAL INTGRATION
0472	REF 3	LAST 1381	04,3633	31'171 1	+1	CAE JPOLMOD	RESTORE PRIOR P27 MODE
0473	REF 7	LAST 1382	04,3634	0 5314 1		TC NEWMODEX +3	
0474	REF 260	LAST 1386	04,3635	3 4755 1		CAF ZFRO	

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0475	REF	11	LAST	1382	04,3636	54 332 1	TS	DNLSCTOD	
0476	REF	1			04,3637	0 3706 0	TC	UPACTOFF	TURN OFF 'UPLINK ACTIVITY' LIGHT
0477					04,3640	0 0006 1	EXTEND		KILL GROUP 6.
0478	REF	30	LAST	1307	04,3641	3 4755 1	DCA	NEGO	
0479	REF	6	LAST	1385	04,3642	52 765 1	DXCH	-PHASE6	
0480	REF	43	LAST	726	04,3643	0 5472 0	TC	FNDEXT	EXTENDED VERB EXIT
R0481 VERB 70 BRANCH									
0482					04,3644	0 0006 1	UPEND70	EXTEND	V70 DOES THE FOLLOWING WITH DP DELTA
0483	REF	20	LAST	1387	04,3645	4 1175 1	DCS	JPBUFF	TIME IN UPBUFF
0484	REF	21	LAST	1388	04,3646	53'205 0	DXCH	UPBUFF +8D	
0485	REF	2	LAST	1385	04,3647	0 3510 0	TC	TIMEDIDL	DECREMENT AGC CLOCK
0486	REF	4	LAST	1387	04,3650	0 3701 1	TC	UPERROUT	ERROR WHILE DECREMENTING CLOCK -- EXIT
0487	REF	8	LAST	1387	F3,1706		EBANK=	TEPHEM	
0488					04,3651	0 0006 1	EXTEND		
0489	REF	22	LAST	1388	04,3652	4 1175 1	DCS	UPBUFF	COPY DECREMENTERS FOR
0490	REF	23	LAST	1388	04,3653	53'207 1	DXCH	UPBUFF +10D	RESTART PROTECTION
0491					04,3654	0 0006 1	EXTEND		
0492	REF	24	LAST	1388	04,3655	4 1175 1	DCS	UPBUFF	
0493	REF	25	LAST	1388	04,3656	53'211 0	DXCH	UPBUFF +12D	
0494	REF	120	LAST	1386	04,3657	0 5353 1	TC	PHASCHNG	RESTART PROTECT(GROUP 6)
0495					04,3660	04026 1	OCT	04026	
0496	REF	261	LAST	1387	04,3661	3 4755 1	CAF	ZERO	
0497					04,3662	22 007 0	ZL		
0498	REF	26	LAST	1388	04,3663	53'207 1	DXCH	UPBUFF +10D	DECREMENT CSM STATE VECTOR TIME
0499	REF	5	LAST	512	04,3664	21'571 1	DAS	TETCSM	
0500	REF	262	LAST	1388	04,3665	3 4755 1	CAF	ZERO	
0501					04,3666	22 007 0	ZL		
0502	REF	27	LAST	1388	04,3667	53'211 0	DXCH	UPBUFF +12D	DECREMENT LEM STATE VECTOR TIME
0503	REF	3	LAST	513	04,3670	21'643 0	DAS	TETLEM	
0504	REF	263	LAST	1388	04,3671	3 4755 1	CAF	ZERO	
0505					04,3672	22 007 0	ZL		
0506	REF	28	LAST	1388	04,3673	53'175 1	DXCH	UPBUFF	
0507	REF	9	LAST	1388	04,3674	21'710 1	DAS	TEPHEM +1	INCREMENT TP TEPHEM
0508	REF	10	LAST	1388	04,3675	27'706 0	ADS	TEPHEM	
0509	REF	121	LAST	1388	04,3676	0 5353 1	TC	PHASCHNG	RESTART PROTECT(GROUP 6)
0510					04,3677	04026 1	OCT	04026	
0511	REF	29	LAST	1388	1174		EBANK=	JPBUFF	

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0512 REF 6 LAST 1387 04,3700 0 3632 0

TC UPOUT

GO TO STANDARD UPDATE PROGRAM EXIT

R0513 ERROR SEQUENCE

0514 REF 9 LAST 1385 04,3701 0 4364 1 UPERROUT TC FALTCN
0515 REF 7 LAST 1389 04,3702 1 3632 1 TCE UPOUTTURN ON *OPERATOR ERROR* LIGHT
GO TO COMMON UPDATE PROGRAM EXIT0516 REF 10 LAST 1389 04,3703 0 4364 1 +2 TC FALTCN
0517 REF 2 LAST 1388 04,3704 0 3706 0 TC UPACTOFF
0518 REF 44 LAST 1388 04,3705 0 5472 0 TC ENDEXTTURN ON *OPERATOR ERROR* LIGHT
TURN OFF *UPLINK ACTIVITY* LIGHT
EXTENDED VERB EXIT
(THE PURPOSE OF UPERROUT +2 EXIT IS
TO PROVIDE AN ERROR EXIT WHICH DOES NOT
RESET ANY RESTART GROUPS)A0519
A0520
A0521
A0522

R0523 :UPACTOFF: IS A ROUTINE TO TURN OFF UPLINK ACTIVITY LIGHT ON ALL EXITS FROM UPDATE PROGRAM(P27).

0525 REE 42 LAST 1363 04,3706 4 4751 1 UPACTOFF CS BIT3
0527 04,3707 0 0006 1 EXTEND
0528 REE 36 LAST 1361 04,3710 03 011 1 WAND DSALMOUT
0530 REE 387 LAST 1384 04,3711 0 0002 0 TC QTURN OFF UPLINK ACTIVITY LIGHT
(BIT 3 OF CHANNEL 11)

L RTB OP CODES

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0001				22,3731		BANK	22
0002	REF	1		10,2000		SETLOC	RTBCODES
0003				10,3462		BANK	

0004	REF	12	LAST 1248	E5,1664		EBANK=	XNB
0005	REF	1				COUNT*	\$\$/RTB

R0006 LOAD TIME2, TIME1 INTO MPAC:

0007				10,3462	0 0006 1	LOADTIME	EXTEND
0008	REF	38	LAST 1386	10,3463	3 0025 0	DCA	TIME2
0009	REF	2	LAST 1014	10,3464	1 6054 1	TCF	SLOAD2

R0010 CONVERT THE SINGLE PRECISION 2'S COMPLEMENT NUMBER ARRIVING IN MPAC (SCALED IN HALF-REVOLUTIONS) TO A
 R0012 DP 1'S COMPLEMENT NUMBER SCALED IN REVOLUTIONS.

0016	REF	800	LAST 1387	10,3465	10 154 0	COULOGIC	CCS	MPAC
0017	REF	264	LAST 1388	10,3466	3 4755 1		CAF	ZERO
0018				10,3467	1 3472 1		TCF	+3
0019				10,3470	13 471 1		NOOP	
0020	REF	26	LAST 1097	10,3471	4 4736 0		CS	HALF
0021	REF	301	LAST 1390	10,3472	54 155 1		TS	MPAC +1
0022	REF	265	LAST 1390	10,3473	3 4755 1		CAF	ZERO
0023	REF	802	LAST 1390	10,3474	56 154 1		XCH	MPAC
0024				10,3475	0 0006 1		EXTEND	
0025	REF	27	LAST 1390	10,3476	7 4736 0		MP	HALF
0026	REF	803	LAST 1390	10,3477	20 155 1		DAS	MPAC
0027	REF	61	LAST 1276	10,3500	1 6060 0		TCF	DANZIG

MODE IS ALREADY AT DOUBLE-PRECISION

R0040 READ THE PIPS INTO MPAC WITHOUT CHANGING THEM:

0041				10,3501	0 0004 0	READPIPS	INHINT
0042	REF	14	LAST 1312	10,3502	3 0037 0	CA	PIPAX
0043	REF	304	LAST 1390	10,3503	54 154 0	TS	MPAC
0044	REF	6	LAST 1312	10,3504	3 0040 0	CA	PIPAY
0045	REF	905	LAST 1390	10,3505	54 157 0	TS	MPAC +3
0046	REF	8	LAST 1312	10,3506	3 0041 1	CA	PIPAZ
0047				10,3507	0 0003 1		RELINT
0048	REF	806	LAST 1390	10,3510	54 161 0	TS	MPAC +5
0049	REF	266	LAST 1390	10,3511	3 4755 1	CAF	ZERO
0050	REF	807	LAST 1390	10,3512	54 155 1	TS	MPAC +1
0051	REF	808	LAST 1390	10,3513	54 160 1	TS	MPAC +4
0052	REF	309	LAST 1390	10,3514	54 162 0	TS	MPAC +6

0053 REF 3 LAST 1072 10,3515 1 6520 1 VECMODE TCF VMODE
 R0054 FORCE TP SIGN AGREEMENT IN MPAC:

0055	REF	19	LAST 1386	10,3516	0 7256 1	SGNAGREE	TC	TFAGREE
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0056 REF 62 LAST 1390 10,3517 1 6060 0 TCF DANZIG

R0057 CONVERT THE DP 1'S COMPLEMENT ANGLE SCALED IN REVOLUTIONS TO A SINGLE PRECISION 2'S COMPLEMENT ANGLE
 R0059 SCALED IN HALF-REVOLUTIONS.

0060 REF 1 10,3520 0 3550 1 1ST02S TC 1T02SUB
 0061 REF 267 LAST 1390 10,3521 3 4755 1 CAF ZERO
 0062 REF 810 LAST 1390 10,3522 54 155 1 TS MPAC +1
 0063 REF 5 LAST 1042 10,3523 1 6057 1 TCF NEWMODE

R0064 00 1ST02S ON A VECTOR OF ANGLES:

0065 REF 2 LAST 1391 10,3524 0 3550 1 V1ST02S TC 1T02SUB ANSWER ARRIVES IN A AND MPAC.

0066 REF 811 LAST 1391 10,3525 52 162 0 DXCH MPAC +5
 0067 REF 812 LAST 1391 10,3526 52 155 1 DXCH MPAC
 0068 REF 3 LAST 1391 10,3527 0 3550 1 TC 1T02SUB
 0069 REF 813 LAST 1391 10,3530 54 156 1 TS MPAC +2

0070 REF 814 LAST 1391 10,3531 52 160 1 DXCH MPAC +3
 0071 REF 815 LAST 1391 10,3532 52 155 1 DXCH MPAC
 0072 REF 4 LAST 1391 10,3533 0 3550 1 TC 1T02SUB
 0073 REF 816 LAST 1391 10,3534 54 155 1 TS MPAC +1

0074 REF 817 LAST 1391 10,3535 3 0161 1 CA MPAC +5
 0075 REF 818 LAST 1391 10,3536 54 154 0 TS MPAC

0076 REF 150 LAST 1382 10,3537 3 4753 1 TPMODE CAF ONE MODE IS TP.
 0077 REF 6 LAST 1391 10,3540 1 6057 1 TCF NEWMODE

R0078 V1ST02S FOR 2 COMPONENT VECTOR. USED BY RR.

0079 REF 5 LAST 1391 10,3541 0 3550 1 2V1ST02S IC 1T02SUB
 0080 REF 819 LAST 1391 10,3542 52 160 1 DXCH MPAC +3
 0081 REF 820 LAST 1391 10,3543 52 155 1 DXCH MPAC
 0082 REF 6 LAST 1391 10,3544 0 3550 1 TC 1T02SUB
 0083 REF 259 LAST 1387 10,3545 54 001 1 TS L
 0084 REF 821 LAST 1391 10,3546 3 0157 1 CA MPAC +3
 0085 REF 3 LAST 1390 10,3547 1 6054 1 TCF SLOAD2

R0086 SUBROUTINE TO DO DOUBLING AND 1'S TO 2'S CONVERSION:

0087 REF 822 LAST 1391 10,3550 52 155 1 1T02SUB DXCH MPAC FINAL MPAC +1 UNSPECIFIED.
 0088 10,3551 20 001 1 DD0UB1
 0089 REF 474 LAST 1387 10,3552 10 000 0 CCS A
 0090 REF 151 LAST 1391 10,3553 6 4753 1 AD ONE
 0091 10,3554 1 3556 0 TCF +2
 0092 10,3555 4 0000 0 COM THIS WAS REVERSE OF MSU.

0093 REF 823 LAST 1391 10,3556 54 154 0 TS MPAC AND SKIP ON OVERFLOW.

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0094 REF 388 LAST 1389 10,3557 0 0002 0

TC Q

0095 REF 475 LAST 1391 10,3560 50 000 1

INDEX A

OVERFLOW UNCORRECT AND IN MSU.

0096 REF 5 LAST 1097 10,3561 3 4734 0

CAF LIMITS

0097 REF 824 LAST 1391 10,3562 26 154 0

ADS MPAC

0098 REF 389 LAST 1392 10,3563 0 0002 0

TC Q

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P0099 SUBROUTINE TO INCREMENT COUS

0102	REF	1		10,3564	3 3577 1	INCR COUS	CAF	LOCTHFTA
0103	REF	148	LAST 1259	10,3565	54 130 1		TS	BUF
0104	REF	825	LAST 1392	10,3566	30 154 1		CAF	MPAC
0105	REF	1		10,3567	0 3600 1		TC	COUINC

PLACE ADRES(THETA) IN BUF.
INCREMENT IN IS COMPL.

0106	REF	149	LAST 1393	10,3570	24 130 0		INCR	BUF
0107	REF	826	LAST 1393	10,3571	30 157 1		CAF	MPAC +3
0108	REF	2	LAST 1393	10,3572	0 3600 1		TC	COUINC

0109	REF	150	LAST 1393	10,3573	24 130 0		INCR	BUF
0110	REF	827	LAST 1393	10,3574	30 161 1		CAF	MPAC +5
0111	REF	3	LAST 1393	10,3575	0 3600 1		TC	COUINC

0112	REF	1		10,3576	1 3515 1		TCF	VECMODE
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0113	REF	23	LAST 1307	10,3577	00321 1	LOCTHETA ADRES	THETA0
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R0114 THE FOLLOWING ROUTINE INCREMENTS IN 2S COMPLEMENT THE REGISTER WHOSE ADDRESS IS IN BUF BY THE IS COMPL.
R0116 QUANTITY FCUNO IN TEM2. THIS MAY BE USED TO INCREMENT DESIRED IMU AND OPTICS COU ANGLES OR ANY OTHER 2S COMPL.
R0118 (+C UNEQUAL TO -0) QUANTITY. MAY BE CALLED BY BANKCALL/SWCALL.

0119	REF	28	LAST 1255	10,3600	54 142 1	COUINC	TS	TEM2	1S COMPL.QUANT. ARRIVES IN ACC. STORE IT
0120	REF	151	LAST 1393	10,3601	50 130 0		INDEX	BUF	
0121				10,3602	10 000 0		CCS	0	CHANGE 2S COMPL. ANGLE(IN BUF) INTO 1S
0122	REF	152	LAST 1391	10,3603	6 4753 1		AD	ONE	
0123				10,3604	1 3610 1		TCF	+4	
0124	REF	153	LAST 1393	10,3605	6 4753 1		AD	ONE	
0125	REF	154	LAST 1393	10,3606	6 4753 1		AD	ONE	OVERFLOW HERE IF 2S COMPL. IS 180 DEG.
0126				10,3607	4 0000 0		COM		

0127	REF	29	LAST 1393	10,3610	6 0142 0		AD	TEM2	SULT MOVES FROM 2ND TO 3D QUAD.(OR BACK)
0129	REF	476	LAST 1392	10,3611	10 000 0		CCS	A	BACK TO 2S COMPL.

0130	REF	155	LAST 1393	10,3612	6 4753 1		AD	ONE	
0131				10,3613	1 3615 1		TCF	+2	
0132				10,3614	4 0000 0		COM		
0133	REF	30	LAST 1393	10,3615	54 142 1		TS	TEM2	STORE 14BIT QUANTITY WITH PRESENT SIGN
0134				10,3616	1 3622 0		TCF	+4	
0135	REF	477	LAST 1393	10,3617	50 000 1		INDEX	A	SIGN.
0137	REF	6	LAST 1392	10,3620	3 4734 0		CAF	LIMITS	FIX IT, BY ADDING IN 37777 OR 40000
0138	REF	31	LAST 1393	10,3621	6 0142 0		AD	TEM2	

0139	REF	152	LAST 1393	10,3622	50 130 0		INDEX	BUF	
0140				10,3623	54 000 0		TS	0	STORE NEW ANGLE IN 2S COMPLEMENT.
0141	REF	390	LAST 1392	10,3624	0 0002 0		TC	Q	

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P0142

RTB TO TORQUE GYRDS, EXCEPT FOR THE CALL TO IMUSTALL. ECADR OF COMMANDS ARRIVES IN X1.

0144	REF 57	LAST 1215	10,3625	50 120 1	PULSEIMU INDEX	FIXLOC	ADDRESS OF GYRD COMMANDS SHOULD BE IN X1
0145	REF 64	LAST 1265	10,3626	3 0046 0	CA	X1	
0146	REF 307	LAST 1383	10,3627	0 4616 1	TC	BANKCALL	
0147	REF 7	LAST 966	10,3630	17276 1	CADR	IMUPULSE	
0148	REF 63	LAST 1391	10,3631	1 6060 0	TCF	DANZIG	

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R0149 EACH ROUTINE TAKES A 3X3 MATRIX STORED IN DOUBLE PRECISION IN A FIXED AREA OF ERASABLE MEMORY AND REPLACES IT
 R0151 WITH THE TRANSPDSE MATRIX. TRANSP1 USES LOCATIONS XNB+0,+1 THROUGH XNB+16D, 17D AND TRANSP2 USES LOCATIONS
 R0153 XNB1+0,+1 THROUGH XNB1+16D, 17D. EACH MATRIX IS STORED BY ROWS.

0154 REF 13 LAST 1390 10,3632 02664 1 XNBEB ECADR XNB
 0155 REF 1 10,3633 03467 1 XNB1EB ECADR XNB1

0156 REF 14 LAST 1395 E5,1664 EBANK= XNB

0164 REF 1 10,3634 3 3632 0 TRANSP1 CAF XNBEB
 0165 REF 67 LAST 1387 10,3635 54 003 0 TS EBANK
 0166 REF 15 LAST 1395 10,3636 53'667 0 DXCH XNB +2
 0167 REF 16 LAST 1395 10,3637 53'673 0 DXCH XNB +6
 0168 REF 17 LAST 1395 10,3640 53'667 0 DXCH XNB +2

0169 REF 18 LAST 1395 10,3641 53'671 1 DXCH XNB +4
 0170 REF 19 LAST 1395 10,3642 53'701 1 DXCH XNB +12D
 0171 REF 20 LAST 1395 10,3643 53'671 1 DXCH XNB +4

0172 REF 21 LAST 1395 10,3644 53'677 1 DXCH XNB +10D
 0173 REF 22 LAST 1395 10,3645 53'703 0 DXCH XNB +14D
 0174 REF 23 LAST 1395 10,3646 53'677 1 DXCH XNB +10D
 0175 REF 64 LAST 1394 10,3647 1 6060 0 TCF DANZIG

0176 REF 2 LAST 1395 E7,1467 EBANK= XNB1

0177 REF 1 10,3650 3 3633 1 TRANSP2 CAF XNB1FB
 0178 REF 68 LAST 1395 10,3651 54 003 0 TS EBANK
 0180 REF 3 LAST 1395 10,3652 53'472 0 DXCH XNB1 +2
 0181 REF 4 LAST 1395 10,3653 53'476 1 DXCH XNB1 +6
 0182 REF 5 LAST 1395 10,3654 53'472 0 DXCH XNB1 +2

0183 REF 6 LAST 1395 10,3655 53'474 0 DXCH XNB1 +4
 0184 REF 7 LAST 1395 10,3656 53'504 0 DXCH XNB1 +12D
 0185 REF 8 LAST 1395 10,3657 53'474 0 DXCH XNB1 +4

0186 REF 9 LAST 1395 10,3660 53'502 0 DXCH XNB1 +10D
 0187 REF 10 LAST 1395 10,3661 53'506 1 DXCH XNB1 +14D
 0188 REF 11 LAST 1395 10,3662 53'502 0 DXCH XNB1 +10D
 0191 REF 65 LAST 1395 10,3663 1 6060 0 TCF DANZIG

L RT8 OP CODES

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R0192 THE SUBROUTINE SIGNMPAC SETS C(MPAC, MPAC +1) TO SIGN(MPAC).
 R0193 FOR THIS, ONLY THE CONTENTS OF MPAC ARE EXAMINED. ALSO +0 YIELDS POSMAX AND -0 YIELDS NEGMAX.

R0195 ENTRY MAY BE BY EITHER OF THE FOLLOWING:

R0196 1. LIMIT THE SIZE OF MPAC ON INTERPRETIVE OVERFLOW:
 R0197 ENTRY: BOVB
 R0198 SIGNMPAC

R0199 2. GENERATE IN MPAC THE SIGNUM FUNCTION OF MPAC:
 R0200 ENTRY: RTB
 R0201 SIGNMPAC

R0202 IN EITHER CASE, RETURN IS TO THE NEXT INTERPRETIVE INSTRUCTION IN THE CALLING SEQUENCE.

0204				10,3664	0 0006	1	SIGNMPAC	EXTEND		
0205	REE	2	LAST 454	10,3665	3 4733	1	DCA	DPOSMAX		
0206	REF	328	LAST 1393	10,3666	52 155	1	DXCH	MPAC		
0207	REE	478	LAST 1393	10,3667	10 000	0	CCS	A		
0208	REF	268	LAST 1391	10,3670	3 4755	1	OPMODE	CAF	ZERO	SETS MPAC +2 TO ZERO IN THE PROCESS
0209	REF	4	LAST 1391	10,3671	1 6056	0	TCF	SLOAD2	+2	
0210				10,3672	1 3673	1	TCF	+1		
0211				10,3673	0 0006	1		EXTEND		
0212	REF	3	LAST 1396	10,3674	4 4733	0	DCS	OPOSMAX		
0213	REF	5	LAST 1396	10,3675	1 6054	1	TCF	SLOAD2		

R0214 RTB OP CODE NORMUNIT IS LIKE INTERPRETIVE INSTRUCTION UNIT, EXCEPT THAT IT CAN BE DEPENDED ON NOT TO BLOW
 R0216 UP WHEN THE VECTOR BEING UNITIZED IS VERY SMALL -- IT WILL BLOW UP WHEN ALL COMPONENTS ARE ZERO. IF NORMUNIT
 R0218 IS USED AND THE UPPER ORDER HALVES OF ALL COMPONENTS ARE ZERO, THE MAGNITUDE RETURNED IN 360 WILL BE TOO LARGE
 R0220 BY A FACTOR OF 2(13) AND THE SQUARED MAGNITUDE RETURNED AT 340 WILL BE TOO BIG BY A FACTOR OF 2(26).

0222	REF	156	LAST 1393	10,3676	3 4753	1	NORMUNX1	CAF	ONE	
02221	REF	11	LAST 911	10,3677	1 3701	0	TCF	NORMUNIT	+1	
02222	REF	269	LAST 1396	10,3700	3 4755	1	NORMUNIT	CAF	ZERO	
02223	REF	58	LAST 1394	10,3701	6 0120	1	AO	FIXLCC		
02224	REF	829	LAST 1396	10,3702	54 156	1	TS	MPAC	+2	
02225	REF	308	LAST 1394	10,3703	0 4616	1	TC	BANKCALL		GET SIGN AGREEMENT IN ALL COMPONENTS
0223	REF	3	LAST 1065	10,3704	01010	1	CAOR	VEGAPPEE		
0224	REF	830	LAST 1396	10,3705	10 154	0	CCS	MPAC		
0225	REE	1		10,3706	1 3742	1	TCF	NOSHIFT		
0226				10,3707	1 3711	1	TCF	+2		
0227	REF	2	LAST 1396	10,3710	1 3742	1	TCF	NOSHIFT		
0228	REF	831	LAST 1396	10,3711	10 157	0	CCS	MPAC	+3	
0229	REF	3	LAST 1396	10,3712	1 3742	1	TCF	NOSHIFT		
0230				10,3713	1 3715	0	TCF	+2		
0231	REF	4	LAST 1396	10,3714	1 3742	1	TCF	NOSHIFT		
0232	REF	832	LAST 1396	10,3715	10 161	0	CCS	MPAC	+5	
0233	REF	5	LAST 1396	10,3716	1 3742	1	TCF	NOSHIFT		
0234				10,3717	1 3721	1	TCF	+2		
0235	REF	6	LAST 1396	10,3720	1 3742	1	TCF	NOSHIFT		

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0236	REF 833	LAST 1396	10,3721	3 0155 0	CA	MPAC +1	SHIFT ALL COMPONENTS LEFT 13
0237			10,3722	0 0006 1	EXTEND		
0238	REF 86	LAST 1364	10,3723	7 4736 0	MP	BIT14	
0239	REF 834	LAST 1397	10,3724	20 155 1	DAS	MPAC	DAS GAINS A LITTLE ACCURACY
0240	REF 835	LAST 1397	10,3725	3 0160 0	CA	MPAC +4	
0241			10,3726	0 0006 1	EXTEND		
02411	REF 87	LAST 1397	10,3727	7 4736 0	MP	BIT14	
02412	REF 836	LAST 1397	10,3730	20 160 1	DAS	MPAC +3	
02413	REF 837	LAST 1397	10,3731	3 0162 1	CA	MPAC +6	
02414			10,3732	0 0006 1	EXTEND		
02415	REF 88	LAST 1397	10,3733	7 4736 0	MP	BIT14	
02416	REF 838	LAST 1397	10,3734	20 162 0	DAS	MPAC +5	
02417	REF 2	LAST 1065	10,3735	3 4761 0	CAF	THIRTEEN	
02418	REF 839	LAST 1397	10,3736	50 156 0	INDEX	MPAC +2	
02419			10,3737	54 045 1	TS	37D	
0242	REF 56	LAST 1382	10,3740	0 4635 0	OFFTUNIT TC	POSTJUMP	
0243	REF 3	LAST 1008	10,3741	01024 0	CADR	UNIT +1	SKIP THE "TC VECAGREE" DONE AT UNIT

02431	REF 270	LAST 1396	10,3742	3 4755 1	NOSHIFT CAF	ZERO
02432	REF 1		10,3743	1 3736 1	ICF	OFFTUNIT -2

R0300 RTB VECSGNAG ...FORCES SIGN AGREEMENT OF VECTOR IN MPAC.

0301	REF 309	LAST 1396	10,3744	0 4616 1	VECSGNAG TC	BANKCALL
0302	REF 4	LAST 1396	10,3745	01010 1	CADR	VECAGREE
0303	REF 66	LAST 1395	10,3746	0 6060 1	TC	CANZIG

*** END OF SKIPPER .070 ***

L T6-RUPT PROGRAMS

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R0001 PROGRAM NAMES: (1) T6JOBCHK MOD. NO. 5 OCTOBER 2, 1967
 R0002 (2) DOT6RUPT

R0003 MODIFICATION BY: LOWELL G HULL (A.C.ELECTRONICS)
 R0004 THESE PROGRAMS ENABLE THE LM DAP TO CONTROL THE THRUST TIMES OF THE REACTION CONTROL SYSTEM JETS BY USING TIME6.
 R0006 SINCE THE LM DAP MAINTAINS EXCLUSIVE CONTROL OVER TIME6 AND ITS INTERRUPTS, THE FOLLOWING CONVENTIONS HAVE BEEN
 R0008 ESTABLISHED AND MUST NOT BE TAMPERED WITH:

R0009 1. NO NUMBER IS EVER PLACED INTO TIME6 EXCEPT BY LM DAP.

R0010 2. NO PROGRAM OTHER THAN LM DAP ENABLES THE TIME6 COUNTER.

R0011 3. TO USE TIME6, THE FOLLOWING SEQUENCE IS ALWAYS EMPLOYED:

R0012 A. A POSITIVE (NON-ZERO) NUMBER IS STORED IN TIME6.

R0013 B. THE TIME6 CLOCK IS ENABLED.

R0014 C. TIME6 IS INTERROGATED AND IS:

R0015 I. NEVER FOUND NEGATIVE (NON-ZERO) OR +0.

R0016 II. SOMETIMES FOUND POSITIVE (BETWEEN 1 AND 2400) INDICATING THAT IT IS ACTIVE.

R0018 III. SOMETIMES FOUND POSMAX INDICATING THAT IT IS INACTIVE AND NOT ENABLED.

R0020 IV. SOMETIMES FOUND NEGATIVE ZERO INDICATING THAT:

R0021 A. A T6RUPT IS ABOUT TO OCCUR AT THE NEXT DINC, OR

R0023 B. A T6RUPT IS WAITING IN THE PRIORITY CHAIN, OR

R0025 C. A T6RUPT IS IN PROCESS NOW.

R0026 4) ALL PROGRAMS WHICH OPERATE IN EITHER INTERRUPT MODE OR WITH INTERRUPT INHIBITED MUST CALL T6JOBCHK
 R0028 EVERY 5 MILLISECONDS TO PROCESS A POSSIBLE WAITING T6RUPT BEFORE IT CAN BE HONORED BY THE HARDWARE.

R0030 (5. PROGRAM JTLST, IN Q,R-AXES, HANDLES THE INPUT LIST.)

R0031 T6JOBCHK CALLING SEQUENCE:

A0032 L TC T6JOBCHK

A0033 L +1 (RETURN)

R0034 DOT6RUPT CALLING SEQUENCE:

A0035 DXCH ARUPT

A0036 EXTEND

A0037 DCA T6ADR

A0038 DTCB

T6RUPT LEAD IN AT LOCATION 4004.

R0039 SUBROUTINES CALLED: DOT6RUPT CALLS T6JOBCHK.

R0040 NORMAL EXIT MODES: T6JOBCHK RETURNS TO L +1.

R0041 DOT6RUPT TRANSFERS CONTROL TO RESUME.

R0042 ALARM/ABORT MODES: NONE.

R0043 INPUT: TIME6 NXT6ADR OUTPUT: TIME6 NXT6ADR CHANNEL 5

R0044 T6NEXT T6NEXT +1 T6NEXT T6NEXT +1 CHANNEL 6

R0045 T6EURTHA T6EURTHA +1 T6EURTHA T6EURTHA +1 BIT15/CH13

R0046 DEBRIS: T6JOBCHK CLOBBERS A. DOT6RUPT CLOBBERS NOTHING.

L T6-RUPT PROGRAMS

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0055				17,2000			BANK 17		
0056	REF	1		17,2000			SETLOC DAPS2		
0057				17,2000			BANK		
0058	REF	2	LAST 234	F6,1464			EBANK= T6NEXT		
0059	REF	1					COUNT* \$\$/DAPT6		
0060	REF	1		17,2000	10 031 1	T6JOBCHK	CCS TIME6		CHECK TIME6 FOR WAITING T6RUPT:
0061	REF	391	LAST 1393	17,2001	0 0002 0		TC Q		NONE: CLOCK COUNTING DOWN.
0062	REF	20	LAST 1110	17,2002	0 5677 1		TC CASHOLE		
0063	REF	1		17,2003	0 2003 0		TC T6JOBCHK +3		
R0064	CONTROL		PASSES TO T6JOB ONLY	WHEN C(TIME6) = -0	(I.E. WHEN A T6RUPT MUST BE PROCESSED).				
0066	REF	31	LAST 1375	17,2004	3 4733 1	T6JOB	CAF POSMAX		DISABLE CLOCK: NEEDED SINCE RUPT OCCURS
0067				17,2005	0 0006 1		EXTEND		1 DINC AFTER T6 = 77777. FOR 625 MUSECS
0068	REF	21	LAST 1330	17,2006	03 013 0		WAND CHAN13		MUST NOT HAVE T6 = +0 WITH FNABLE SFT
0069	REF	32	LAST 1399	17,2007	3 4733 1		CA POSMAX		
0070				17,2010	22 007 0		ZL		
0071	REF	1		17,2011	53'467 1		DXCH T6FURTHA		
0072	REF	3	LAST 1399	17,2012	53'465 0		DXCH T6NEXT		
0073	REF	2	LAST 234	17,2013	23'463 1		LXCH NXT6ADR		
0074	REF	2	LAST 1399	17,2014	54 031 1		TS TIME6		
0075	REF	7	LAST 1363	17,2015	6 7724 1		AD PRIO37		
0076	REF	479	LAST 1396	17,2016	54 000 0		TS A		
0077	REF	1		17,2017	1 2023 0		TCF ENABLET6		
0078	REF	33	LAST 1399	17,2020	3 4733 1		CA POSMAX		
0079	REF	3	LAST 1399	17,2021	54 031 1		TS TIME6		
0080	REF	1		17,2022	1 2034 0		TCF GOCH56		
0081	REF	51	LAST 1376	17,2023	3 4735 1	ENABLET6	CA BIT15		
0082				17,2024	0 0006 1		EXTEND		
0083	REF	22	LAST 1399	17,2025	05 013 0		WOR CHAN13		
0084	REF	4	LAST 1399	17,2026	3 1464 0		CA T6NEXT		
0085	REF	8	LAST 1399	17,2027	6 7724 1		AD PRIO37		
0086	REF	480	LAST 1399	17,2030	54 000 0		TS A		
0087	REF	2	LAST 1399	17,2031	1 2034 0		TCF GOCH56		
0088	REF	34	LAST 1399	17,2032	3 4733 1		CA POSMAX		
0089	REF	5	LAST 1399	17,2033	55'464 1		TS T6NEXT		
0090	REF	260	LAST 1391	17,2034	50 001 0	GOCH56	INDEX L		
0091	REF	1		17,2035	1 5744 1		TCF WRITFP -1		
0092				5744			BLOCK 02		
0093	REF	1		4000			SETLOC FFTAG9		
0094				5744			BANK		
0095	REF	14	LAST 913	E6,1633			EBANK= CDUXD		
0096	REF	1					COUNT* \$\$/DAPT6		
0097	REF	4	LAST 234	5744	3 1470 0		CA NEXTP		
0098				5745	0 0006 1	WRITEP	EXTEND		
0099	REF	2	LAST 227	5746	01 006 0		WRITE CHAN6		

L T6-RUPT PROGRAMS

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0100	REF 392	LAST 1399	5747	0 0002 0		TC	Q
0101	REF 1		5750	3 1471 1		CA	NEXTU
0102	REF 261	LAST 1399	5751	54 001 1	WRITEU	TS	L
0103	REF 1		5752	4 5765 1		CS	00314OCT
0104			5753	0 0006 1		EXTEND	
0105	REF 3	LAST 1021	5754	02 005 0		RAND	CHAN5
0106	REF 262	LAST 1400	5755	6 0001 0		AD	L
0107			5756	0 0006 1		EXTEND	
0108	REF 4	LAST 1400	5757	01 005 0		WRITE	CHAN5
0109	REF 393	LAST 1400	5760	0 0002 0		TC	Q

0110	REF 1		5761	3 1472 1		CA	NEXTV
0111	REF 263	LAST 1400	5762	54 001 1	WRITEV	TS	L
0112	REF 2	LAST 1400	5763	3 5765 0		CA	00314OCT
0113			5764	1 5753 1		TCF	-90
0114			5765	00314 1	00314OCT	OCT	00314

0115			17,2036			BANK	17
0116	REF 2	LAST 1399	17,2000			SETLOC	DAPS2
0117			17,2036			BANK	

0118	REF 6	LAST 1399	E6,1464			EBANK=	T6NEXT
0119	REF 2	LAST 1399 TO 1399:	30	30*		COUNT*	31/DAPT6

0120	REF 11	LAST 1333	17,2036	22 016 0	DOT6RUPT	LXCH	BANKRUPT	(INTERRUPT LEAD INS CONTINUED)
0121			17,2037	0 0006 1		EXTEND		
0122	REF 10	LAST 1333	17,2040	22 012 1		QXCH	QRUP T	

0123	REF 2	LAST 1399	17,2041	0 2000 0		TC	T6JOBCHK	CALL T6JOBCHK.
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0124	REF 25	LAST 1333	17,2042	1 5270 0		TCF	RESUME	END TIME6 INTERRUPT PROCESSOR.
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L DAP INTERFACE SUBROUTINES

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0001				20,2123	BANK 20
0002	REF	3	LAST	5B 20,2000	SETLOC DAPS3
0003				20,2123	BANK
0004	REF	15	LAST	1399 E6,1633	EBANK= CDUXD
0005	REF	1			COUNT* \$\$/DAPIF

R0006 MCD 0 DATE 11/15/66 BY GEORGE W. CHERRY

R0007 MOD 1 1/23/67 MODIFICATION BY PETER ADLER

R0008 FUNCTIONAL DESCRIPTION

R0009 HEREIN ARE A COLLECTION OF SUBROUTINES WHICH ALLOW MISSION CONTROL PROGRAMS TO CONTROL THE MODE
R0011 AND INTERFACE WITH THE DAP.

R0012 CALLING SEQUENCES

R0013	IN INTERRUPT OR WITH INTERRUPT INHIBITED
R0014	TC IBNKCALL
R0015	FCADR ROUTINE

R0016	IN A JOB WITHOUT INTERRUPT INHIBITED
R0017	INHINT
R0018	TC IBNKCALL
R0019	FCADR ROUTINE
R0020	RELINT

R0021 OUTPUT

R0022 SEE INDIVIDUAL ROUTINES BELOW

R0023 DEBRIS

R0024 A,L, AND SOMETIMES MDUETEMP

ODE NOT IN PULSES MODE

L DAP INTERFACE SUBROUTINES

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R0087 SUBROUTINE NAMES:
 R0088 SETMAXDB, SETMINDB, RESTORDB, PFLITEDB

R0089 MODIFIED: 30 JANUARY 1968 BY P S WEISSMAN TO CREATE RESTORDB.

R0090 MODIFIED: 1 MARCH 1968 BY P S WEISSMAN TO SAVE EBANK AND CREATE PFLITEDB

R0091 FUNCTIONAL DESCRIPTION:

R0092 SETMAXDB - SET DEADBAND TO 5.0 DEGREES

R0093 SETMINDB - SET DEADBAND TO 0.3 DEGREE

R0094 RESTORDB - SET DEADBAND TO MAX OR MIN ACCORDING TO SETTING OF DBSELECT BIT OF DAPBOOLS

R0096 PFLITEDB - SET DEADBAND TO 1.0 DEGREE AND ZERO THE COMMANDED ATTITUDE CHANGE AND COMMANDED RATE

R0098 ALL ENTRIES SET UP A NOVAC JOB TO DO 1/ACCS SO THAT THE TJETLAW SWITCH CURVES ARE POSITIONED TO

R0100 REFLECT THE NEW DEADBAND. IT SHOULD BE NOTED THAT THE DEADBAND REFERS TO THE ATTITUDE IN THE P-,U-,AND V-AXES.

R0102 SUBROUTINE CALLED: NOVAC

R0103 CALLING SEQUENCE: SAME AS ABOVE

A0104 DR TC RESTORDB +1 FROM ALLCDBST

R0105 DEBRIS: A, L, Q, RUPTREG1, (ITEMS IN NOVAC)

0106 REF 35 LAST 909 20,2123 30 111 0 RESTORDB CAE DAPBOOLS DETERMINE CREW-SELECTED DEADBAND.

0107 REF 1 20,2124 7 4750 0 MASK DBSELECT

0108 20,2125 0 0006 1 EXTEND

0109 REF 6 LAST 854 20,2126 1 2140 1 BZF SETMINDB

0110 REF 1 20,2127 3 2151 0 SETMAXDB CAF WIDEDB SET 5 DEGREE DEADBAND.

0111 REF 2 LAST 227 20,2130 55 346 0 +1 TS DB

0112 20,2131 0 0006 1 EXTEND SET UP JOB TO RE-POSITION SWITCH CURVES.

0113 REF 56 LAST 1371 20,2132 22 070 0 QXCH RUPTREG1

0114 REF 4 LAST 751 20,2133 3 7714 1 CALLACCS CAF PRIC27

0115 REF 31 LAST 1365 20,2134 0 5072 1 TC NOVAC

0116 REF 7 LAST 237 F6,1537 EBANK= AOSQ

0117 REF 2 LAST 207 20,2135 02454 0 2CADR 1/ACCSJOB

0117 20,2136 40106 1

0118 REF 57 LAST 1402 20,2137 0 0070 0 TC RUPTREG1 RETURN TO CALLER.

0119 REF 1 20,2140 3 2150 1 SETMINDB CAF NARROWDB SET 0.3 DEGREE DEADBAND.

0120 REF 2 LAST 795 20,2141 1 2130 0 TCF SETMAXDB +1

0121 20,2142 0 0006 1 PFLITEDB EXTEND THE RETURN FROM CALLACCS IS TO RUPTREG1.

0122 REF 58 LAST 1402 20,2143 22 070 0 QXCH RUPTREG1

0123 REF 9 LAST 854 20,2144 0 2153 1 TC ZATTEROR

0124 REF 1 20,2145 3 2152 0 CAF POWERDB

0125 REF 3 LAST 1402 20,2146 55 346 0 TS DB

0126 REF 1 20,2147 1 2133 0 TCF CALLACCS

01261 20,2150 00155 0 NARROWDB DCTAL 00155

SET UP 1/ACCS AND RETURN TO CALLER.
0.3 DEGREE SCALED AT 45.

L DAP INTERFACE SUBROUTINES

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01262		20,2151	03434	1	WIDEDB	OCTAL	03434	5.0 DEGRFES SCALED AT 45.
0127		20,2152	00554	0	POWERDB	DEC	.02222	1.0 DEGREE SCALED AT 45.

0128	REF	5	LAST	902	20,2153	3 5015	0	ZATFROR	CAF	EBANK6	
0129	REF	69	LAST	1395	20,2154	56 003	1		XCH	EBANK	
0130	REF	264	LAST	1400	20,2155	54 001	1		TS	L	SAVE CALLERS EBANK IN L.
0131	REF	21	LAST	1307	20,2156	30 032	0		CAE	CDUX	
0132	REF	16	LAST	1401	20,2157	55'633	1		TS	CDUXD	
0133	REF	10	LAST	1303	20,2160	30 033	1		CAE	CDUY	
0134	REF	3	LAST	910	20,2161	55'634	0		TS	CDUYD	
0135	REF	13	LAST	1303	20,2162	30 034	0		CAE	CDUZ	
0136	REF	4	LAST	910	20,2163	55'635	1		TS	CDUZD	
0137	REF	8	LAST	923	20,2164	1 2170	1		TCF	STOPRATE +3	

0138	REF	6	LAST	1403	20,2165	3 5015	0	STOPRATE	CAF	FBANK6	
0139	REF	70	LAST	1403	20,2166	56 003	1		XCH	EBANK	
0140	REF	265	LAST	1403	20,2167	54 001	1		TS	L	SAVE CALLERS FBANK IN L.
0141	REF	271	LAST	1397	20,2170	3 4755	1	+3	CAF	ZERO	
0142	REF	11	LAST	917	20,2171	55'641	1		TS	OMEGAPD	
0143	REF	6	LAST	916	20,2172	55'642	1		TS	OMEGAQD	
0144	REF	6	LAST	916	20,2173	55'643	0		TS	OMEGARD	
0145	REF	5	LAST	917	20,2174	55'636	1		TS	DELC DUX	
0146	REF	2	LAST	151	20,2175	55'637	0		TS	DELC DUY	
0147	REF	2	LAST	151	20,2176	55'640	0		TS	DELC DUZ	
0148	REF	4	LAST	917	20,2177	55'277	0		TS	DELPFROR	
0149	REF	2	LAST	382	20,2200	55'300	1		TS	DELREROR	
0150	REF	2	LAST	382	20,2201	55'301	0		TS	DELREROR	
0151	REF	71	LAST	1403	20,2202	22 003	1		LXCH	EBANK	RESTORE CALLERS EBANK.
0152	REF	394	LAST	1400	20,2203	0 0002	0		TC	Q	

R0153 SUBROUTINE NAME: ALLCOAST

R0154 WILL BE CALLED BY FRESH STARTS AND ENGINE OFF ROUTINES.

R0156 CALLING SEQUENCE: (SAME AS ABOVE)

R0157 EXIT: RETURN TO Q.

R0158 SUBROUTINES CALLED: STOPRATE, RESTORDB, NOVAC

R0159 ZERO: (FOR ALL AXES) ADS, ALPHA, ADSTERM, OMEGAD, DELCDU, DELFROR

R0160 OUTPUT: DRIFTBIT/DAPBOOLS, DB, JOB TO DO 1/ACCS

R0161 DEFRIS: A, L, Q, RUPTREG1, RUPTREG2, (ITEMPS IN NOVAC)

0162		20,2204	0 0006	1	ALLCOAST	EXTEND		SAVE Q FOR RETURN
0163	REF	22	LAST	1324	20,2205	22 071	1	QXCH RUPTREG2

L DAP INTERFACE SUBROUTINES

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0164	REF	9	LAST	1403	20,2206	0 2165 1	TC	STOPRATF	CLEAR RATE INTERFACE. RETURN WITH A=0
0165	REF	72	LAST	1403	20,2207	22 003 1	LXCH	EBANK	AND L=EBANK6. SAVF CALLERS FBANK.
0166	REF	8	LAST	1402	20,2210	55'537 0	TS	ACSC	
0167	REF	9	LAST	1404	20,2211	55'540 0	TS	ACSC +1	
0168	REF	1			20,2212	55'541 1	TS	ACSR	
0169	REF	2	LAST	1404	20,2213	55'542 1	TS	ACSR +1	
0170	REF	2	LAST	210	20,2214	55'422 0	TS	ALPHAQ	FOR DOWNLIST.
0171	REF	1			20,2215	55'423 1	TS	ALPHAQ	
0172	REF	2	LAST	148	20,2216	55'545 0	TS	ADSQTERM	
0173	REF	1			20,2217	55'546 0	TS	ADSPTERM	
0174	REF	73	LAST	1404	20,2220	22 003 1	LXCH	EBANK	RESTORE EBANK (EBANK6 NO LONGER NEEDED)
0175	RFF	36	LAST	1402	20,2221	4 0111 1	CS	DAPBCOLS	SET UP DRIFTBIT
0176	REF	3	LAST	747	20,2222	7 4744 0	MASK	DRIFTBIT	
0177	REF	37	LAST	1404	20,2223	26 111 1	ADS	DAPBCOLS	
0178	REF	8	LAST	855	20,2224	0 2124 1	TC	RESTORDB +1	RESTORE DFADRBANK TO CRFW-SELECTED VALUE.
0179	REF	23	LAST	1403	20,2225	0 0071 1	TC	RUPTREG2	RETURN.

L OAPIDLER PROGRAM

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R0001 THE CAPIDLER PROGRAM IS STARTED BY FRESH START AND RESTART. THE DAPIDLER PROGRAM IS DONE 10 TIMES
 R0003 PER SECOND UNTIL THE ASTRONAUT DESIRES THE DAP TO WAKE UP, AND THE IMU AND CDUS ARE READY FOR USE BY THE DAP.
 R0005 THE NECESSARY INITIALIZATION OF THE DAP IS DONE BY THE DAPIDLER PROGRAM.

0006				16,2000		BANK 16	
0007	REF	1		16,2000		SETLOC DAPS1	
0008				16,2000		BANK	
0009	REF	10	LAST 1404	E6,1537		EBANK= AOSQ	
0010	REF	1				COUNT* \$\$/DAPID	
0011				16,2000	0 0006 1	CHEKBITS EXTEND	
0012	REF	7	LAST 910	16,2001	00 031 0	READ CHAN31	IF BOTH BIT13 AND BIT14 ARE ONE, THEN
0013				16,2002	4 0000 0	COM	THE MODE SELECT SWITCH IS IN THE OFF
0014	REF	6	LAST 509	16,2003	7 4355 1	MASK BIT13-14	POSITION, AND SO THE DAP SHOULD BE OFF,
0015				16,2004	0 0006 1	EXTEND	WITH NO ATTITUDE ERROR DISPLAY.
0016	REF	1		16,2005	1 2154 1	BZF MORE IDLE	
0017	REF	51	LAST 1311	16,2006	4 1303 1	CS IMODES33	
0018	REF	59	LAST 1384	16,2007	7 4746 1	MASK BIT6	
0019	REF	481	LAST 1399	16,2010	10 000 0	CCS A	
0020	REF	1		16,2011	1 2203 0	TCF JUMPDSP	
0021	REF	4	LAST 234	16,2012	4 1273 1	CS RCSFLAGS	IMU NOT USABLE. SET UP INITIALIZATION
0022	REF	43	LAST 1389	16,2013	7 4751 1	MASK BIT3	FLAG FOR ATT ERROR DISPLAY ROUTINE.
0023	REF	5	LAST 1405	16,2014	27 273 1	ADS RCSFLAGS	
0024	REF	1		16,2015	1 2160 0	TCF SHUTDOWN	
0025	REF	60	LAST 1333	16,2016	3 4742 1	CHEKMORE CAF BIT10	BIT 10 OF 30 IS PGNC5 CONTROL OF S/C
0026				16,2017	0 0006 1	EXTEND	
0027	REF	10	LAST 910	16,2020	02 030 0	RAND CHAN30	BITS IN 30 ARE INVERTED
0028	REF	482	LAST 1405	16,2021	10 000 0	CCS A	
0029	REF	2	LAST 1405	16,2022	1 2154 1	TCF MORE IDLE	
0030				16,2023	0 0002 0	RETURN	

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P0031 DAPIDLER ENTRY.

0032	REF	12	LAST 1400	16,2024	22 016 0	DAPIDLER	LXCH	BANKRUPT	INTERRUPT LEAD INS (CONTINUED)
0033				16,2025	0 0006 1		EXTEND		
0034	REF	11	LAST 1400	16,2026	22 012 1		QXCH	QRUP T	
0035	REF	6	LAST 1405	16,2027	3 1273 0		CA	RCSFLAGS	
0036	REF	53	LAST 1360	16,2030	7 4737 1		MASK	BIT13	
0037	REF	483	LAST 1405	16,2031	10 000 0		CCS	A	CHECK IF 1/ACCSJOB HAS BEEN SET UP SINCE
0038	REF	1		16,2032	1 2041 1		TCF	CHECKUP	THE LAST FRESH START OR RESTART.
00381	REF	54	LAST 1406	16,2033	3 4737 0		CA	BIT13	
00382	REF	7	LAST 1406	16,2034	27 273 1		ADS	RCSFLAGS	BIT 13 IS 1.
00383	*REF	5	LAST 1402	16,2035	3 7714 1		CAF	PRI027	
0039	REF	32	LAST 1402	16,2036	0 5072 1		TC	NOVAC	SET UP JOB TO DO A LITTLE INITIALIZATION
0040	REF	11	LAST 1405	E6,1537			EBANK=	AOSQ	AND EXECUTE 1/ACCS.
0041	REF	1		16,2037	02447 1		2CADR	1/ACCSET	(WILL BRANCH TO MOREIDLE ON ACCSOKAY)
0041	REF	1		16,2040	40106 1				
0042	REF	1		16,2041	0 2000 0	CHECKUP	TC	CHEKBITS	CHECK TO SEE IF LM DAP IS TO GO ON AND
A0043									DO ERROR DISPLAY.
0044	REF	38	LAST 1404	16,2042	30 111 0		CAE	DAPBOOLS	IF 1/ACCS HAS NOT BEEN COMPLETED, IDLE.
0045	REF	2	LAST 234	16,2043	7 4751 1		MASK	ACCSOKAY	NOTE: ONLY FRESH START AND RESTART
0046				16,2044	0 0006 1		EXTEND		KNOCK THIS BIT DOWN.
0047	REF	3	LAST 1405	16,2045	1 2154 1		BZF	MOREIDLF	
0048	REF	51	LAST 1312	16,2046	0 4674 0	STARTDAP	TC	IBNKCALL	ZERO ATTITUDE ERROR AND DESIRED RATES.
0049	REF	10	LAST 1402	16,2047	40153 1		FCADR	ZATTEROR	
0050	REF	272	LAST 1403	16,2050	3 4755 1		CAF	ZERO	***** INITIALIZE: *****
0051	REF	3	LAST 148	16,2051	55 524 1		TS	TJP	
0052	RFF	2	LAST 149	16,2052	55 525 0		TS	TJU	
0053	REF	1		16,2053	55 526 0		TS	TJV	
0054	REF	7	LAST 210	16,2054	55 417 0		TS	OMEGAP	RATES IN BODY (PILOT) COORDINATES.
0055	RFF	7	LAST 778	16,2055	55 420 1		TS	OMEGAQ	
0056	REF	1		16,2056	55 421 0		TS	OMEGAR	
0057	REF	6	LAST 144	16,2057	55 426 1		TS	TRAPEDP	
0058	REF	1		16,2060	55 427 0		TS	TRAPEDQ	
0059	REF	1		16,2061	55 430 0		TS	TRAPEDR	
0060	REF	12	LAST 1406	16,2062	55 537 0		TS	AOSQ	OFFSET ACCELERATION ESTIMATES.
0061	REF	13	LAST 1406	16,2063	55 540 0		TS	AOSQ +1	
0062	REF	3	LAST 1404	16,2064	55 541 1		TS	AOSR	
0063	REF	4	LAST 1406	16,2065	55 542 1		TS	AOSR +1	
0064	REF	3	LAST 1404	16,2066	55 422 0		TS	ALPHAQ	COPIES OF OFFSET ESTIMATES FOR DOWNLIST.
0065	REF	2	LAST 1404	16,2067	55 423 1		TS	ALPHAR	
0066	REF	3	LAST 149	16,2070	55 500 1		TS	NEGUC	
0067	REF	1		16,2071	55 502 0		TS	NFGUR	
0068	REF	3	LAST 1404	16,2072	55 545 0		TS	AOSQTERM	QRAXIS RATE DERIVATION TERMS AND KALMAN
0069	REF	2	LAST 1404	16,2073	55 546 0		TS	AOSRTERM	FILTER INITIALIZATION TERMS.
0070	REF	1		16,2074	55 510 0		TS	OACCDOT	DESCENT ACCELERATION DERIVATIVE EST.
0071	REF	1		16,2075	55 512 1		TS	RACCDOT	

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0072	REF	1		16,2076	55'501 0	TS	ALLOWGTS	AOSTASK FLAG FOR QRAXIS RCS CONTROL USE.
0073	REF	1		16,2077	55'627 1	TS	COTROLER	DO TRYGTS ON FIRST PASS (WILL GO TO RCS)
0074	REF	1		16,2100	55'631 0	TS	INSTS	RECOGNIZE FIRST GTS PASS AS SUCH.
0075	REF	3	LAST 149	16,2101	55'630 1	TS	QGIMTIMR	STOP GIMBAL DRIVES. (PROBABLY WOULD BE
0076	REF	1		16,2102	55'632 0	TS	RGIMTIMR	GOOD ENOUGH JUST TO INACTIVATE TIMERS)
0077	REF	1		16,2103	55'456 0	TS	OLDPMIN	MINIMUM IMPULSE MODE ERASABLES
0078	REF	1		16,2104	55'457 1	TS	OLDQRMIN	
0079	REF	48	LAST 1374	4747		CALLGMBL	EQUALS	RCSFLAGS INITIALIZATION.
0080	REF	1		16,2105	4 2177 0	CS	MANFLAG	
0081	REF	8	LAST 1406	16,2106	7 1273 1	MASK	RCSFLAGS	NEGUQIR) HAVE BEEN GENERATED.
0082	REF	9	LAST 1407	16,2107	55'273 1	TS	RCSFLAGS	

R0083 SET UP "OLD" MEASURED CDU ANGLES:

0084				16,2110	0 0006 1	EXTEND		
0085	REF	22	LAST 1403	16,2111	3 0033 1	DCA	CDUX	OLDXFORP AND OLDYFORP
0086	REF	3	LAST 145	16,2112	53'437 1	DXCH	OLDXFORP	
0087	REF	14	LAST 1403	16,2113	3 0034 0	CA	CDUZ	
0088	REF	1		16,2114	55'440 1	TS	OLDZFORQ	
0089	REF	10	LAST 1407	16,2115	4 1273 1	CS	RCSFLAGS	
0090	REF	47	LAST 1361	16,2116	7 4740 1	MASK	BIT12	
00901	REF	11	LAST 1407	16,2117	27'273 1	ADS	RCSFLAGS	BIT 12 SET TO 1.
0091	REF	31	LAST 1358	16,2120	3 4751 0	CA	FDUR	
0092	REF	2	LAST 148	16,2121	55'535 1	TS	SKIPU	
0093	REF	1		16,2122	55'536 1	TS	SKIPV	
0094	REF	35	LAST 1399	16,2123	3 4733 1	CA	PCSMAX	
0095	REF	4	LAST 1399	16,2124	54 031 1	TS	TIME6	
0096	REF	7	LAST 1400	16,2125	55'464 1	TS	T6NEXT	
0097	REF	2	LAST 1399	16,2126	55'466 0	TS	T6FURTHA	
0098	REF	273	LAST 1406	16,2127	3 4755 1	CA	ZERO	
0099	REF	8	LAST 1407	16,2130	55'465 0	TS	T6NEXT +1	
0100	REF	3	LAST 1407	16,2131	55'467 1	TS	T6FURTHA +1	
0101	REF	3	LAST 1399	16,2132	55'463 0	TS	NXT6ADR	
0102	REF	5	LAST 1399	16,2133	55'470 1	TS	NEXTP	
0103	REF	2	LAST 1400	16,2134	55'471 0	TS	NEXTU	
0104	REF	2	LAST 1400	16,2135	55'472 0	TS	NEXTV	
0105	REF	8	LAST 1033	16,2136	4 4363 1	CS	TEN	
0106	REF	1		16,2137	55'755 0	TS	DAPZRUPT	JASK NOT IN PROGRESS, INITIALIZE NEG.
0107	REF	94	LAST 1384	16,2140	3 4752 0	CA	TWQ	
0108	REF	1		16,2141	55'431 1	TS	NPTRAPS	
0109	REF	1		16,2142	55'432 1	TS	NQTRAPS	
0110	REF	1		16,2143	55'433 0	TS	NRTRAPS	
0111				16,2144	0 0006 1	EXTEND		
0112	REF	1		16,2145	3 2202 0	DCA	PAXADIDL	
0113	REF	3	LAST 234	16,2146	53'275 1	DXCH	TSADR	
0114	REF	1		16,2147	3 7726 0	SETTIME5	CAF	MS100
0115	REF	5	LAST 859	16,2150	54 030 0	TS	TIME5	
0116	REF	26	LAST 1400	16,2151	1 5270 0	TCF	RESUME	
0117	REF	14	LAST 1406	16,1537		EBANK=	ACSQ	
0118	REF	2	LAST 237	16,2152	02024 0	IDLERADR	2CADR	DAPIDLER
0118				16,2153	34106 1			

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0119	REF	52	LAST 1406	16,2154	0 4674 0	MOREIDLE	TC	IBNKCALL	CALCULATE Q,R-AXES ATTITUDE ERRORS.
0120	REE	1		16,2155	36563 1		CADR	QERRCALC	
0121	REF	53	LAST 1408	16,2156	0 4674 0		TC	IBNKCALL	
0122	REE	1		16,2157	35425 1		CADR	CALC PERR	CALCULATE P AXIS ATTITUDE ERRORS.
0123				16,2160	0 0006 1	SHUTDOWN	EXTEND		
0124	REF	1		16,2161	3 2153 1		DCA	IDLERADR	
0125	REF	4	LAST 1407	16,2162	53'275 1		DXCH	ISADR	
0126	REE	274	LAST 1407	16,2163	3 4755 1		CAF	ZERO	KILL ANY POSSIBLE JET REQUESTS
0127	REF	6	LAST 1407	16,2164	55'470 1		IS	NEXTP	
0128	REF	3	LAST 1407	16,2165	55'471 0		IS	NEXTU	
0129	REF	3	LAST 1407	16,2166	55'472 0		IS	NEXTV	
0130				16,2167	0 0006 1		EXTEND		COMMAND JETS OFF.
0131	REF	5	LAST 1400	16,2170	01 005 0		WRITE	CHAN5	
0132				16,2171	0 0006 1		EXTEND		
0133	REF	3	LAST 1399	16,2172	01 006 0		WRITE	CHAN6	
0134	REF	1		16,2173	4 2200 0		CS	BGIM23	TURN TRIM GIMBAL OFF
0135				16,2174	0 0006 1		EXTEND		
0136	REF	65	LAST 1318	16,2175	03 012 1		WAND	CHAN12	
0137	REF	1		16,2176	1 2147 0		TCF	SETTIMES	RETURN IN 100 MSEC.
01371				16,2177	03021 1	MANFLAG	OCT	03021	
0138				16,2200	07400 1	BGIM23	OCTAL	07400	
0139	REF	8	LAST 1406	E6,1417			EBANK=	OMEGAP	
0140	REF	1		16,2201	02210 0	PAXADIDL	2CADR	PAXIS	
0140	REE	1		16,2202	34106 1				
0141	REE	2	LAST 170	7726		MS100	=	OCT37766	
0142	REF	71	LAST 1377	0061		COSMG	=	ITEMP1	
01431				16,2203	0 0006 1	JUMPDSP	EXTFND		TRANSEER TO BANK 20
01432	REF	1		16,2204	3 2207 0		DCA	DSPCADR	FOR ATTITUDE ERROR DISPLAYS
01433				16,2205	52 006 0		DTCB		
01434	REF	3	LAST 152	E6,1757			ERANK=	AK	
01435	REF	1		16,2206	02226 0	DSPCADR	2CADR	ALIDSPLY	
01435	REE	1		16,2207	40106 1				

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01436 20,2226 BANK 20
 01437 REF 4 LAST 1401 20,2000 SETLOC OAPS3
 01438 20,2226 BANK
 01439 REF 1 COUNT* \$4/NEEDL

R0144 PROGRAM: ALTOSPLY

R0145 MOD 0. 6 DEC 1967

R0146 AUTHOR: CRAIG WORK, DON KEENE, MIT IL

R0147 MOD 3 BY DON KEENE AUG 1, 1968 MOVED PROGRAM TO BANK 20

R0148 PROGRAM DESCRIPTION:

R0149 ALTOSPLY REVERSES THE DSPLYALT BIT OF RCSFLAGS EACH TIME IT IS CALLED, WHICH IS PRESUMABLY EVERY 100 MS.
 R0151 IF THE REVERSEO BIT IS ONE, NEEDLER IS CALLED TO DISPLAY ATTITUDE ERRORS. IF THE BIT IS ZERO, THE ATTITUDE ERR-
 R0153 ORS ARE CALCULATED AS 1) DAP FOLLOWING ERRORS, IF NEEDLFLG = 0, AND 2) TOTAL ATTITUDE ERRORS FOR NEEDLFLG = 1.

R0155 WARNING: ALTOSPLY MAY ONLY BE CALLED WITH INTERRUPT INHIBITFO.

R0156 WARNING: EBANK MUST BE SET TO 6 WHEN USING THIS ROUTINE.

R0157 INPUT: RCSFLAGS AND 1) IF NEEDLFLG=0, INPUT PERRR,QERRR2,ERROR.
 R0158 2) IF NEEDLFLG=1, INPUT CPHI,CTHETA,CPSI,COUX,COUY,COUZ,M11,M21,M31,M22,M32. (GPMATRIX)

R0160 OUTPUTS: RCSFLAGS WITH DSPLYALT REVERSED,AK,AK1,AK2,+ NEEDLER OUTPUTS.

R0161 ENTRY: TCF ALTOSPLY

R0162 EXIT: TCF CHEKMORE

R0163 ALARM OR ABORT EXITS: NONE

R0164 SUBPROGRAMS CALLED: NEEDLER, OVERSUB2

R0165 OEBRIS: A,L,AND NEEDLER OEBRIS.

0166 REF 12 LAST 1407 20,2226 3 1273 0 ALTOSPLY CA RCSFLAGS INVERT THE DISPLAY ALTERNATION BIT.
 0167 REF 266 LAST 1403 20,2227 54 001 1 TS L
 0168 REF 1 20,2230 3 4750 1 CA DSPLYALT
 0169 20,2231 0 0006 1 EXTEND
 0170 REF 18 LAST 1384 20,2232 06 001 0 RXOR LCHAN
 0171 REF 13 LAST 1409 20,2233 55 273 1 TS RCSFLAGS

0172 REF 2 LAST 1409 20,2234 7 4750 0 MASK OSPLYALT
 0173 REF 484 LAST 1406 20,2235 10 000 0 CCS A IS ALTERNATION FLAG ZERO?
 0174 REF 1 20,2236 1 2322 1 TCF NEEDLER

0175 REF 36 LAST 1370 20,2237 30 074 1 CAE FLAGWROO NEEDLFLG WILL INDICATE TOTAL OR OAP AT-

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0176	REF	1		20,2240	7 4750 0	MASK	NEEDLBIT	TITUDE ERROR DISPLAY REQUEST.
0177	REF	485	LAST 1409	20,2241	10 000 0	CCS	A	
0178	REF	1		20,2242	1 2252 1	TCF	DSPLYTOT	TOTAL ERROR IS NEEDED IN AK, AK +1, AK +2
0179	REF	2	LAST 147	20,2243	4 1446 1	CS	QRROR	YES. DISPLAY ATT ERRORS ON THE , -BALL.
0180	REF	4	LAST 1408	20,2244	55'760 0	TS	AK +1	ERROR COMPLEMENTS ARE INPUT TO NEEDLER.
0181	REF	2	LAST 147	20,2245	4 1450 0	CS	RERROR	
01815	REF	5	LAST 1410	20,2246	55'761 1	TS	AK +2	
0182	REF	2	LAST 149	20,2247	4 1462 1	CS	PERRROR	
0183	REF	6	LAST 1410	20,2250	57'757 0	XCH	AK	
0184	REF	1		20,2251	1 2442 0	TCF	RETNMORE	DISPLAY THESE THE NEXT TIME THROUGH
RO185	CALCULATE GIMBAL ANGLE TOTAL ERRORS, RESOLVE INTO PILOT AXFS, STORE TOTAL ERRORS FOR NEEDLER. Q-AXIS FIRST.							
0187				20,2252	0 0006 1	DSPLYTOT	EXTEND	
0188	REF	72	LAST 1408	20,2253	22 061 0	QXCH	ITEMP1	SAVE Q FOR CHEKBITS RETURN.
0189	REF	3	LAST 491	20,2254	3 0322 1	CA	CTHFTA	DESIRED ATTITUDE, Y-AXIS, 2'S COMP.
0190				20,2255	0 0006 1	EXTEND		SUBTRACT CURRENT ATTITUDE.
0191	REF	11	LAST 1403	20,2256	20 033 0	MSU	CDUY	DIFFERENCE SCALED AT PI, 1'S COMP.
0192	REF	7	LAST 1410	20,2257	55'757 1	TS	AK	SAVE FOR R-ERROR CALCULATION.
0193				20,2260	0 0006 1	EXTEND		
0194	REF	2	LAST 204	20,2261	7 1413 1	MP	M21	(CTHFTA-CDUY)*M21 SCALED AT PI RADIANS.
0195	REF	8	LAST 1410	20,2262	57'760 1	XCH	AK +1	STORE FIRST TERM OF Q ERROR.
0196	REF	5	LAST 530	20,2263	3 0323 0	CA	CPSI	DESIRED ATTITUDE, Z-AXIS, 2'S COMP.
0197				20,2264	0 0006 1	EXTEND		SUBTRACT CURRENT ATTITUDE.
0198	REF	15	LAST 1407	20,2265	20 034 1	MSU	CDUZ	DIFFERENCE SCALED AT PI, 1'S COMP.
0199	REF	9	LAST 1410	20,2266	55'761 1	TS	AK +2	SAVE Z-AXIS TERM FOR R ERROR CALCULATION
0200				20,2267	0 0006 1	EXTEND		
0201	REF	5	LAST 902	20,2270	7 1415 1	MP	M22	(CPSI-CDUZ)*M22, SCALED AT PI RADIANS.
0202	REF	10	LAST 1410	20,2271	6 1760 1	AD	AK +1	Q ERROR COMPLETE , AT PI RAD.
0203	REF	1		20,2272	0 2435 1	TC	OVERSUB2	PIN NEEDLES IN CASE OF OVERFLOW.
0204	REF	11	LAST 1410	20,2273	55'760 0	TS	AK +1	
RO205	R ERROR CALCULATION NEXT.							
0206	REF	12	LAST 1410	20,2274	3 1757 0	CA	AK	Y-AXIS DIFFERENCE STORED BY Q-AXIS CALC.
0207				20,2275	0 0006 1	EXTEND		
0208	REF	2	LAST 204	20,2276	7 1414 0	MP	M31	(CTHETA-CDUY)*M31, SCALED AT PI RADIANS.
0209	REF	13	LAST 1410	20,2277	57'761 0	XCH	AK +2	FIRST TERM OF R ERROR.
A0210								Z-AXIS DIFFERENCE, STORED BY A CALC. IS
0211				20,2300	0 0006 1	EXTEND		RECOVERED BY THE EXCHANGE.
0212	REF	3	LAST 902	20,2301	7 1416 1	MP	M32	(CPSI-CDUZ)*M32, SCALED AT PI RADIANS.
0213	REF	14	LAST 1410	20,2302	6 1761 0	AD	AK +2	R ERROR COMPLETE , AT PI RAD.
0214	REF	2	LAST 1410	20,2303	0 2435 1	TC	OVERSUB2	PIN NEEDLES IN CASE OF OVERFLOW.
0215	REF	15	LAST 1410	20,2304	55'761 1	TS	AK +2	
RO216	NOW CALCULATE P ERROR. (NOTE THAT M13 = 1, SCALED AT 1, SO THE MULTIPLICATION IS BY-PASSED.)							

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0218	REF	16	LAST 1410	20,2305	3 1757 0	CA	AK	Y-AXIS OIEFFERENCE STORED BY Q AXIS CALC.
0219				20,2306	0 0006 1	EXTEND		
0220	REF	7	LAST 203	20,2307	7 1412 0	MP	M11	(CTHETA-CDUY)*M11 SCALED AT PI RAOIANS.
0221	REF	17	LAST 1411	20,2310	57*757 0	XCH	AK	FIRST TERM OF P ERROR IN AK, AT PI RAD.
0222	REE	11	LAST 913	20,2311	30 321 1	CAE	CPHI	DESIREO ATTITUOE, X-AXIS, 2'S COMP.
0223				20,2312	0 0006 1	EXTEND		SUBTRACT CURRENT X ATTITUDE.
0224	REF	23	LAST 1407	20,2313	20 032 1	MSU	CDUX	X-AXIS OIEFFERENCE, 1'S COMP, AT PI RAD.
R0225	M13 = 1,		SC BYPASS THE MULTIPLICATION.					
R0226			EXTEND					
R0227			MP M13					(CPHI-CDUX)*M13 SCALED AT PI RAOIANS.
0228	REF	18	LAST 1411	20,2314	6 1757 0	A0	AK	P ERROR COMPLETE , SCALED AT PI RAO
0229	REE	3	LAST 1410	20,2315	0 2435 1	TC	OVERSUB2	PIN NEEOLAS IN CASE OF OVERFLOW.
0230	REF	19	LAST 1411	20,2316	55*757 1	TS	AK	
0231				20,2317	0 0006 1	EXTEND		
0232	REF	73	LAST 1410	20,2320	22 061 0	QXCH	ITEMP1	RESTORE Q FOR CHEKBITS RETURN.
0233	REF	2	LAST 1410	20,2321	1 2442 0	TCF	RFTNMORE	DISPLAY THESE THE NEXT TIME THROUGH

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P0234 FCAI ATTITUDE ERROR DISPLAY SUBROUTINE

R0235 PROGRAM DESCRIPTION: D. KEENE 5/24/67

R0236 MOD 1 BY CRAIG WORK, 12 DEC 67

R0237 MOD 2 BY CRAIG WORK, 6 APRIL 68 CONVERTS ATTITUDE ERROR DISPLAY SCALING FROM 16 7/8 DEG. TO 42 3/16 DEGREES.

R0239 THIS SUBROUTINE IS USED TO DISPLAY ATTITUDE ERRORS ON THE FCAI VIA THE DIGITAL TO ANALOG CONVERTERS (DACs)
R0241 IN THE CDUS. CARE IS TAKEN TO METER OUT THE APPROPRIATE NUMBER OF PULSES TO THE IMU ERROR COUNTERS AND PREVENT
R0243 OVERFLOW, TO CONTROL THE RELAY SEQUENCING, AND TO AVOID INTERFERENCE WITH THE COARSE ALIGN LOOP WHICH ALSO USES
R0245 THE DACs.

R0246 CALLING SEQUENCE:

R0247 DURING THE INITIALIZATION SECTION OF THE USER'S PROGRAM, BIT3 OF RCSFLAGS SHOULD BE SET TO INITIATE THE
R0249 TURN-CN SEQUENCE WITHIN THE NEEDLES PROGRAM:

R0250 CS RCSFLAGS IN EBANK6

R0251 MASK BIT3

R0252 ADS RCSFLAGS

R0253 THEREAFTER, THE ATTITUDE ERRORS GENERATED BY THE USER SHOULD BE TRANSFERED TO THE FOLLOWING LOCATIONS IN EBANK6:

R0255 AK SCALED 180 DEGREES NOTE: THESE LOCATIONS ARE SUBJECT

R0256 AK1 SCALED 180 DEGREES TO CHANGE

R0257 AK2 SCALED 180 DEGREES

R0258 FULL SCALED DEFLECTION OF THE NEEDLES CORRESPONDS TO 5 1/16 DEGREES, WHILE 384 BITS IN THE IMU ERROR COUNTER
R0260 CORRESPONDS TO 42 3/16 DEGREES. (DAC MAXIMUM CAPACITY IS 384 BITS.) 46 BITS EFFECTIVELY PIN THE NEEDLES.

R0262 A CALL TO NEEDLER WILL THEN UPDATE THE DISPLAY:

R0263 INHINT

R0264 IC IBNKCALL NOTE: EBANK SHOULD BE SET TO E6

R0265 CADR NEEDLER

R0266 RELINT

R0267 THIS PROCESS SHOULD BE REPEATED EACH TIME THE ERRORS ARE UPDATED. AT LEAST 3 PASSES THRU THE PROGRAM ARE
R0269 REQUIRED BEFORE ANYTHING IS ACTUALLY DISPLAYED ON THE ERROR METERS.
R0270 NOTE: EACH CALL TO NEEDLER MUST BE SEPARATED BY AT LEAST 50MS TO ASSURE PROPER RELAY SEQUENCING.

R0272 ERASABLE USED:

R0273 AK CDUXCMD

R0274 AK1 CDUYCMD

R0275 AK2 CDUZCMD

R0276 EDRIVEX A,L,Q

R0277 EDRIVEY T5TEMP

R0278 EDRIVEZ DINDX

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R0279 SWITCHES: RCSFLAGS BITS 3,2

R0280 I/O CHANNELS: CHAN12 BIT 4 (COARSE ALIGN - READ ONLY)
 R0281 CHAN12 BIT 6 (IMU ERROR COUNTER ENABLE)
 R0282 CHAN14 BIT 13,14,15 (DAC ACTIVITY)

R0283 SIGN CONVENTIONK AK = THETAC - THETA
 R0284 WHERE THETAC = COMMAND ANGLE
 R0285 THETA = PRESENT ANGLE

0286	REF	14	LAST	1409	20,2322	3 1273 0	NEEDLER	CA	RCSFLAGS	
0287	REF	28	LAST	1364	20,2323	7 6241 1		MASK	SIX	
0288					20,2324	0 0006 1		EXTEND		
0289	REF	1			20,2325	1 2362 0		BZF	NEEDLES3	
0290	REF	44	LAST	1405	20,2326	7 4751 1		MASK	BIT3	
0291					20,2327	0 0006 1		EXTEND		
0292	REF	1			20,2330	1 2353 1		BZF	NEEDLER2	BIT3 = 0, BIT2 = 1
0293	REF	60	LAST	1405	20,2331	4 4746 1		CS	BIT6	FIRST PASS BIT3 = 1
0294					20,2332	0 0006 1		EXTEND		DISABLE IMU ERROR COUNTER TO ZERO DACS
0295	REF	66	LAST	1408	20,2333	03 012 1		WAND	CHAN12	MUST WAIT AT LEAST 60 MS BEFORE
0296	REF	275	LAST	1408	20,2334	4 4755 0	NEEDLER1	CS	ZERO	ENABLING COUNTERS.
0297	REF	20	LAST	1411	20,2335	55'757 1		TS	AK	ZERO THE INPUTS ON FIRST PASS
0298	REF	1			20,2336	55'760 0		TS	AK1	
0299	REF	1			20,2337	55'761 1		TS	AK2	
0300	REF	3	LAST	152	20,2340	55'762 1		TS	EDRIVEX	ZERO THE DISPLAY REGISTERS
0301	REF	1			20,2341	55'763 0		TS	EDRIVEY	
0302	REF	1			20,2342	55'764 1		TS	EDRIVEZ	
0303	REF	4	LAST	1307	20,2343	54 050 0		TS	CDUXCMD	ZERO THE OUT COUNTERS
0304	REF	2	LAST	189	20,2344	54 051 1		TS	CDUYCMD	
0305	REF	2	LAST	190	20,2345	54 052 1		TS	CDUZCMD	
0306	REF	29	LAST	1413	20,2346	4 6241 1		CS	SIX	RESET RCSFLAGS FOR PASS2
0307	REF	15	LAST	1413	20,2347	7 1273 1		MASK	RCSFLAGS	
0308	REF	56	LAST	1387	20,2350	6 4752 0		AD	BIT2	
0309	REF	16	LAST	1413	20,2351	55'273 1		TS	RCSFLAGS	
0310	REF	3	LAST	1411	20,2352	1 2442 0		TCF	RFTNMORE	
0311	REF	61	LAST	1413	20,2353	3 4746 0	NEEDLER2	CAF	BIT6	ENABLE IMU ERROR COUNTERS
0312					20,2354	0 0006 1		EXTEND		
0313	REF	67	LAST	1413	20,2355	05 012 1		WOR	CHAN12	
0314	REF	30	LAST	1413	20,2356	4 6241 1		CS	SIX	RESET RCSFLAGS TO DISPLAY ATTITUDE
0315	REF	17	LAST	1413	20,2357	7 1273 1		MASK	RCSFLAGS	ERRORS WAIT ATLEAST 4 MS FOR
0316	REF	18	LAST	1413	20,2360	55'273 1		TS	RCSFLAGS	RELAY CLOSURE
0317	REF	4	LAST	1413	20,2361	1 2442 0		TCF	RFTNMORE	
0318	REF	62	LAST	1413	20,2362	3 4746 0	NEEDLES3	CAF	BIT6	CHECK TO SEE IF IMU ERROR COUNTER
0319					20,2363	0 0006 1		EXTEND		IS ENABLED
0320	REF	68	LAST	1413	20,2364	02 012 0		RAND	CHAN12	

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0321	REF 486	LAST 1410	20,2365	10 000 0		CCS	A	IF NOT, RE-INITIALIZE NEEDLER.
0322	REF 1		20,2366	1 2373 0		TCF	NEEDLES	
0323	REF 19	LAST 1413	20,2367	4 1273 1		CS	RCSFLAGS	SET UP INITIALIZATION FLAG IN RCSFLAGS.
0324	REF 45	LAST 1413	20,2370	7 4751 1		MASK	BIT3	
0325	REF 20	LAST 1414	20,2371	27 273 1		ADS	RCSFLAGS	
0326	REF 5	LAST 1413	20,2372	1 2442 0		TCF	RETNMORE	
0327	REF 95	LAST 1407	20,2373	3 4752 0	NEEDLES	CAF	TWO	
0328	REF 1		20,2374	54 063 0	DACLOOP	TS	DINDX	
0329	REF 1		20,2375	4 2434 1		CS	ONETENTH	RESCALE INPUTS TO + OR - 1800 DEGREES.
0330			20,2376	0 0006 1		EXTEND		
0331	REF 2	LAST 1414	20,2377	5 0063 1		INDEX	DINDX	
0332	REF 21	LAST 1413	20,2400	7 1757 1		MP	AK	
0333	REF 267	LAST 1409	20,2401	54 001 1		TS	L	
0334	REF 487	LAST 1414	20,2402	10 000 0		CCS	A	
0335	REF 1		20,2403	3 2432 0		CA	DACLIMIT	
0336			20,2404	1 2406 0		TCF	+2	
0337	REF 2	LAST 1414	20,2405	4 2432 1		CS	DACLIMIT	
0338	REF 268	LAST 1414	20,2406	6 0001 0		AD	L	
0339	REF 1		20,2407	54 061 1		TS	T5TEMP	OVFLO CHK
0340			20,2410	1 2414 0		TCF	+4	
0341	REF 488	LAST 1414	20,2411	50 000 1		INDEX	A	ON OVERFLOW LIMIT OUTPUT TO +-384
0342	REF 3	LAST 1414	20,2412	3 2432 0		CAF	DACLIMIT	
0343	REF 269	LAST 1414	20,2413	54 001 1		TS	L	
0344	REF 3	LAST 1414	20,2414	50 063 1		INDEX	DINDX	
0345	REF 4	LAST 1413	20,2415	4 1762 1		CS	EDRIVEX	CURRENT VALUE OF DAC
0346	REF 270	LAST 1414	20,2416	6 0001 0		AD	L	
0347	REF 4	LAST 1414	20,2417	50 063 1		INDEX	DINDX	
0348	REF 5	LAST 1413	20,2420	26 050 0		ADS	CDUXCMD	
0349	REF 5	LAST 1414	20,2421	50 063 1		INDEX	DINDX	
0350	REF 5	LAST 1414	20,2422	23 762 0		LXCH	EDRIVEX	
0351	REF 6	LAST 1414	20,2423	10 063 0		CCS	DINDX	
0352	REF 1		20,2424	1 2374 1		TCF	DACLOOP	
0353	REF 5	LAST 1366	20,2425	3 7737 0		CAF	13,14,15	
0354			20,2426	0 0006 1		EXTEND		
0355	REF 23	LAST 1320	20,2427	05 014 1		WOR	CHAN14	SET DAC ACTIVITY BITS
0356	REF 6	LAST 1414	20,2430	1 2442 0		TCF	RETNMORE	
0357			20,2431	77177 0		DEC	-384	
0358			20,2432	37200 1	DACLIMIT	DEC	16000	
0359			20,2433	00600 1		DEC	384	
0360			20,2434	03146 1	ONETENTH	OCT	03146	DECIMAL +0.1, SCALED AT 1.
0361	REF 56	LAST 1360	4750		DSPLYALT	EQUALS	BIT4	100 MS ALTERNATION BIT IN RCSFLAGS
0362			20,2435	54 007 1	OVERSUB2	TS	7	RETURNS A UNCHANGED OR LIMITED TO
0363	REF 395	LAST 1403	20,2436	0 0002 0		TC	Q	POS MAX OR NEG MAX IF A HAS OVERFLOW
0364	REF 489	LAST 1414	20,2437	50 000 1		INDEX	A	

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0365 REF 7 LAST 1393 20,2440 4 4734 1
0366 REF 396 LAST 1414 20,2441 0 0002 0

CS LIMITS
TC 3

DUPLICATE CODING IN BANK 16

0367 20,2442 0 0006 1 RETN MORE EXTEND
0368 REF 1 20,2443 3 2446 0 DCA MORE CADR
0369 20,2444 52 006 0 DTCB

RETURN TO CHEK MORE

0370 REF 15 LAST 1407 E6,1537
0371 REF 1 20,2445 02016 1 MORE CADR 2CADR CHEK MORE
0371 REF 1 20,2446 34106 1

EBANK= ACSQ
2CADR CHEK MORE

L P-AXIS RCS AUTOPILOT

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0001 16,2210
 0002 REF 2 LAST 1405 16,2000
 0003 16,2210

BANK 16
 SETLOC DAPS1
 BANK

0004 REF 3 LAST 1410 E6,1462
 0005 REF 1

EBANK= PERROR
 COUNT* \$\$\$/DAPP

R0006 THE FOLLOWING T5RUPT ENTRY BEGINS THE PROGRAM WHICH CONTROLS THE P-AXIS ACTION OF THE LEM USING THE RCS JETS.
 R0008 THE NOMINAL TIME BETWEEN THE P-AXIS RUPTS IS 100 MS IN ALL NON-IDLING MODES OF THE DAP.

0010 REF 2 LAST 1407 16,2210 3 7726 0 PAXIS
 0011 REF 6 LAST 1407 16,2211 26 030 0
 A00115

CA MS100
 ADS TIME5

*** NECESSARY IN ORDER TO ALLOW SYN-
 CHRONIZATION WITH OTHER INTERRUPTS ***

0012 REF 13 LAST 1406 16,2212 22 016 0
 0013 16,2213 0 0006 1
 0014 REF 12 LAST 1406 16,2214 22 012 1

LXCH BANKRUPT
 EXTEND
 QXCH QPUPT

INTERRUPT LEAD IN (CONTINUED)

R0015 CHECK IF DAP PASS IS PERMISSIBLE

0016 REF 2 LAST 1407 16,2215 11'755 0
 0017 REF 1 16,2216 0 5634 0
 0018 16,2217 02000 0

CCS DAPZRUPT
 TC BAILOUT
 OCT 02000

IF DAPZRUPT POSITIVE, DAP (JASK) IS
 STILL IN PROGRESS AND A RESTART IS
 CALLED FOR. IT IS NEVER ZERO.

0019 REF 2 LAST 1406 16,2220 0 2000 0

TC CHEKBITS

RETURN IS TO I+1 IF DAP SHOULD STAY ON.

R0020 ***** KALCMANU=DAP AND "RATE=HOLD"-DAP INTERFACE *****

R0021 THE FOLLOWING SECTION IS EXECUTED EVERY 100 MS (10 TIMES A SECOND) WITHIN THE P-AXIS REACTION CONTROL SYSTEM
 R0023 AUTOPILOT (WHENEVER THE DAP IS IN OPERATION).

0024 REF 17 LAST 1403 16,2221 3 1633 0
 0025 16,2222 0 0006 1
 0026 REF 6 LAST 1403 16,2223 21'636 1
 0027 REF 1 16,2224 0 2245 0
 0028 REF 18 LAST 1416 16,2225 55'633 1
 0029 REF 4 LAST 1403 16,2226 3 1634 1
 0030 16,2227 0 0006 1
 0031 REF 3 LAST 1403 16,2230 21'637 0
 0032 REF 2 LAST 1416 16,2231 0 2245 0
 0033 REF 5 LAST 1416 16,2232 55'634 0
 0034 REF 5 LAST 1403 16,2233 3 1635 0
 0035 16,2234 0 0006 1
 0036 REF 3 LAST 1403 16,2235 21'640 0
 0037 REF 3 LAST 1416 16,2236 0 2245 0
 0038 REF 6 LAST 1416 16,2237 55'635 1
 00381 16,2240 0 0006 1
 00382 REF 1 16,2241 27'443 1
 00383 16,2242 0 0006 1
 00384 REF 1 16,2243 27'455 0

CA CDUXD
 EXTEND
 MSU DELCDUX
 TC 1STOTWOS
 TS CDUXD
 CA CDUYD
 EXTEND
 MSU DELCDUY
 TC 1STOTWOS
 TS CDUYD
 CA CDUZD
 EXTEND
 MSU DELCDUZ
 TC 1STOTWOS
 TS CDUZD
 EXTEND
 DIM TCP
 EXTEND
 DIM TCOR

DIMINISH MANUAL CONTROL DIRECT RATE
 TIME COUNTERS.

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A0039 RATELOOP COMPUTES JFTRATEQ, JETRATER, AND 1JACC*NO. PJETS IN ITEMP1.
 A0040 RETURNS TO BACKP.

A0041 JETRATER = 1JACC*NO. PJETS * TJP (NOTE TJ IS THE TIME FIRED DURING CSP)

A0042 JETRATER = 1JACCQ(IJU*NO.UJETS - TJV*NO.VJETS)

A0043 JETRATER = 1JACCQ(IJU*NO.UJETS + TJV*NO.VJETS)

0044	REF	1		16,2244	1 3624 0	TCF	RATELOOP	
0045	REF	490	LAST 1414	16,2245	10 000 0	CCS	A	
0046	REF	157	LAST 1396	16,2246	6 4753 1	AD	DNE	
0047	REF	397	LAST 1415	16,2247	0 0002 0	TC	Q	
0048	REF	491	LAST 1417	16,2250	4 0000 0	CS	A	
0049	REF	398	LAST 1417	16,2251	0 0002 0	TC	Q	
0050				16,2252	0 0006 1	SUBDIVIDE	EXTEND	OVERFLOW PROTECTION ROUTINE TO GIVE
0051	REF	3	LAST 148	16,2253	7 1737 1	MP	DAPTEMP3	POSMAX OR NEGMAX IF THE DIVIDE WOULD
0052	REF	3	LAST 145	16,2254	21'425 1	DAS	OMEGAU	OVERFLOW

0053				16,2255	0 0006 1	+3	EXTEND	
00531	REF	4	LAST 1417	16,2256	3 1425 0		DCA	OMEGAU
00532	REF	2	LAST 146	16,2257	53'742 0		DXCH	DAPTEMP5
00533	REF	5	LAST 1417	16,2260	11'424 0		CCS	OMEGAU
0054				16,2261	1 2263 0		TCF	+2
0055	REF	1		16,2262	1 2273 1		TCF	DIVIDER
0056	REF	1		16,2263	6 2304 1		AD	-OCT630
0057				16,2264	0 0006 1		EXTEND	
0058	REF	2	LAST 1417	16,2265	6 2273 0		BZMF	DIVIDER
0059	REF	6	LAST 1417	16,2266	11'424 0		CCS	OMEGAU
0060	REF	36	LAST 1407	16,2267	3 4733 1		CA	POSMAX
0061	REF	399	LAST 1417	16,2270	0 0002 0		TC	Q
0062	REF	37	LAST 1417	16,2271	4 4733 0		CS	POSMAX
0063	REF	400	LAST 1417	16,2272	0 0002 0		TC	Q

0064	REF	7	LAST 1417	16,2273	53'425 1	DIVIDER	DXCH	OMEGAU
0065				16,2274	0 0006 1		EXTEND	
0066	REF	74	LAST 1411	16,2275	10 061 1		OV	ITEMP1
0067	REF	401	LAST 1417	16,2276	0 0002 0		TC	Q

0068				16,2277	54 007 1	OVERSUB	TS	7	RETURNS A UNCHANGED OR LIMITED TO
0069	REF	402	LAST 1417	16,2300	0 0002 0		TC	Q	POSMAX OR NEGMAX IF A HAS OVERFLOW
0070	REF	492	LAST 1417	16,2301	50 000 1		INDEX	A	
0071	REF	52	LAST 1399	16,2302	4 4734 1		CS	BIT15 -1	
0072	REF	403	LAST 1417	16,2303	0 0002 0		TC	Q	

0073				16,2304	77147 0	-OCT630	OCT	77147	
------	--	--	--	---------	---------	---------	-----	-------	--

0074	REF	19	LAST 152	16,2305	3 1735 1	BACKP	CA	DAPTEMP1	
0075				16,2306	0 0006 1		EXTEND		

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0076 REF 7 LAST 917 16,2307 7 1530 1
 0077 REF 3 LAST 147 16,2310 55'743 1
 A0078
 A0079
 A0080
 A0081
 A0082
 A0083
 A0084
 A0086

MP 1JACC
 TS JETRATE
 BEGINNING OF THE RATE DERIVATION
 OMEGAP,Q,R BODY RATES SCALED AT PI/4
 TRAPER,Q,R BODY ANGLE ERRORS FROM PREDICTED ANGLE (PI/40)
 NPI(QR)TRAPS NUMBER OF TIMES ANGLE ERROR HAS BEEN ACCUMULATED
 AOSQ(R)TERM CHANGE IN RATE DUE TO OFFSET ACCELERATION. (PI/4)
 JETRATE,Q,R CHANGE IN RATE DUE TO JET ACCELERATION. (PI/4)
 TRAPSIZE NEGATIVE LIMIT OF MAGNITUDE OF TRAPEDP,ECT.
 OMEGAU DP-TEMPORARY STORAGE

A0087 OMEGA = OMEGA + JETRATE + AOSTERM (+TRAPED/NTRAPS IF TRAPED BIG)

0088 REF 24 LAST 1411 16,2311 30 032 0
 0089 REF 271 LAST 1414 16,2312 54 001 1
 0090 16,2313 0 0006 1
 0091 REF 4 LAST 1407 16,2314 21'436 0
 0092 REF 5 LAST 1418 16,2315 23'436 1
 0093 REF 20 LAST 1417 16,2316 55'735 0
 0094 REF 1 16,2317 3 3603 1
 0095 REF 75 LAST 1417 16,2320 54 061 1
 0096 RFF 4 LAST 1418 16,2321 4 1743 1
 0097 16,2322 0 0006 1
 0098 REF 89 LAST 1397 16,2323 7 4736 0
 0099 REF 7 LAST 1406 16,2324 27'426 1
 0100 REF 1 16,2325 3 1744 1
 0101 REF 4 LAST 1406 16,2326 6 1545 1
 0102 16,2327 0 0006 1
 0103 REF 1 16,2330 7 7735 0
 0104 REF 2 LAST 1406 16,2331 27'427 0
 0105 REF 1 16,2332 3 1745 0
 0106 REF 3 LAST 1406 16,2333 6 1546 1
 0107 16,2334 0 0006 1
 0108 REF 2 LAST 1418 16,2335 7 7735 0
 0109 REF 2 LAST 1406 16,2336 27'430 0

CAE CDUX
 TS L
 EXTEND
 MSU OLDXFORP SCALED AT PI
 LXCH OLDXFQPP
 TS DAPTEMP1
 CA 1/40
 TS ITEMP1
 CS JETPATE
 EXTEND
 MP BIT14
 ADS TRAPEOP
 CA JETRATEQ
 AD AOSQTERM
 EXTEND
 MP -BIT14
 ADS TRAPEOQ
 CA JETRATEQ
 AD AOSRTERM
 EXTEND
 MP -BIT14
 ADS TRAPEOR

0110 REF 12 LAST 1410 16,2337 3 0033 1
 0111 REF 272 LAST 1418 16,2340 54 001 1
 0112 16,2341 0 0006 1
 0113 REF 1 16,2342 21'437 1
 0114 REF 2 LAST 1418 16,2343 23'437 0
 0115 REF 3 LAST 1418 16,2344 55'736 0
 0116 16,2345 0 0006 1
 0117 REF 8 LAST 1411 16,2346 7 1412 0
 0118 REF 21 LAST 1418 16,2347 6 1735 1
 0119 REF 8 LAST 1417 16,2350 53'425 1

CA CDUY
 TS L
 EXTEND
 MSU OLDYFORP SCALED AT PI
 LXCH OLDYFORP
 TS DAPTEMP2
 EXTEND
 MP M11 M11 SCALED AT 1
 AD DAPTEMP1
 OXCH OMEGAU

0120 REF 1 16,2351 0 2255 1
 0121 16,2352 0 0006 1

TC SUBDIVDE *3 RETURNS WITH CDU-RATE AT PI/4
 EXTEND

L

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0122	REF	9	LAST	1408	16,2353	61'417	1	SU	OMEGAP	
0123	REF	8	LAST	1418	16,2354	27'426	1	ADS	TRAPEDP	
0124	REF	1			16,2355	0 2277	1	TC	OVERSUB	
0125	REF	9	LAST	1419	16,2356	55'426	1	TS	TRAPEDP	
012501					16,2357	0 0006	1	EXTEND		
012502	REF	3	LAST	1417	16,2360	3 1742	1	DCA	DAPTEMP5	
012503	REF	3	LAST	145	16,2361	21'445	1	DAS	DXERROR	
012504	REF	1			16,2362	4 1452	1	CS	PLAST	
012505					16,2363	0 0006	1	EXTEND		
012506	REF	2	LAST	1418	16,2364	7 3603	0	MP	1/40	
012507	REF	4	LAST	1419	16,2365	21'445	1	DAS	DXERPDR	MANUAL MODE X-ATTITUDE ERROR (DP)
0126	REF	16	LAST	1410	16,2366	3 0034	0	CA	CDUZ	
0127	REF	273	LAST	1418	16,2367	54 001	1	TS	L	
0128					16,2370	0 0006	1	EXTEND		
0129	REF	2	LAST	1407	16,2371	21'440	1	MSU	OLDZFORQ	
0130	REF	4	LAST	1417	16,2372	55'737	1	TS	DAPTEMP3	
0131	REF	3	LAST	1419	16,2373	23'440	0	LXCH	OLDZFORQ	
0132	REF	3	LAST	1410	16,2374	3 1413	0	CA	M21	
0133					16,2375	0 0006	1	EXTEND		
0134	REF	4	LAST	1418	16,2376	7 1736	0	MP	DAPTEMP2	
0135	REF	9	LAST	1418	16,2377	53'425	1	DXCH	OMEGAU	
0136	REF	6	LAST	1410	16,2400	3 1415	0	CA	M22	
0137	REF	2	LAST	1418	16,2401	0 2252	0	TC	SUBDIVDE	
0138					16,2402	0 0006	1	EXTEND		
0139	REF	8	LAST	1406	16,2403	61'420	0	SU	OMFGAQ	
0140	REF	3	LAST	1418	16,2404	27'427	0	ADS	TRAPEDQ	
0141	REF	2	LAST	1419	16,2405	0 2277	1	TC	OVERSUB	
0142	REF	4	LAST	1419	16,2406	55'427	0	TS	TRAPEDQ	
014201					16,2407	0 0006	1	EXTEND		
014202	REF	4	LAST	1419	16,2410	3 1742	1	DCA	DAPTEMP5	
014203	REF	2	LAST	145	16,2411	21'447	0	OAS	DYERPDR	
014204	REF	1			16,2412	4 1453	0	CS	QLAST	
014205					16,2413	0 0006	1	EXTEND		
014206	REF	3	LAST	1419	16,2414	7 3603	0	MP	1/40	
014207	REF	3	LAST	1419	16,2415	21'447	0	DAS	DYERROR	MANUAL MODE Y-ATTITUDE ERROR (DP)
0143	REF	3	LAST	1410	16,2416	3 1414	1	CA	M31	
0144					16,2417	0 0006	1	EXTEND		
0145	REF	5	LAST	1419	16,2420	7 1736	0	MP	DAPTEMP2	
0146	REF	10	LAST	1419	16,2421	53'425	1	DXCH	OMFGAU	
0147	REF	4	LAST	1410	16,2422	3 1416	0	CA	M32	
0148	REF	3	LAST	1419	16,2423	0 2252	0	TC	SUBDIVDE	
0149					16,2424	0 0006	1	EXTEND		
0150	REF	2	LAST	1406	16,2425	61'421	1	SU	OMEGAR	
0151	REF	3	LAST	1418	16,2426	27'430	0	ADS	TRAPEDR	
0152	REF	3	LAST	1419	16,2427	0 2277	1	TC	OVERSUB	
0153	REF	4	LAST	1419	16,2430	55'430	0	TS	TRAPEDR	TRAPEDS HAVE ALL BEEN COMPUTED

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015301				16,2431	0 0006 1	EXTEND	
015302	REE	5	LAST 1419	16,2432	3 1742 1	DCA	DAPTEMP5
015303	REF	2	LAST 145	16,2433	21'451 1	DAS	DZERROR
015304	RFE	1		16,2434	4 1454 1	CS	RLAST
015305				16,2435	0 0006 1	EXTEND	
015306	REF	4	LAST 1419	16,2436	7 3603 0	MP	1/40
015307	REE	3	LAST 1420	16,2437	21'451 1	DAS	DZERROR
01531	REE	39	LAST 1406	16,2440	3 0111 0	CA	DAPBOOLS
01532	REF	7	LAST 909	16,2441	7 4737 1	MASK	CSDDOCKD
01533				16,2442	0 0006 1	EXTEND	
01534	REF	1		16,2443	1 2451 1	BZE	LONLY
01535				16,2444	0 0006 1	EXTEND	DOCKED
01536	REF	2	LAST 228	16,2445	3 1405 1	DCA	DKOMEGAN
01537	REE	76	LAST 1418	16,2446	52 062 1	DXCH	ITEMP1
01538	REF	2	LAST 228	16,2447	3 1403 1	CA	DKTRAP
015382				16,2450	1 2455 0	TCE	+5
015384				16,2451	0 0006 1	EXTEND	UNDOCKED
015386	REF	2	LAST 228	16,2452	3 1410 0	DCA	LM3MEGAN
015388	REE	77	LAST 1420	16,2453	52 062 1	DXCH	ITEMP1
01539	REF	2	LAST 228	16,2454	3 1406 1	CA	LMTRAP
015392	REF	30	LAST 1369	16,2455	54 063 0	TS	ITEMP3
0154	REF	10	LAST 1419	16,2456	11'426 1	CCS	TRAPEDP
0155				16,2457	1 2461 1	TCE	+2
0156	REE	1		16,2460	1 2476 1	TCF	SMALPDIE
0157	REE	31	LAST 1420	16,2461	6 0063 1	AD	ITEMP3
0158				16,2462	0 0006 1	EXTEND	TRAPSIZE > ABOUT 77001 %-1.4DEG/SEC"
0159	REE	2	LAST 1420	16,2463	6 2476 0	BZMF	SMALPDIE
0160				16,2464	22 007 0	ZL	
0161	REF	11	LAST 1420	16,2465	23'426 0	LXCH	TRAPEDP
0162	REF	276	LAST 1413	16,2466	3 4755 1	CA	ZERC
0163				16,2467	0 0006 1	EXTEND	
0164	REF	2	LAST 1407	16,2470	11'431 1	DV	NPTRAPS
0165	REE	10	LAST 1419	16,2471	27'417 0	ADS	OMEGAP
0166	REE	4	LAST 1419	16,2472	0 2277 1	TC	OVERSUB
0167	REF	11	LAST 1420	16,2473	55'417 0	TS	OMEGAP
0168	REE	78	LAST 1420	16,2474	3 0061 0	CA	ITEMP1
0169	REF	3	LAST 1420	16,2475	55'431 1	TS	NPTRAPS
0170	REF	4	LAST 1420	16,2476	25'431 0	INCR	NPTRAPS
0171	REF	5	LAST 1418	16,2477	3 1743 0	CA	JETRAT
0172	REF	12	LAST 1420	16,2500	27'417 0	ADS	OMEGAP
0173	REE	5	LAST 1420	16,2501	0 2277 1	TC	OVERSUB
0174	REF	13	LAST 1420	16,2502	55'417 0	TS	OMEGAP
0175	REF	5	LAST 1419	16,2503	11'427 0	CCS	TRAPEDP
0176				16,2504	1 2506 1	TCE	+2
0177	REE	1		16,2505	1 2533 1	TCE	Q-RATE
0178	REF	32	LAST 1420	16,2506	6 0063 1	AD	ITEMP3
0179				16,2507	0 0006 1	EXTEND	
0180	REE	2	LAST 1420	16,2510	6 2533 0	BZMF	Q-RATE

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0181				16,2511	22 007 0	ZL		
0182	REF	6	LAST 1420	16,2512	23'427 1	LXCH	TRAPFDO	
0183	REF	277	LAST 1420	16,2513	3 4755 1	CA	ZERO	
0184				16,2514	0 0006 1	EXTEND		
0185	REF	2	LAST 1407	16,2515	11'432 1	DV	NOTPAPS	
0186	REF	22	LAST 1418	16,2516	55'735 0	TS	DAPTEMP1	SAVE FOR OFFSET ESTIMATE
0189	REF	9	LAST 1419	16,2517	27'420 1	ADS	OMEGAQ	
0190	REF	6	LAST 1420	16,2520	0 2277 1	TC	OVERSUB	
0191	REF	10	LAST 1421	16,2521	55'420 1	TS	OMEGAQ	
0192	REF	79	LAST 1420	16,2522	3 0061 0	CA	ITEMP1	ABOUT 10 OR 0 FOR DOCKED OR UNDOCKED
0193	RFF	3	LAST 1421	16,2523	57'432 0	XCH	NOTRAPS	
0194	REF	27	LAST 1370	16,2524	6 0062 0	AD	ITEMP2	KAOS > ABOUT 60D %N/N_60"
0195	REF	23	LAST 1421	16,2525	57'735 1	XCH	DAPTEMP1	
0196				16,2526	0 0006 1	EXTEND		
0197	REF	24	LAST 1384	16,2527	7 4756 0	MP	FIVE	
0198				16,2530	0 0006 1	EXTEND		
0199	REF	24	LAST 1421	16,2531	11'735 0	DV	DAPTEMP1	
0200	REF	16	LAST 1415	16,2532	27'537 0	ADS	ADSC	
0201	REF	4	LAST 1421	16,2533	25'432 0	INCR	NOTRAPS	Q-RATE
0202	REF	2	LAST 1418	16,2534	3 1744 1	CA	JETRATFQ	
0203	REF	5	LAST 1418	16,2535	6 1545 1	AD	ADSCTERM	
0204	RFF	11	LAST 1421	16,2536	27'420 1	ADS	OMEGAQ	
0205	REF	7	LAST 1421	16,2537	0 2277 1	TC	OVERSUB	
0206	REF	12	LAST 1421	16,2540	55'420 1	TS	OMEGAQ	
0207	RFF	5	LAST 1419	16,2541	11'430 0	CCS	TRAPEDR	
0208				16,2542	1 2544 1	TCF	+2	
0209	REF	1		16,2543	1 2571 1	TCF	R-RATE	
0210	REF	33	LAST 1420	16,2544	6 0063 1	AD	ITEMP3	TRAPSIZE > ABOUT 77001 %-1.4DEG/SEC"
0211				16,2545	0 0006 1	EXTEND		
0212	REF	2	LAST 1421	16,2546	6 2571 0	8ZMF	R-RATE	
0213				16,2547	22 007 0	ZL		
0214	REF	6	LAST 1421	16,2550	23'430 1	LXCH	TRAPEDR	
0215	RFF	278	LAST 1421	16,2551	3 4755 1	CA	ZERO	
0216				16,2552	0 0006 1	EXTEND		
0217	REF	2	LAST 1407	16,2553	11'433 0	DV	NRTRAPS	
0218	REF	6	LAST 1419	16,2554	55'736 0	TS	DAPTEMP2	SAVE FOR OFFSET ESTIMATE
0221	REF	3	LAST 1419	16,2555	27'421 0	ADS	OMEGAR	
0222	REF	8	LAST 1421	16,2556	0 2277 1	TC	OVERSUB	
0223	REF	4	LAST 1421	16,2557	55'421 0	TS	OMEGAR	
0224	REF	80	LAST 1421	16,2560	3 0061 0	CA	ITEMP1	ABOUT 10 OR 0 FOR DOCKED OR UNDOCKED
0225	REF	3	LAST 1421	16,2561	57'433 1	XCH	NRTRAPS	
0226	REF	28	LAST 1421	16,2562	6 0062 0	AD	ITEMP2	KAOS > ABOUT 60D %N/N_60"
0227	REF	7	LAST 1421	16,2563	57'736 1	XCH	DAPTEMP2	
0228				16,2564	0 0006 1	EXTEND		
0229	RFF	25	LAST 1421	16,2565	7 4756 0	MP	FIVE	
0230				16,2566	0 0006 1	EXTEND		
0231	REF	8	LAST 1421	16,2567	11'736 0	DV	DAPTEMP2	
0232	RFF	5	LAST 1406	16,2570	27'541 1	ADS	ACSR	
0233	REF	4	LAST 1421	16,2571	25'433 1	INCR	NRTRAPS	R-RATE

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0234 REF 2 LAST 1418 16,2572 3 1745 0
 0235 REF 4 LAST 1418 16,2573 6 1546 1
 0236 REF 5 LAST 1421 16,2574 27'421 0
 0237 REF 9 LAST 1421 16,2575 0 2277 1
 0238 REF 6 LAST 1422 16,2576 55'421 0

CA JFTRATER
 AD ACSRTERM
 ADS OMEGAR
 TC OVERSUB
 TS OMEGAR

A0239

END OF RATE DEVIATION

A0240

BEGIN OFFSET ESTIMATOR

A0241

IN POWERED FLIGHT, ADSTASK WILL BE CALLED EVERY 2 SECONDS.

A0242

ADS = ADS + K*SUMPATE

0243 REF 40 LAST 1420 16,2577 4 0111 1
 0244 REF 4 LAST 1404 16,2600 7 4744 0
 0245 REF 493 LAST 1417 16,2601 10 000 0
 0246 REF 1 16,2602 1 2613 0
 0247 REF 4 LAST 1406 16,2603 55'422 0
 0248 REF 3 LAST 1406 16,2604 55'423 1
 0249 REF 6 LAST 1421 16,2605 55'545 0
 0250 REF 5 LAST 1422 16,2606 55'546 0
 0251 REF 17 LAST 1421 16,2607 55'537 0
 0252 REF 6 LAST 1421 16,2610 55'541 1
 0253 REF 1 16,2611 1 2635 1
 0254 16,2612 00074 1
 0255 REF 2 LAST 1406 16,2613 3 1510 1
 0256 16,2614 0 0006 1
 0257 REF 3 LAST 1010 16,2615 7 4766 0
 0258 REF 18 LAST 1422 16,2616 21'540 0
 0259 REF 19 LAST 1422 16,2617 3 1537 1
 0260 REF 5 LAST 1422 16,2620 55'422 0
 0261 16,2621 0 0006 1
 0262 REF 1 16,2622 7 3601 1
 0263 REF 7 LAST 1422 16,2623 55'545 0
 0264 REF 2 LAST 1406 16,2624 3 1512 0
 0265 16,2625 0 0006 1
 0266 REF 4 LAST 1422 16,2626 7 4766 0
 0267 REF 7 LAST 1422 16,2627 21'542 1
 0268 REF 8 LAST 1422 16,2630 3 1541 0
 0269 REF 4 LAST 1422 16,2631 55'423 1
 0270 16,2632 0 0006 1
 0271 REF 2 LAST 1422 16,2633 7 3601 1
 0272 REF 6 LAST 1422 16,2634 55'546 0
 R0273

KAOS

WORKTIME

CS DAPBOOLS
 MASK DRIFTBIT
 CCS A
 TCF WORKTIME
 TS ALPHAQ
 TS ALPHAR
 TS ADSQTERM
 TS ADSFTERM
 TS ADSQ
 TS ACSR
 TCF PAXFILT
 DEC 60
 CA QACCDOT
 EXTEND
 MP CALLCODE
 DAS ADSQ
 CA ADSQ
 TS ALPHAQ
 EXTEND
 MP 200MS
 TS ADSQTERM
 CA PACCDOT
 EXTEND
 MP CALLCODE
 DAS ACSF
 CA ADSF
 TS ALPHAR
 EXTEND
 MP 200MS
 TS ADSFTERM

ZERO THE OFFSET ACCELERATION VALUES.

OCTAL 00032 IS DECIMAL .1 AT 2(6).

.2 AT 1

OCTAL 00032 IS DECIMAL .1 AT 2(6).

.2 AT 1

PAXFILT

0274 REF 1 16,2635 3 4747 1
 02742 REF 21 LAST 1414 16,2636 7 1273 1
 02744 REF 494 LAST 1422 16,2637 10 000 0
 02746 REF 1 16,2640 0 3721 0

CA CALLGMBL
 MASK RCSFLAGS
 CCS A
 TC ACDT+C12

EXECUTE ACDT+C12, IF NEEDED.

CALLGMBL IS NOT BIT15, SO THIS TEST IS VALID.

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0275	REF	12	LAST 1124	16,2641	52 011 0		DXCH	ARUPT	
0276	REF	4	LAST 152	16,2642	53'752 1		DXCH	DAPARUPT	
0277	REF	1		16,2643	3 2654 1		CA	SUPERJOB	SETTING UP THE SUPERJOB
0278	REF	3	LAST 1377	16,2644	56 017 1		XCH	8PUPT	
0279	REF	13	LAST 1416	16,2645	22 012 1		LXCH	QRUPT	
0280	REF	1		16,2646	53'754 1		DXCH	DAPBQRPT	
0281	REF	1		16,2647	3 2653 0		CA	SUPERADR	
0282	REF	1		16,2650	52 016 1		DXCH	ZRUPT	
0283	REF	3	LAST 1416	16,2651	53'756 0		DXCH	DAPZRUPT	
0284	REF	1		16,2652	1 5275 0		TCF	NOQBRSM +1	RELINT (JUST IN CASE) AND RESUME, IN THE FORM OF A JASK, AT SUPERJOB.
A0285									
0286	REF	2	LAST 1423	16,2653	02655 0	SUPERADR GENADR SUPERJOB +1			
R0287	COUNT	DOWN	GIMBAL DRIVE TIMERS AND TURN OFF DRIVES IF REQUIRED.						
0288	REF	4	LAST 1407	16,2654	11'630 1	SUPERJOB	CCS	QGIMTIMR	0-AXIS GIMBAL DRIVE TIMER
0289	REF	1		16,2655	1 2667 0		TCF	DECQTIMR	POSITIVE- COUNTING DOWN
0290	REF	1		16,2656	1 2673 0		TCF	TURNOFFQ	NEGATIVE- DRIVE SHOULD BE ENDED
0291	REF	2	LAST 1407	16,2657	11'632 0	CHKRTIMR	CCS	RGIMTIMR	NEGATIVE- INACTIVE
0292	REF	1		16,2660	1 2671 1		TCF	DECRTIMR	(NEG ZERO- IMPOSSIBLE)
0293	REF	1		16,2661	1 2703 0		TCF	TURNOFFR	REPEATED (ABOVE) FOR R AXIS.
02931	REF	48	LAST 1407	16,2662	3 4740 0		CA	BIT12	
02932	REF	22	LAST 1422	16,2663	7 1273 1		MASK	RCSFLAGS	
0294				16,2664	0 0006 1		EXTEND		
02941	REF	1		16,2665	1 2713 1		8ZF	SKIPPAXS	
02942	REF	1		16,2666	0 2717 1		TC	CHKVISEZ	
0295	REF	5	LAST 1423	16,2667	55'630 1	DECQTIMR	TS	QGIMTIMR	COUNT TIMERS DOWN TO POS ZERO.
0296	REF	1		16,2670	1 2657 0		TCF	CHKRTIMR	
0297	REF	3	LAST 1423	16,2671	55'632 0	DECRTIMR	TS	RGIMTIMR	
0298	REF	2	LAST 1423	16,2672	1 2662 0		TCF	CHKRTIMR +3	
0299	REF	4	LAST 1406	16,2673	55'500 1	TURNOFFQ	TS	NEGUQ	HALT DRIVES.
0300	REF	3	LAST 1422	16,2674	55'510 0		TS	QACCDOT	
0301	REF	1		16,2675	4 5007 1		CS	QGIMBITS	
0302				16,2676	0 0006 1		EXTEND		
0303	REF	69	LAST 1413	16,2677	03 012 1		WAND	CHAN12	
0304	REF	7	LAST 1117	16,2700	3 4735 1		CAF	NEGMAX	
0305	REF	6	LAST 1423	16,2701	55'630 1		TS	QGIMTIME	
0306	REF	3	LAST 1423	16,2702	1 2657 0		TCF	CHKRTIMR	
0307	REF	2	LAST 1406	16,2703	55'502 0	TURNOFFR	TS	NEGUR	
0308	REF	3	LAST 1422	16,2704	55'512 1		TS	RACCDOT	
0309	REF	1		16,2705	4 5020 1		CS	RGIMBITS	
0310				16,2706	0 0006 1		EXTEND		
0311	REF	70	LAST 1423	16,2707	03 012 1		WAND	CHAN12	
0312	REF	8	LAST 1423	16,2710	3 4735 1		CAF	NEGMAX	
0313	REF	4	LAST 1423	16,2711	55'632 0		TS	RGIMTIMR	
0314	REF	4	LAST 1423	16,2712	1 2662 0		TCF	CHKRTIMR +3	
0315	REF	11	LAST 1297	5007		QGIMBITS	EQUALS	DGT1400	8 BITS 9 AND 10 (OF CHANNEL 12).
0316	REF	4	LAST 1280	5020		RGIMBITS	EQUALS	PRIO6	8 BITS 11 AND 12 (OF CHANNEL 12).

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0317	REF	23	LAST 1423	16,2713	4 1273	1	SKIPPAXS	CS	RCSFLAGS	
03171	REF	49	LAST 1423	16,2714	7 4740	1		MASK	BIT12	
0318	REF	24	LAST 1424	16,2715	27 273	1		ADS	RCSFLAGS	BIT 12 SET TO 1.
0319	REF	1		16,2716	1 3607	1		TCF	QRAXIS	GO TO QRAXIS OR TO GTS.

A0320 Y-Z TRANSLATION

A0321 INPUT: BITS 9-12 OF CH31 (FROM TRANSLATION CONTROLLER)

A0322 OUTPUT: NEXTP

A0323 NEXTP IS THE CHANNEL 6 CODE OF JETS FOR THE DESIRED TRANSLATION.
 A0324 IF THERE ARE FAILURES IN THE DESIRED POLICY, THEN

A0325 (1) FOR DIAGONAL TRANS: UNFAILED PAIR
 A0326 ALARM (IF NO PAIR)

A0327 (2) FOR PRINCIPAL TRANS: TRY TO TACK WITH DIAGONAL PAIRS
 A0328 ALARM (IF DIAGONAL PAIRS ARE FAILED)

0329				16,2717	0 0006	1	CHKVISEZ	EXTEND		
0330	REF	8	LAST 1405	16,2720	00 031	0		READ	CHAN31	
0331	REF	495	LAST 1422	16,2721	4 0000	0		CS	A	
0332	REF	1		16,2722	7 3576	1		MASK	074000CT	
0333				16,2723	0 0006	1		EXTEND		
0334	REF	1		16,2724	1 2773	1		BZF	TSNEXTP	
0335				16,2725	0 0006	1		EXTEND		
0336	REF	47	LAST 1293	16,2726	7 4745	1		MP	BIT7	
0337	REF	496	LAST 1424	16,2727	50 000	1		INDEX	A	
0338	REF	1		16,2730	3 3555	1		CA	INDXYZ	
0339	REF	1		16,2731	55 742	0		TS	ROTINDEX	
0340	REF	31	LAST 1413	16,2732	3 6241	0	TRYUDRV	CA	SIX	
0341	REF	1		16,2733	0 3534	0		TC	SELECTYZ	
0342	REF	32	LAST 1424	16,2734	4 6241	1		CS	SIX	
0343	REF	1		16,2735	6 1741	1		AD	NUMBERT	
0344				16,2736	0 0006	1		EXTEND		
0345	REF	2	LAST 1424	16,2737	1 2772	0		BZF	TSNEXTP -1	
0346	REF	26	LAST 1421	16,2740	4 4756	0		CS	FIVE	
0347	REF	2	LAST 1424	16,2741	6 1742	1		AD	ROTINDEX	
0348				16,2742	0 0006	1		EXTEND		
0349	REF	1		16,2743	6 2761	0		BZMF	ALTERTYZ	
0350	REF	2	LAST 1424	16,2744	4 1741	0		CS	NUMBERT	
0351	REF	32	LAST 1407	16,2745	6 4751	0		AD	FOUR	
0352				16,2746	0 0006	1		EXTEND		
0353	REF	3	LAST 1424	16,2747	6 2772	1		BZMF	TSNEXTP -1	
0354	REF	47	LAST 1312	16,2750	0 5567	0	ABORTYZ	TC	ALARM	
0355				16,2751	02001	1		OCT	02001	
0356	REF	62	LAST 1387	16,2752	3 4753	1		CA	BIT1	INVERT BIT 1 OF RCSFLAGS.
03561	REF	25	LAST 1424	16,2753	23 273	0		LXCH	RCSFLAGS	
03562				16,2754	0 0006	1		EXTEND		
03563				16,2755	06 001	0		RXOR	1	

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03564	REF	26	LAST	1424	16,2756	55'273 1		TS	RCSFLAGS	
0357	REF	279	LAST	1421	16,2757	3 4755 1		CA	ZERO	
0358	REF	4	LAST	1424	16,2760	1 2773 1		TCF	TSNEXTP	
0359	REF	63	LAST	1424	16,2761	3 4753 1	ALTERYZ	CA	BIT1	INVERT BIT 1 OF RCSFLAGS.
0360	REF	27	LAST	1425	16,2762	23'273 0		LXCH	RCSFLAGS	
0361					16,2763	0 0006 1		EXTEND		
03611					16,2764	06 001 0		RXOR	1	
03612	REF	28	LAST	1425	16,2765	55'273 1		TS	RCSFLAGS	
03613	REF	64	LAST	1425	16,2766	7 4753 0		MASK	BIT1	
0362	REF	33	LAST	1424	16,2767	6 4751 0		AO	FOUR	
0363	REF	3	LAST	1424	16,2770	27'742 0		AOS	ROTI NOEX	
0364	REF	1			16,2771	1 2732 1		TCF	TRYUCRV	
0365	REF	1			16,2772	3 1737 0		CA	POLYTEMP	
0366	REF	7	LAST	1408	16,2773	55'470 1	TSNEXTP	TS	NEXTP	
A0367							STATE LOGIC			

A0368							CHECK IN ORDER:		IF ON	
A0369							LPDPHASE		GO TO PURGENCY	
A0370							PULSES		MINIMUM PULSE LOGIC	
A0371							OETENT(BIT15 CH31)		RATE COMMAND	
A0372							GO TO PURGENCY			

0373	REF	55	LAST	1406	16,2774	3 4737 0		CA	BIT13	CHECK STICK IF IN ATT. HOLD.
0374					16,2775	0 0006 1		EXTEND		
0375	REF	9	LAST	1424	16,2776	02 031 1		RAND	CHAN31	
0376					16,2777	0 0006 1		EXTEND		
0377	REF	1			16,3000	1 3006 0		BZF	MANMODE	

0378	REF	41	LAST	1422	16,3001	3 0111 0		CA	DAPBCOLS	
0379	REF	2	LAST	909	16,3002	7 4743 1		MASK	XOVINHIB	
0380	REF	497	LAST	1424	16,3003	10 000 0		CCS	A	
0381	REF	1			16,3004	1 3442 1		TCF	PURGENCY	ATTITUDE STEER DURING VISIBILITY PHASE

0382	REF	1			16,3005	1 3050 0		TCF	DETENTCK	
0383	REF	4	LAST	747	16,3006	3 4735 1	MANMODE	CA	PULSES	PULSES IS ONE FOR PULSE MOOF
0384	REF	42	LAST	1425	16,3007	7 0111 1		MASK	DAPBCOLS	
0385					16,3010	0 0006 1		EXTEND		
0386	REF	2	LAST	1425	16,3011	1 3050 0		BZF	OETENTCK	BRANCH FOR RATE COMMAND

0387	REF	280	LAST	1425	16,3012	3 4755 1		CA	ZERO	
0388	REF	4	LAST	1416	16,3013	55'462 1		TS	PERROR	
R0389										MINIMUM IMPULSE MOOE

0390	REF	25	LAST	1418	16,3014	3 0032 0		CA	CDUX	
0391	REF	19	LAST	1416	16,3015	55'633 1		TS	COUXD	

0392	REF	2	LAST	1407	16,3016	11'456 0		CCS	OLDPMIN	
0393	REF	1			16,3017	1 3033 0		TCF	CHECKP	

0394	REF	46	LAST	1414	16,3020	3 4751 0	FIREP	CA	BIT3	
0395					16,3021	0 0006 1		EXTEND		

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0396	REF	10	LAST 1425	16,3022	02 031 1		RAND	CHAN31
0397				16,3023	0 0006 1		EXTEND	
0398	REF	1		16,3024	1 3043 1		BZF	+XMIN
0399	REF	57	LAST 1414	16,3025	3 4750 1		CA	BIT4
0400				16,3026	0 0006 1		EXTEND	
0401	REF	11	LAST 1426	16,3027	02 031 1		RAND	CHAN31
0402				16,3030	0 0006 1		EXTEND	
0403	REF	1		16,3031	1 3041 0		BZF	-XMIN
0404	REF	1		16,3032	1 3421 1		TCF	JETSCFF
0405				16,3033	0 0006 1	CHECKP	EXTEND	
0406	REF	12	LAST 1426	16,3034	00 031 0		READ	CHAN31
0407	REF	498	LAST 1425	16,3035	4 0000 0		CS	A
0408	RFF	6	LAST 1325	16,3036	7 5742 1		MASK	DCT14
0409	REF	3	LAST 1425	16,3037	55'456 0		TS	OLDPMIN
0410	REF	2	LAST 1426	16,3040	1 3421 1		TCF	JETSCFF
0411	RFF	9	LAST 1407	16,3041	4 4363 1	-XMIN	CS	TEN
0412				16,3042	1 3044 0		TCF	+2
0413	REF	10	LAST 1426	16,3043	3 4363 0	+XMIN	CA	TEN
0414	REF	4	LAST 1406	16,3044	55'524 1		TS	TJP
0415	REF	158	LAST 1417	16,3045	3 4753 1		CA	ONE
0416	REF	4	LAST 1426	16,3046	55'456 0		TS	OLDPMIN
0417	REF	1		16,3047	1 3327 0		TCF	PJETSLEC -6

ANYTHING LESS THAN 14MS. CORRECTED
IN JET SELECTION ROUTINE

R0418 MANUAL RATE COMMAND MODE

R0419 =====

R0420 BY ROBERT F. STENGEL

R0421

R04211 THIS MODE PROVIDES RCAM MANUAL CONTROL THRU 2 CONTROL LAWS: 1) DIRECT RATE AND 2) PSEUDO-AUTO.

R04213 THE DIRECT RATE MODE AFFORDS IMMEDIATE CONTROL WITHOUT OVERSHOOT. THE PSEUDO-AUTO MODE PROVIDES PRECISE

R04215 RATE CONTROL AND ATTITUDE HOLD.

R04216

R04217 IN DIRECT RATE, JETS ARE FIRED WHEN STICK POSITION CHANGES BY A FIXED NUMBER OF INCREMENTS IN ONE DAP CYCLE.

R04219 THE 'BREAKOUT LEVEL' IS .6 D/S FOR LM-ONLY AND .3 D/S FOR CSM-DOCKED. THIS LAW NULLS THE RATE ERROR TO WITHIN

R04221 THE 'TARGET DEADBAND', WHICH EQUALS THE BREAKOUT LEVEL.

R04222 IN PSEUDO-AUTO, BODY-FIXED RATE AND ATTITUDE ERRORS ARE SUPPLIED TO TJETLAW, WHICH EXERCISES CONTROL.

R04224 CONTROL SWITCHES FROM DIRECT RATE TO PSEUDO-AUTO IF THE TARGET DB IS ACHIEVED OR IF TIME IN (1) EXCEEDS 4 SEC.

R04226 IF THE INITIAL COMMAND DOES NOT EXCEED THE BREAKOUT LEVEL, CONTROL GOES TO PSEUDO-AUTO IMMEDIATELY.

R04228

R04229 SINCE P-AXIS CONTROL IS SEPARATE FROM Q,R AXES CONTROL, IT IS POSSIBLE TO USE (1) IN P-AXIS AND (2) IN Q,R AXES,

R04231 OR VICE VERSA. THIS ALLOWS A DEGREE OF ATTITUDE HOLD IN UNCONTROLLED AXES. DUE TO U,V CONTROL, HOWEVER, Q AND

R04233 R AXES ARE COUPLED AND MUST USE THE SAME CONTROL LAW.

R04234

R04235 HAND CONTROLLER COMMANDS ARE SCALED BY A LINEAR/QUADRATIC LAW. FOR THE LM-ALONE, MAXIMUM COMMANDED RATES ARE 20

R04237 AND 4 D/S IN NORMAL AND FINE SCALING; HOWEVER, STICK SENSITIVITY AT ZERO COUNTS (OBTAINED AT A STICK DEFLECTION

R04239 OF 2 DEGREES FROM THE CENTERED POSITION) IS .5 OR .1 D/S PER DEGREE. NORMAL AND FINE SCALINGS FOR THE CSM-DOCKED

R04241 CASE IS AUTOMATICALLY SET TO 1/10 THE ABOVE VALUES. SCALING IS DETERMINED IN ROUTINE 3.

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P-AXIS RCS AUTOPILOT

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A04243									ZEROENBL	ENABLES COUNTERS SO THEY CAN BE READ NEXT TIME
A0425									JUSTOUT	FIRST DETECTION OF OUT OF DETENT (BY DURRCBIT)
A0426										
A0427										
0430					16,3050	0 0006	1	DETENTCK	EXTEND	
0431	REF	13	LAST	1426	16,3051	00 031	0		READ	CHAN31
0432	REF	1			16,3052	55'441	0		TS	CH31TEMP
0433	REF	53	LAST	1417	16,3053	7 4735	0		MASK	BIT15
0434					16,3054	0 0006	1		EXTEND	CHECK OUT-OF-DETENT BIT.
0435	REF	1			16,3055	1 3202	0		BZF	RHCMOVEO
0436	REF	1			16,3056	3 4740	0		CAF	DURRCBIT
0437	REF	43	LAST	1425	16,3057	7 0111	1		MASK	OAPBOOLS
0438					16,3060	0 0006	1		EXTEND	
0439	REF	2	LAST	1425	16,3061	1 3442	1		BZF	PURGECY
										BRANCH IF NOT IN RATE COMMAND LAST PASS.
R0440										
0441	REF	35	LAST	1386	16,3062	3 4743	0		CA	BIT9
0441	REF	29	LAST	1425	16,3063	7 1273	1		MASK	RCSFLAGS
04412					16,3064	0 0006	1		EXTEND	JUST IN DETENT??
04413	REF	1			16,3065	1 3077	0		BZF	RUTH
04426	REF	56	LAST	1425	16,3066	3 4737	0		CAF	BIT13
04427					16,3067	0 0006	1		EXTEND	CHECK FOR ATTITUDE HOLO.
04428	REF	14	LAST	1427	16,3070	02 031	1		RANO	CHAN31
04429					16,3071	0 0006	1		EXTEND	
0443	REF	1			16,3072	1 3177	1		BZF	RATEDAMP
										BRANCH IF IN ATTITUDE HOLO.
04431	REF	1			16,3073	4 5014	0		CS	BITS9,11
04432	REF	30	LAST	1427	16,3074	7 1273	1		MASK	RCSFLAGS
04433	REF	31	LAST	1427	16,3075	55'273	1		TS	RCSFLAGS
04434	REF	2	LAST	1427	16,3076	1 3177	1		TCF	RATEDAMP
										IN AUTO. (X-AXIS OVERRIDE)
04465	REF	32	LAST	1427	16,3077	3 1273	0	RUTH	CA	RCSFLAGS
0447	REF	1			16,3100	7 4742	0		MASK	PBIT
0448					16,3101	0 0006	1		EXTEND	IN ATTITUDE HOLO.
0449					16,3102	1 3104	0		BZF	+2
0450	REF	3	LAST	1427	16,3103	1 3177	1		TCF	RATEOAMP
0451	REF	33	LAST	1427	16,3104	3 1273	0		CA	RCSFLAGS
0452	REF	1			16,3105	7 4741	0		MASK	ORBIT
0453					16,3106	0 0006	1		EXTEND	
0454	REF	1			16,3107	1 3115	0		BZF	RATEDONE
04541	REF	4	LAST	1427	16,3110	1 3177	1		TCF	RATEOAMP
										BRANCH IF Q,R RATE DAMPING IS FINISHED.
R04542										
0455					16,3111	00001	0	1/10SEC	OCT	1
04551					16,3112	00050	1	40CYC	OCT	50
04552					16,3113	74777	0	PORBIT	OCT	74777
04553	REF	8	LAST	954	5014			BITS9,11	EQUALS	ERANK5
04554					16,3114	00056	1	LINRATP	OEC	46
R04561										
0457	REF	2	LAST	1427	16,3115	4 4740	1	RATEDONE	CS	DURRCBIT
0458					16,3116	0 0004	0		INHINT	
0459	REF	44	LAST	1427	16,3117	7 0111	1		MASK	OAPBOOLS
										MANUAL COMMAND AND DAMPING COMPLETED IN ALL AXES.

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0460 RFF 45 LAST 1427 16,3120 54 111 1 TS DAPBOOLS

R0461 READ CDUS INTO CDU DESIRED REGISTERS

04611 RFF 57 LAST 1427 16,3121 3 4737 0

CAF BIT13

04612 16,3122 0 0006 1

EXTEND

04613 RFF 15 LAST 1427 16,3123 02 031 1

RAND CHAN31

04614 16,3124 0 0006 1

EXTEND

04615 16,3125 1 3131 0

BZF +4

04616 RFF 26 LAST 1425 16,3126 3 0032 0

CA CDUX

(X-AXIS OVERRIDE)

04617 RFF 20 LAST 1425 16,3127 55'633 1

TS CDUXD

04618 16,3130 0 3133 0

TC +3

0462 RFF 54 LAST 1408 16,3131 0 4674 0

TC IRNKCALL

0463 RFF 11 LAST 1406 16,3132 40153 1

FCADR ZATTEROR

04635 16,3133 0 0003 1

RELINT

0464 RFF 3 LAST 1427 16,3134 1 3442 1

TCF PURGNCY

0465 REF 5 LAST 1425 16,3135 55'462 1

TS PERRCR

0466 RFF 3 LAST 1427 16,3136 3 4740 0

JUSTOUT

CA QURRC8IT

INITIALIZATION - FIRST MANUAL PASS.

04668 RFF 46 LAST 1428 16,3137 26 111 1

ADS DAPBOOLS

0467 REF 281 LAST 1425 16,3140 3 4755 1

CA ZFRO

04671 RFF 5 LAST 1419 16,3141 55'444 0

TS DXERROR

04672 REF 6 LAST 1428 16,3142 55'445 1

TS DXERROR +1

04673 REF 4 LAST 1419 16,3143 55'446 1

TS DYERROR

04674 RFF 5 LAST 1428 16,3144 55'447 0

TS DYERROR +1

04675 RFF 4 LAST 1420 16,3145 55'450 0

TS DZERROR

04676 REF 5 LAST 1428 16,3146 55'451 1

TS DZERROR +1

04679 RFF 2 LAST 1419 16,3147 55'452 1

TS PLAST

046791 RFF 2 LAST 1419 16,3150 55'453 0

TS QLAST

046792 REF 2 LAST 1420 16,3151 55'454 1

TS RLAST

046793 RFF 1 16,3152 54 042 0

TS Q-RHCCTR

0468 RFF 1 16,3153 54 044 0

TS R-RHCCTR

04683 REF 1 16,3154 3 3113 1

CA QRRIT

04684 RFF 34 LAST 1427 16,3155 7 1273 1

MASK RCSFLAGS

04685 REF 35 LAST 1428 16,3156 55'273 1

TS RCSFLAGS

BITS 10 AND 11 OF RCSFLAGS ARE 0.

046851 REF 36 LAST 1428 16,3157 4 1273 1

CS RCSFLAGS

SFT 'JUST-IN' BIT TO 1.

046852 REF 36 LAST 1427 16,3160 7 4743 1

MASK BIT9

046853 RFF 37 LAST 1428 16,3161 27'273 1

ADS RCSFLAGS

0471 REF 1 16,3162 0 3164 1

TC ZEROEN8L

0472 RFF 3 LAST 1426 16,3163 1 3421 1

TCF JETSOFF

0473 RFF 2 LAST 1428 16,3164 22 044 1

ZEROEN8L

LXCH R-RHCCTR

0474 REF 2 LAST 1428 16,3165 3 0042 1

CA Q-RHCCTR

0475 RFF 1 16,3166 53'461 1

DXCH SAVFHAND

0476 RFF 282 LAST 1428 16,3167 3 4755 1

CA ZFRO

0477 REF 1 16,3170 54 043 1

TS P-RHCCTR

0478 RFF 3 LAST 1428 16,3171 54 042 0

TS Q-RHCCTR

0479 REF 3 LAST 1428 16,3172 54 044 0

TS R-RHCCTR

0480 REF 1 16,3173 3 3602 0

CA BITS8,9

0481 16,3174 0 0006 1

EXTEND

0482 REF 23 LAST 1399 16,3175 05 013 0

WOR

CHAN13

COUNTERS ZEROED AND ENABLED

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0483	REF 404	LAST 1417	16,3176	0 0002 0	TC	Q	
04831	REF 283	LAST 1428	16,3177	3 4755 1	RATEOAMP	CA	ZERO
04832	REF 2	LAST 1428	16,3200	54 043 1	TS	P-RHCCTR	
04833	REF 1		16,3201	1 3206 1	TCF	RATFRROR	
0484	REF 4	LAST 1428	16,3202	3 4740 0	RHCMOVED	CA	TURRCBIT
0485	REF 47	LAST 1428	16,3203	7 0111 1		MASK	OAPBOOLS
0486			16,3204	0 0006 1		EXTEND	
0487	REF 1		16,3205	1 3135 1		BZF	JUSTOUT -1
04871	REF 27	LAST 1428	16,3206	3 0032 0	RATERORR	CA	COUX
04872	REF 21	LAST 1428	16,3207	55'633 1		TS	COUXD
0488	REF 3	LAST 1429	16,3210	10 043 1		CCS	P-RHCCTR
0489			16,3211	1 3214 1		TCF	+3
0490			16,3212	1 3214 1		TCF	+2
0491			16,3213	1 3214 1		TCF	+1
0492			16,3214	6 0000 1		DOUBLE	
0493			16,3215	6 0000 1		DOUBLE	
0496	REF 1		16,3216	6 3114 0		AD	LINRATP
04961			16,3217	0 0006 1		EXTEND	
04962	REF 4	LAST 1429	16,3220	7 0043 1		MP	P-RHCCTR
04963	REF 274	LAST 1419	16,3221	3 0001 0		CA	L
04964			16,3222	0 0006 1		EXTEND	
04965	REF 6	LAST 309	16,3223	7 1442 0		MP	STIKSENS
04966	REF 3	LAST 1428	16,3224	57'452 0		XCH	PLAST
04967			16,3225	4 0000 0		COM	
04968	REF 4	LAST 1429	16,3226	6 1452 0		AD	PLAST
04969	REF 25	LAST 1421	16,3227	55'735 0		TS	DAPTEMPI
0497	REF 2	LAST 1428	16,3230	0 3164 1		TC	ZEROENBL
0498	REF 5	LAST 1429	16,3231	4 1452 1		CS	PLAST
0499	REF 14	LAST 1420	16,3232	6 1417 1		AD	DMEGAP
0500	REF 1		16,3233	55'425 1		TS	E00TP
0501	REF 26	LAST 1429	16,3234	11'735 0		CCS	DAPTEMPI
0502			16,3235	1 3240 0		TCF	+3
0503			16,3236	1 3246 0		TCF	+8
0504			16,3237	1 3240 0		TCF	+1
0505	REF 5	LAST 309	16,3240	6 1474 1		AD	-RATEDB
0506			16,3241	0 0006 1		EXTEND	
0507			16,3242	6 3246 1		BZMF	+4
0508	REF 1		16,3243	3 3112 0		CA	40CYC
0509	REF 2	LAST 1416	16,3244	55'443 1		TS	TCF
05091	REF 1		16,3245	0 3257 1		TC	PEGI
0510	REF 38	LAST 1428	16,3246	3 1273 0		CA	RCSFLAGS
05101	REF 2	LAST 1427	16,3247	7 4742 0		MASK	PRIT
05102			16,3250	0 0006 1		EXTEND	
05104			16,3251	1 3253 1		BZF	+2
05106	REF 2	LAST 1429	16,3252	0 3257 1		TC	PEGI
05108	REF 7	LAST 1428	16,3253	3 1444 1		CA	DXERROR
0512	REF 1		16,3254	55'150 0		TS	E
05121	*REF 6	LAST 1428	16,3255	55'462 1		TS	PFRROR
05122	REF 4	LAST 1428	16,3256	0 3446 1		TC	PURGFNCY +4

P CONTROL
 F INOCOW REQUIRES THAT COUXD=COUX DURING X-AXIS OVERRIDE
 LINEAR/QUADRATIC CONTROLLER SCALING (SEE EXPLANATION IN Q,R-AXES RCS AUTOPILOT)
 INTERVAL. ZERO AND ENABLE ACA COUNTERS.
 IF P COMMAND CHANGE EXCEEDS BREAKOUT LEVEL, GO TO DIRECT RATE CONTROL. IF NOT CHECK FOR DIRECT RATE CONTROL LAST TIME.
 CHECK FOR DIRECT RATE COMMAND LAST TIME.
 TO PURE RATE COMMAND PSFUDO-AUTO CONTROL. X-ATTITUDE ERROR (SP) LOAD P-AXIS ERROR FOR MODEL FDAI DISPLAY

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05125	REF	28	LAST	1429	16,3257	3 0032 0	PEGI	CA	CDUX	DIRECT RATE CONTROL.
05126	REF	22	LAST	1429	16,3260	55'633 1		TS	CDUXD	
05127	REF	284	LAST	1429	16,3261	3 4755 1		CA	ZERO	
05128	REF	8	LAST	1429	16,3262	55'444 0		TS	DXERROR	
05129	REF	9	LAST	1430	16,3263	55'445 1		TS	DXERROR +1	
0513	*REF	7	LAST	1429	16,3264	55'462 1		TS	PERROR	ZERO P-AXIS ERROR FOR MODEL FDAI DISPLAY
0517	REF	2	LAST	1429	16,3265	11'425 1		CCS	EDOTP	
0518					16,3266	0 3271 0		TC	+3	
0519					16,3267	0 3271 0		TC	+2	
0520					16,3270	0 3271 0		TC	+1	
0521	REF	1			16,3271	55'735 0		TS	ABSEDOTP	
05215	REF	1			16,3272	6 1474 1		AD	TARGETDB	
0522					16,3273	0 0006 1		EXTEND		IF RATE ERROR IS LESS THAN DEADBAND,
05225	REF	1			16,3274	6 3304 0		BZMF	LAST	FIRE, AND SWITCH TO PSEUDO-AUTO.
0523	REF	3	LAST	1429	16,3275	3 1443 0		CA	TCP	
0524					16,3276	0 0006 1		EXTEND		IF TIME IN RATE COMMAND EXCEEDS 4 SEC.,
05245	REF	2	LAST	1430	16,3277	6 3304 0		BZMF	LAST	
0525	REF	39	LAST	1429	16,3300	4 1273 1		CS	RCSFLAGS	
05251	REF	3	LAST	1429	16,3301	7 4742 0		MASK	PBIT	
05252	REF	40	LAST	1430	16,3302	27'273 1		ADS	RCSFLAGS	BIT 10 IS 1.
052601					16,3303	1 3307 1		TCF	+4	
052602	REF	4	LAST	1430	16,3304	4 4742 0	LAST	CS	PBIT	
052603	REF	41	LAST	1430	16,3305	7 1273 1		MASK	RCSFLAGS	
052604	REF	42	LAST	1430	16,3306	55'273 1		TS	RCSFLAGS	BIT 10 IS 0.
05262	REF	3	LAST	1430	16,3307	4 1425 1		CS	EDOTP	
05263					16,3310	0 0006 1		EXTEND		
05264	REF	1			16,3311	7 1551 0		MP	1/ANETP	1/2JTACC SCALED AT 2EXP(7)/PI
05265	REF	499	LAST	1426	16,3312	20 001 1		DAS	A	
05266	REF	10	LAST	1422	16,3313	0 2277 1		TC	OVERSUB	
05267					16,3314	0 0006 1		EXTEND		
05268	REF	1			16,3315	7 7715 1		MP	25/32	A CONTAINS TJET SCALED AT 2EXP(4)(16/25)
05269	REF	5	LAST	1426	16,3316	55'524 1		TS	TJP	4.JET TIME
0527	REF	2	LAST	1430	16,3317	3 1735 1		CA	ABSEDOTP	
0528	REF	2	LAST	145	16,3320	6 1473 0		AD	-2JETLIM	COMPARING DELTA RATE WITH 2 JET LIMIT
0529					16,3321	0 0006 1		EXTEND		
0530					16,3322	6 3325 0		BZMF	+3	
0531	REF	33	LAST	1424	16,3323	3 6241 0		CA	SIX	
0532					16,3324	1 3334 1		TCF	+8D	
0533	REF	6	LAST	1430	16,3325	3 1524 0		CA	TJP	
0534	REF	7	LAST	1430	16,3326	27'524 1		ADS	TJP	

A0535 GOES TO PJETSLEC FOR TWO JETS

A0536 P-JET-SELECTION-ROUTINE (ROTATION)

A0537 INPUT: NUMBERT 4,5,6 FOR WHICH PAIR OR 4 JETS
 A0538 TJP + FOR +P ROTATION

A0539 OUTPUT: CHANNEL 6
 A0540 PJUMPADR FOR P-AXIS SKIP

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				(JTLST CALL)	(SMALL TJP)
A0541					ORDER OF POLICIES TRIED IN CASE OF FAILURE.
A0542					+P -P
A0543					7,15 8,16
A0544					4,12 3,11
A0545					4,7 8,11
A0546					7,12 11,16
A0547					12,15 3,16
A0548					4,15 3,8
A0549					ALARM ALARM
A0550					CA ADRBSYST
0551	REF	1	16,3327 3 4747 1	MASK	DAPBCOLS
0552	REF	48 LAST 1429	16,3330 7 0111 1	CCS	A
0553	REF	500 LAST 1430	16,3331 10 000 0	CA	ONE
0554	REF	159 LAST 1426	16,3332 3 4753 1	AD	FOUR
0555	REF	34 LAST 1425	16,3333 6 4751 0	TS	NUMBERT
0556	REF	3 LAST 1424	16,3334 55'741 0	CA	ONE
0557	REF	160 LAST 1431	16,3335 3 4753 1	TS	L
0558	REF	275 LAST 1429	16,3336 54 001 1	CCS	TJP
0559	REF	8 LAST 1430	16,3337 11'524 1	TCF	+5
0560				TCF	JETSCFF
0561	REF	4 LAST 1428	16,3341 1 3421 1	TCF	+2
0562				TCF	JETSCFF
0563	REF	5 LAST 1431	16,3343 1 3421 1	ZL	
0564				AD	ONE
0565	REF	161 LAST 1431	16,3345 6 4753 1	TS	ABSTJ
0566	REF	1	16,3346 55'735 0	LXCH	ROTINDEX
0567	REF	4 LAST 1425	16,3347 23'742 1	TC	SELCTP
0568	REF	1	16,3350 0 3514 1	CS	SIX
0569	REF	34 LAST 1430	16,3351 4 6241 1	AD	NUMBERT
0570	REF	4 LAST 1431	16,3352 6 1741 1	EXTEND	
0571				BZF	+2
0572					
0573	REF	96 LAST 1414	16,3355 4 4752 1	CS	TWD
0574	REF	35 LAST 1431	16,3356 6 4751 0	AD	FOUR
0575	REF	2 LAST 148	16,3357 55'521 1	TS	NO.PJETS
0576	REF	2 LAST 1425	16,3360 3 1737 0	CA	POLYTEMP
0577	REF	2 LAST 1399	16,3361 0 5745 1	TC	WRITEP
0578	REF	2 LAST 1431	16,3362 4 1735 0	CS	ABSTJ
0579	REF	1	16,3363 6 3575 0	AD	+150MST6
0580				EXTEND	
0581	REF	2 LAST 1424	16,3365 6 3607 0	BZMF	QRAXIS
0582	REF	1	16,3366 6 3555 1	GO TO QRAXIS OR TO GTS.	
0583				AD	-136MST6
0584				EXTEND	
0585	REF	3 LAST 1431	16,3371 27'735 0	BZMF	+5
0586	REF	5 LAST 1431	16,3372 51'742 1	ADS	ABSTJ
				INDEX	ROTINDEX

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0587	RFF	1		16,3373	3 3604 0		CA	MINTIMES	
0588	REF	9	LAST 1431	16,3374	55'524 1		TS	TJP	
0589	REF	4	LAST 1431	16,3375	3 1735 1		CA	ABSTJ	
0590				16,3376	22 007 0		ZL		
0591				16,3377	0 0004 0		INHINT		
0592	REF	4	LAST 1407	16,3400	53'467 1		DXCH	T6FURTHA	
0593	REF	55	LAST 1428	16,3401	0 4674 0		TC	IBNKCALL	
0594	REF	1		16,3402	37046 1		CAOR	JTLST	
0595	REF	50	LAST 1424	16,3403	4 4740 1		CS	8IT12	
05951	REF	43	LAST 1430	16,3404	7 1273 1		MASK	RCSFLAGS	
0596	REF	44	LAST 1432	16,3405	55'273 1		TS	RCSFLAGS	BIT 12 SET TO 0.
05961	REF	1		16,3406	0 3410 1		TC	ALTSYST	
05962	REF	3	LAST 1431	16,3407	1 3607 1		TCF	QRAXIS	
0597	REF	49	LAST 1431	16,3410	3 0111 0	ALTSYST	CA	DAP800LS	ALTERNATE P-AXIS JETS
0598	REF	276	LAST 1431	16,3411	54 001 1		TS	L	
0599	REF	2	LAST 1431	16,3412	3 4747 1		CA	AORBSYST	
0600				16,3413	0 0006 1		EXTEND		
0601	REF	19	LAST 1409	16,3414	06 001 0		RXOR	LCMAN	
0602	REF	50	LAST 1432	16,3415	54 111 1		TS	DAPBCOLS	
0603				16,3416	0 0003 1		RELINT		
0604	REF	405	LAST 1429	16,3417	0 0002 0		TC	Q	
0606	REF	2	LAST 1432	16,3420	0 3410 1	DKALT	TC	ALTSYST	
0607	REF	3	LAST 1431	16,3421	0 5744 0	JETSOFF	TC	WRITEP -1	
0608	REF	285	LAST 1430	16,3422	3 4755 1		CA	ZERO	
0609	REF	10	LAST 1432	16,3423	55'524 1		TS	TJP	
0610	REF	4	LAST 1432	16,3424	1 3607 1		TCF	QRAXIS	
R0611	(NOTE -- M13 = 1 IDENTICALLY IMPLIES NULL MULTIPLICATION.)								
0612	REF	13	LAST 1418	16,3425	3 0033 1	CALCPERR	CA	CDUY	P-ERROR CALCULATION.
0613				16,3426	0 0006 1		EXTEND		
0614	REF	6	LAST 1416	16,3427	21'634 0		MSU	COUYD	COU VALUE - ANGLE DESIRED (Y-AXIS)
0615				16,3430	0 0006 1		EXTEND		
0616	REF	9	LAST 1418	16,3431	7 1412 0		MP	M11	(COUY-COUYD)M11 SCALED AT PI RADIANS
0617	REF	2	LAST 1429	16,3432	57'750 1		XCH	E	SAVE FIRST TERM (OF TWO)
0618	REF	29	LAST 1430	16,3433	3 0032 0		CA	CDUX	THIRD COMPONENT
0619				16,3434	0 0006 1		EXTEND		
0620	REF	23	LAST 1430	16,3435	21'633 1		MSU	COUXD	COU VALUE - ANGLE DESIRED (X-AXIS)
R0621									
R0622									
0623	REF	5	LAST 1403	16,3436	6 1277 1		MP	M13	
0624	REF	3	LAST 1432	16,3437	27'750 0		AD	DELPERDR	KALCMANU INTERFACE ERROR
0625	REF	8	LAST 1430	16,3440	57'462 0		AOS	E	SAVE SUM OF TERMS. COULD BE OVERFLOW.
0626	REF	406	LAST 1432	16,3441	0 0002 0		XCH	PERROR	SAVE P-ERROR FOR EIGHT-BALL DISPLAY.
							TC	Q	RETURN TO CALLER

R0627 P-AXIS URGENCY FUNCTION CALCULATION.

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0628	REF	2	LAST 1408	16,3442	0 3425 1	PURGENCY	TC	CALCPERR	CALCULATE P-AXIS ERRORS.
0629	REF	12	LAST 1403	16,3443	4 1641 1		CS	OMEGAPD	THIS CODING IS COMMON TO BOTH LM DAP AND
0630	REF	15	LAST 1429	16,3444	6 1417 1		AD	OMEGAP	SPS-BACKUP MODE.
0631	REF	4	LAST 1430	16,3445	55'425 1		TS	EDOTP	EDOTP = OMEGAP - OMEGAPD AT PI/4 RAD/SEC
0632	REF	162	LAST 1431	16,3446	4 4753 0		CS	ONE	
0633	REF	2	LAST 147	16,3447	55'476 1		TS	AXISCTR	
0634	REF	51	LAST 1432	16,3450	3 0111 0		CA	DAPBCOLS	
0635	REF	8	LAST 1420	16,3451	7 4737 1		MASK	CSMOOCKD	
0636				16,3452	0 0006 1		EXTEND		
0637	REF	1		16,3453	1 3470 0		BZF	HEADTJET	
0638				16,3454	0 0004 0		INHINT		IF CSMOOCKD = 1, GO TO DOCKED RCS LOGIC
0639	REF	56	LAST 1432	16,3455	0 4674 0		TC	IBNKCALL	
0640	REF	1		16,3456	37700 1		CADR	SPSRCS	
0641	REF	11	LAST 1432	16,3457	3 1524 0		CA	TJP	
0642				16,3460	0 0006 1		EXTEND		
0643	REF	1		16,3461	1 3420 0		BZF	OKALT	IF TJP = ZERO, CHANGE AORBSYST.
0644				16,3462	0 0003 1		RELINT		
0645	REF	5	LAST 1431	16,3463	4 1741 0		CS	NUMBFR	
0646	REF	35	LAST 1431	16,3464	6 6241 0		AO	SIX	
0647				16,3465	0 0006 1		EXTEND		IF NUMBERT = 6 BYPASS AORBSYST CHECK
0648	REF	2	LAST 1426	16,3466	1 3335 0		BZF	PJETSLEC	AND USE FOUR JETS, OTHERWISE,
0649	REF	3	LAST 1433	16,3467	1 3327 0		TCF	PJETSLEC -6	SELECT AORBSYST AND USE TWO JETS
0650	REF	286	LAST 1432	16,3470	3 4755 1	HEADTJET	CA	ZERO	
0651	REF	1		16,3471	55'477 0		TS	SENSETYP	
0652				16,3472	0 0004 0		INHINT		
0653	REF	57	LAST 1433	16,3473	0 4674 0		TC	IBNKCALL	
0654	REF	1		16,3474	37207 0		CADR	TJETLAW	
0655				16,3475	0 0003 1		RELINT		
0656	REF	1		16,3476	4 1737 1		CS	FIREFCT	
0657	REF	1		16,3477	6 3513 0		AD	-FOUROEG	
0658				16,3500	0 0006 1		EXTEND		
0659	REF	4	LAST 1433	16,3501	6 3327 1		BZMF	PJETSLEC -6	
0660	REF	12	LAST 1433	16,3502	11'524 1		CCS	TJP	
0661				16,3503	1 3505 0		TCF	+2	
0662	REF	6	LAST 1431	16,3504	1 3421 1		TCF	JETSOFF	
0663	REF	1		16,3505	6 3512 1		AO	-160MST6	
0664				16,3506	0 0006 1		EXTEND		
0665	REF	5	LAST 1433	16,3507	6 3327 1		BZMF	PJETSLEC -6	
0666	REF	36	LAST 1433	16,3510	3 6241 0		CA	SIX	
0667	REF	6	LAST 1433	16,3511	1 3334 1		TCF	PJETSLEC -1	
0668				16,3512	77377 1	-160MST6	DEC	-256	
0669				16,3513	75117 1	-FOUROEG	DEC	-.08888	

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P0677 JET POLICY CONSTRUCTION SUBROUTINE

A0678 INPUT: ROTINDEX, NUMBERT

A0679 OUTPUT: POLYTEMP (JET POLICY)

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A0680 THIS SUBROUTINE SELECT A SUBSET OF THE DESIRED JETS WHICH HAS NO FAILURE
0681 RFE 37 LAST 1433 16,3514 3 6241 0 SELECTP CA SIX
0682 REF 1 16,3515 55'740 1 TS TEMPNUM
0683 REF 6 LAST 1433 16,3516 51'741 1 INDEX NUMBERT
0684 REF 1 16,3517 3 3546 0 CA TYPEP
0685 REF 6 LAST 1431 16,3520 51'742 1 INDEX ROTINDEX
0686 RFE 1 16,3521 7 3537 1 MASK JETSALL
0687 REE 3 LAST 1431 16,3522 55'737 1 TS POLYTEMP
0688 REF 6 LAST 227 16,3523 7 1263 0 MASK CH6MASK
0689 REF 501 LAST 1431 16,3524 10 000 0 CCS A
0690 16,3525 1 3527 0 TCE +2
0691 REF 407 LAST 1432 16,3526 0 0002 0 TC 0
0692 REE 2 LAST 1434 16,3527 11'740 1 CCS TEMPNUM
0693 16,3530 1 3534 1 TCF +4
0694 REF 48 LAST 1424 16,3531 0 5567 0 TC ALARM
0695 16,3532 02003 0 OCT 02003
0696 REF 7 LAST 1433 16,3533 1 3421 1 TCE JETSDEE *****TCE ALARMJET *****
0697 REF 7 LAST 1434 16,3534 55'741 0 SELECTYZ TS NUMBERT
0698 REE 2 LAST 1431 16,3535 1 3515 1 TCE SELECTP +1
0699 REE 1 16,3536 1 2752 1 -1 TCF ABORTYZ +2
0700 16,3537 00252 1 JETSALL OCT 00252
0701 16,3540 00125 1 OCT 00125 +P
0702 16,3541 00140 1 OCT 00140 -Y
0703 16,3542 00006 1 OCT 00006 -Z
0704 16,3543 00220 1 OCT 00220 +Y
0705 16,3544 00011 1 OCT 00011 +Z
0706 16,3545 00151 1 OCT 00151 +V
0707 16,3546 00146 1 TYPEP OCT 00146 -U
0708 16,3547 00226 1 OCT 00226 -V
0709 16,3550 00231 1 OCT 00231 +U
0710 16,3551 00151 1 OCT 00151 +V
0711 16,3552 00132 1 OCT 00132 1-3
0712 16,3553 00245 1 OCT 00245 2-4
0713 16,3554 00377 1 OCT 00377 ALL
0714 REE 2 LAST 1431 16,3555 INDXYZ = -136MST6
0715 16,3555 77445 1 -136MST6 DEC -218
0716 16,3556 00004 0 DEC 4
0717 16,3557 00002 0 DEC 2
0718 16,3560 07776 0 OCT 07776
0719 16,3561 00005 1 DEC 5
0720 16,3562 00011 1 DEC 9
0721 16,3563 00012 1 DEC 10
0722 16,3564 07776 0 OCT 07776
0723 16,3565 00003 1 DEC 3

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0724	16,3566	00010 0	DEC	8
0725	16,3567	00007 0	DEC	7
0726	16,3570	07776 0	OCT	07776
0727	16,3571	07776 0	OCT	07776
0728	16,3572	07776 0	OCT	07776
0729	16,3573	07776 0	OCT	07776
0730	16,3574	07776 0	OCT	07776
0731	16,3575	00360 1	+150MST6 DEC	240
0732	16,3576	07400 1	07400OCT OCT	07400

THESE INDEXES OF MASK JETSALL WILL
CHANGE THE INSTRUCTION AT SELECTP +4
TO BE TC JETSALL -1
ONLY USED FOR TRANSLATION FAILURE

R0733 T-JET LAW FIXED CONSTANTS

0734	16,3577	00266 0	NORMSCL OCT	266
0737	16,3600	74631 0	-100MS DEC	-.1
0738	16,3601	06315 0	200MS DEC	.2
0739	REF 5 LAST 963	7715	25/32 =	PRIO31 (DEC .78125)
0740	16,3602	00600 1	BITS8,9 OCTAL	00600
0741	16,3603	00632 0	1/40 DEC	.02500
0742	16,3604	77751 1	MINTIMES DEC	-22
0743	16,3605	00026 0	DEC	22
0744	REF 2 LAST 1423	16,3606	02713 0 PSKIPADR GENADR	SKIPPAXS

A0745 GOES TO Q,R-AXES RCS AUTOPILOT

0746	REF 7 LAST 1403	16,3607	4 1643 0	QXAXIS CS	OMEGARD
0747	REF 7 LAST 1422	16,3610	6 1421 1	AD	OMEGAR
0748	REF 11 LAST 1430	16,3611	0 2277 1	TC	DVERSUB
0749	REF 2 LAST 145	16,3612	55*435 0	TS	EDOTR
0750	REF 7 LAST 1403	16,3613	4 1642 1	CS	OMEGAQD
0751	REF 13 LAST 1421	16,3614	6 1420 0	AD	OMEGAQ
0752	REF 12 LAST 1435	16,3615	0 2277 1	TC	DVERSUB
0753	REF 3 LAST 144	16,3616	55*434 1	TS	EDOTQ
0754		16,3617	0 0006 1	EXTEND	
0755	REF 1	16,3620	3 3623 0	DCA	QERRCALL
0756		16,3621	52 006 0	DTCB	

0757	REF 20 LAST 1422	E6,1537		EBANK=	AOSQ
0758	REF 1	16,3622	02043 1	QERRCALL 2CADR	CALLQEP
0758	REF 1	16,3623	36106 0		

L Q,R-AXFS RCS AUTOPILOT

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0001				17,2043			BANK 17		
0002	REF	3	LAST 1400	17,2000			SETLOC DAPS2		
0003				17,2043			BANK		
0004	RFF	24	LAST 1432	F6,1633			EBANK= CDUX0		
0005	REF	1					COUNT* %\$/DAPQR		
R0006									
00061	RFF	58	LAST 1428	17,2043	3 4737 0	CALLQERR	CA BIT13		CALCULATE Q,R ERRORS UNLESS THESE AXFS
00062				17,2044	0 0006 1		EXTENO		ARE IN MANUAL RATE COMMAND.
00063	REF	16	LAST 1428	17,2045	02 031 1		RAND CHAN31		
00064	RFF	502	LAST 1434	17,2046	10 000 0		CCS A		
00065				17,2047	1 2054 0		TCF +5		IN AUTO COMPUTE Q,R ERRORS
0007	REF	52	LAST 1433	17,2050	4 0111 1		CS DAPROOLS		IN MANUAL RATE COMMAND?
00071	RFF	5	LAST 1429	17,2051	7 4740 1		MASK DUPRCBIT		
00072				17,2052	0 0006 1		EXTEND		
00073	REF	1		17,2053	1 2055 1		BZF Q,RORGT5		IF SO BYPASS CALCULATION OF ERRORS.
00074	REF	2	LAST 1408	17,2054	0 2563 0		TC QERRCALC		
R0008									
0009	RFF	2	LAST 1407	17,2055	11'627 1	Q,RORGT5	CCS COTROLER		CHOOSE CONTROL SYSTEM FOR THIS OAP PASS:
0010	RFF	1		17,2056	1 2544 1		TCF GOTOGT5		GTS (ALTERNATES WITH RCS WHEN DOCKED)
0011	REF	1		17,2057	1 2531 0		TCF TRYGT5		GTS IF ALLOWED, OTHERWISE RCS
0012	REF	287	LAST 1433	17,2060	3 4755 1	RCS	CAF ZERO		RCS (TRYGT5 MAY BRANCH TO HERE)
0013	RFF	3	LAST 1436	17,2061	55'627 1		TS COTROLER		
0014	RFF	4	LAST 1435	17,2062	53'435 0		DXCH FDOTQ		
0015	RFF	1		17,2063	0 3100 0		TC ROT45DEG		
0016	REF	11	LAST 1419	17,2064	53'425 1		DXCH OMEGAU		

A0017

X - TRANSLATION:

A0018 INPUT: BITS 7,8 OF CH31 (TRANSLATION CONTROLLER)
 A0019 ULLAGR
 A0020 APSELGR, DRIFTRIT
 A0021 ACC4OR2X, AORBTRAN

A0022 OUTPUT: NEXTU, NEXTV CODES OF TRANSLATION FOR AFTER ROTATION
 A0023 SENSETY TELL ROTATION DIRECTION AND DESIRE

R0024 X-TRANS POLICIES ARE EITHER 4 JETS OR A DIAGONAL PAIR. IN 2-JET TRANSLATION THE SYSTEM IS SPECIFIED. A FAILURE
 R0026 WILL OVERRIDE THIS SPECIFICATION. AN ALARM RESULTS WHEN NO POLICY IS AVAILABLE BECAUSE OF FAILURES.

0028	REF	48	LAST 1424	17,2065	3 4745 0	SENSEGET	CA 3117		INPUT BITS OVERRIDE THE INTERNAL BITS
0029				17,2066	0 0006 1		EXTENO		SENSETY WILL NOT OPPOSE ANYTRANS
0030	REF	17	LAST 1436	17,2067	02 031 1		RAND CHAN31		
0031				17,2070	0 0006 1		EXTENO		
0032	RFF	1		17,2071	1 2117 0		BZF +XORULGF		

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0033	REF	42	LAST	1359	17,2072	3 4744 1	CA	BIT8	
0034					17,2073	0 0006 1	EXTEND		
0035	REF	18	LAST	1436	17,2074	02 031 1	RAND	CHAN31	
0036					17,2075	0 0006 1	EXTEND		
0037	REF	1			17,2076	1 2120 1	BZF	-XTRANS	
0038	REF	3	LAST	750	17,2077	3 4746 0	CA	JLLAGER	
0039	REF	53	LAST	1436	17,2100	7 0111 1	MASK	DAPBOOLS	
0040	REF	503	LAST	1436	17,2101	10 000 0	CCS	A	
0041	REF	2	LAST	1436	17,2102	1 2117 0	TCF	+XORULGE	
0042	REF	4	LAST	1408	17,2103	55'471 0	TS	NEXTU	STORE NULL TRANSLATION POLICIES
0043	REF	4	LAST	1408	17,2104	55'472 0	TS	NEXTV	
0047	REF	54	LAST	1437	17,2105	4 0111 1	CS	DAPBOOLS	BURNING OR ORIFTING?
0048	REF	5	LAST	1422	17,2106	7 4744 0	MASK	DRIFTBIT	
0049					17,2107	0 0006 1	EXTEND		
0050	REF	1			17,2110	1 2115 1	BZF	TSENSE	
0051	REF	18	LAST	863	17,2111	3 0106 0	CA	ELGWRD10	DPS (INCLUDING DOCKED) OR APS?
0052	REF	13	LAST	863	17,2112	7 4737 1	MASK	APSELBIT	
0053	REF	504	LAST	1437	17,2113	10 000 0	CCS	A	
0054	REF	97	LAST	1431	17,2114	3 4752 0	CAF	TWD	FAVOR +X JETS DURING AN APS BURN.
0055	REF	2	LAST	1433	17,2115	55'477 0	TSENSE	SENSETYP	
0056	REF	1			17,2116	1 2151 1	TCE	QRCONTRL	
0057	REF	163	LAST	1433	17,2117	3 4753 1	+XORULGE	CAF	JNE
0058	REF	36	LAST	1431	17,2120	6 4751 0	-XTRANS	AD	EDOUR
0059	REF	7	LAST	1434	17,2121	55'742 0		TS	ROIINDEX
0060	REF	7	LAST	1386	17,2122	6 7744 1		AD	NEG3
00601	REF	3	LAST	1437	17,2123	55'477 0		TS	SENSETYP
0061	REF	55	LAST	1437	17,2124	3 0111 0		CA	DAPBOOLS
0062	REF	2	LAST	308	17,2125	7 4741 0		MASK	ACC4OR2X
0063	REF	505	LAST	1437	17,2126	10 000 0		CCS	A
0064	REF	1			17,2127	1 2256 0		TCF	TRANS4
0065	REF	56	LAST	1437	17,2130	3 0111 0		CA	DAPBOOLS
0066	REF	1			17,2131	7 4742 0		MASK	ADRETRAN
0067	REF	506	LAST	1437	17,2132	10 000 0		CCS	A
0068	REF	164	LAST	1437	17,2133	3 4753 1		CA	ONE
0069	REF	98	LAST	1437	17,2134	6 4752 0		AD	TWD
0070	REF	8	LAST	1434	17,2135	55'741 0	TSNUMBRT	TS	NUMBERT
0071	REF	1			17,2136	0 3130 0	TC	SELCTSUB	
0072	REF	4	LAST	1434	17,2137	11'737 1		CCS	POLYTEMP
0073					17,2140	1 2143 1		TCF	+3
0074	REF	49	LAST	1434	17,2141	0 5567 0		TC	ALARM
0075					17,2142	02002 1		OCT	02002
0076	REF	3	LAST	1400	17,2143	3 5765 0		CA	00314OCT
0077	REF	5	LAST	1437	17,2144	7 1737 1		MASK	POLYTEMP
0078	REF	5	LAST	1437	17,2145	55'471 0	TSNEXTS	TS	NEXTU

THREE FOR B
TWO FOR A SYSTEM 2 JET X TRANS

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0079	REF	4	LAST	1437	17,2146	4 5765 1	CS	003140CT
0080	REE	6	LAST	1437	17,2147	7 1737 1	MASK	POLYTEMP
0081	REF	5	LAST	1437	17,2150	55'472 0	TS	NEXTV

A0082

Q,R-AXES RCS CONTROL MODE SELECTION

A0083

SWITCHES

INDICATION WHEN SET

A0085

BIT13/CHAN31

AUTO, GO TO ATTSTEER

A0086

PULSES

MINIMUM IMPULSE MODE

A0087

(OTHERWISE)

RATE COMMAND/ATTITUDE HOLD MODE

0088	REF	59	LAST	1436	17,2151	3 4737 0	QRCONTRL	CA	BIT13	CHECK MODE SELECT SWITCH.
0089					17,2152	0 0006 1		EXTEND		
0090	REF	19	LAST	1437	17,2153	02 031 1		RAND	CHAN31	BITS INVERTED
0091	REE	507	LAST	1437	17,2154	10 000 0		CCS	A	
0092	REF	1			17,2155	1 2616 0		TCE	ATTSTEER	
0093	REF	5	LAST	1425	17,2156	3 4735 1	CHKBIT10	CAE	PULSES	PULSES = 1 EOP MIN IMP USE OF RHC
0094	REE	57	LAST	1437	17,2157	7 0111 1		MASK	DAPBOOLS	
0095					17,2160	0 0006 1		EXTEND		
0096	REF	1			17,2161	1 2260 0		BZE	CHEKSTIK	IN ATT-HOLD/RATE-COMMAND IF BIT10=0

R0097 MINIMUM IMPULSE MODE

0098					17,2162	0 0004 0		INHINT		
0099	REF	58	LAST	1433	17,2163	0 4674 0		TC	I8NKCALL	
0100	REF	12	LAST	1428	17,2164	40153 1		CADR	ZATTERROR	
0101	REE	288	LAST	1436	17,2165	3 4755 1		CA	ZERO	
0102	REE	3	LAST	1410	17,2166	55'446 1		TS	QEPROR	
0103	REF	3	LAST	1410	17,2167	55'450 0		TS	RERROR	FOR DISPLAYS
0104					17,2170	0 0003 1		RELINT		
0105					17,2171	0 0006 1		EXTEND		
0106	REE	20	LAST	1438	17,2172	00 031 0		READ	CHAN31	
0107	REF	1			17,2173	55'735 0		TS	TEMP31	IS EQUAL TO DAPTEMP1
0108	REF	2	LAST	1407	17,2174	11'457 1		CCS	DLQRMIN	
0109	REE	1			17,2175	1 2217 0		TCE	CHECKIN	
0110	REF	2	LAST	1438	17,2176	3 1735 1	FIREQR	CA	TEMP31	
0111	REE	65	LAST	1425	17,2177	7 4753 0		MASK	BIT1	
0112					17,2200	0 0006 1		EXTEND		
0113	REF	1			17,2201	1 2223 1		BZE	+QMIN	
0114	REE	3	LAST	1438	17,2202	3 1735 1		CA	TEMP31	
0115	REF	57	LAST	1413	17,2203	7 4752 1		MASK	BIT2	
0116					17,2204	0 0006 1		EXTEND		
0117	REF	1			17,2205	1 2227 0		BZF	-QMIN	
0118	REF	4	LAST	1438	17,2206	3 1735 1		CA	TEMP31	
0119	REE	49	LAST	1407	17,2207	7 4747 0		MASK	BIT5	

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0120				17,2210	0 0006 1		EXTEND	
0121	REF	1		17,2211	1 2233 0		BZF	+RMIN
0122	REF	5	LAST 1438	17,2212	3 1735 1		CA	TEMP31
0123	REF	63	LAST 1413	17,2213	7 4746 1		MASK	BIT6
0124				17,2214	0 0006 1		EXTEND	
0125	REF	1		17,2215	1 2235 0		BZF	-RMIN
0126	REF	1		17,2216	1 3015 1		TCF	XTRANS
0127	REF	6	LAST 1439	17,2217	4 1735 0	CHECKIN	CS	TEMP31
0128	REF	1		17,2220	7 2255 0		MASK	OCT63
0129	RFF	3	LAST 1438	17,2221	55'457 1		TS	OLDQRMIN
0130	REF	2	LAST 1439	17,2222	1 3015 1		TCF	XTRANS
0131	RFF	1		17,2223	3 3041 1	+QMIN	CA	14MS
0132	REF	3	LAST 1406	17,2224	55'525 0		TS	TJU
0133	REF	2	LAST 1439	17,2225	4 3041 0		CS	14MS
0134	REF	1		17,2226	1 2237 1		TCF	MINQR
0135	REF	3	LAST 1439	17,2227	4 3041 0	-QMIN	CS	14MS
0136	REF	4	LAST 1439	17,2230	55'525 0		TS	TJU
0137	REF	4	LAST 1439	17,2231	3 3041 1		CA	14MS
0138	REF	2	LAST 1439	17,2232	1 2237 1		TCF	MINQR
0139	REF	5	LAST 1439	17,2233	3 3041 1	+RMIN	CA	14MS
0140				17,2234	1 2236 0		TCF	+2
0141	REF	6	LAST 1439	17,2235	4 3041 0	-RMIN	CS	14MS
0142	REF	5	LAST 1439	17,2236	55'525 0		TS	TJU
0143	REF	2	LAST 1406	17,2237	55'526 0	MINQR	TS	TJV
0144	REF	1		17,2240	3 2254 0		CA	MINADR
0145	REF	1		17,2241	55'475 1		TS	REYJADR
0146	REF	165	LAST 1437	17,2242	3 4753 1		CA	ONE
0147	REF	4	LAST 1439	17,2243	55'457 1		TS	OLDQRMIN
0148	REF	3	LAST 1433	17,2244	55'476 1	MINRTN	TS	AXISCTR
0149	REF	58	LAST 1438	17,2245	3 0111 0		CA	DAPROCLS
0150	REF	2	LAST 1437	17,2246	7 4742 0		MASK	AORRTRAN
0151	REF	508	LAST 1438	17,2247	10 000 0		CCS	A
0152	REF	166	LAST 1439	17,2250	3 4753 1		CA	ONE
0153	REF	99	LAST 1437	17,2251	6 4752 0		AO	TWO
0154	REF	9	LAST 1437	17,2252	55'741 0		TS	NUMBERT
0155	REF	1		17,2253	1 2661 0		TCF	AFTERTJ
0156	REF	1		17,2254	02244 1	MINADR	GENADR	MINRTN
0157				17,2255	00063 1	OCT63	OCT	63
0158	REF	1		17,3041		14MS	=	+TJMINT6
0164	REF	37	LAST 1437	17,2256	3 4751 0	TRANS4	CA	FOUR
0165	RFF	1		17,2257	1 2135 0		TCF	TSNUMBRT

A0166

RATE COMMAND MODE:

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A0167

DESCRIPTION (SAME AS P-AXIS)

0171	REF	2	LAST 1407	17,2260	55'631 0	CHEKSTIK	TS	INGTS	NOT IN GTS WHEN IN ATT HOLD
0172	REF	167	LAST 1439	17,2261	4 4753 0		CS	ONE	1/ACCS WILL DO THE NULLING DRIVES
0173	REF	4	LAST 1436	17,2262	55'627 1		TS	COTRDLR	COME BACK TO RCS NEXT TIME
0174	REF	54	LAST 1427	17,2263	3 4735 1		CA	BIT15	
0175	REF	2	LAST 1427	17,2264	7 1441 0		MASK	CH31TEMP	
0177				17,2265	0 0006 1		EXTEND		
01771	REF	1		17,2266	1 2305 1		BZF	RHCACTIV	BRANCH IF OUT OF DETENT.
0178	REF	6	LAST 1436	17,2267	3 4740 0		CA	DURRCBIT	*****
01781	REF	59	LAST 1439	17,2270	7 0111 1		MASK	DAPRODLS	*IN DETENT* CHECK FOR MANUAL CONTROL
01782				17,2271	0 0006 1		EXTEND		***** LAST TIME.
01783	REF	1		17,2272	1 2616 0		BZF	STILLRCS	
01788	REF	37	LAST 1428	17,2273	4 4743 1		CS	BIT9	
01789	REF	45	LAST 1432	17,2274	7 1273 1		MASK	RCSFLGS	
017891	REF	46	LAST 1440	17,2275	55'273 1		TS	RCSFLGS	BIT 9 IS 0.
017892	REF	1		17,2276	1 2302 0		TCF	DAMPING	
0215				17,2277	00050 1	40CYCL	DCT	50	
02151				17,2300	00001 0	1/10S	DCT	1	
02152				17,2301	00056 1	LINRAT	DEC	46	
R02154	=====								
02155	REF	289	LAST 1438	17,2302	3 4755 1	DAMPING	CA	ZERD	
021551	REF	2	LAST 1428	17,2303	55'460 0		TS	SAVEHAND	
021552	REF	3	LAST 1440	17,2304	55'461 1		TS	SAVEHAND +1	
0220	REF	4	LAST 1440	17,2305	11'460 0	RHCACTIV	CCS	SAVEHAND	*****
0221				17,2306	1 2311 1		TCF	+3	Q,R MANUAL CONTROL WC = A*[B+|D|]*D
0222				17,2307	1 2311 1		TCF	+2	*****
0223				17,2310	1 2311 1		TCF	+1	
02231				17,2311	6 0000 1		DOUBLE		WHERE
02232				17,2312	6 0000 1		DOUBLE		
0224	REF	1		17,2313	6 2301 1		AD	LINRAT	WC = COMMANDED ROTATIONAL RATE
0225				17,2314	0 0006 1		EXTEND		A = QUADRATIC SENSITIVITY FACTOR
0226	REF	5	LAST 1440	17,2315	7 1460 0		MP	SAVEHAND	B = LINEAR/QUADRATIC SENSITIVITY
0227	REF	277	LAST 1432	17,2316	3 0001 0		CA	L	|D| = ABS. VALUE OF DEFLECTION
0228				17,2317	0 0006 1		EXTEND		D = HAND CONTROLLER DEFLECTION
02281	REF	7	LAST 1429	17,2320	7 1442 0		MP	STIKSENS	
02282	REF	3	LAST 1428	17,2321	57'453 1		XCH	QLAST	COMMAND Q RATE SCALED 45 DEG/SFC
02283				17,2322	4 0000 0		COM		
02284	REF	4	LAST 1440	17,2323	6 1453 1		AD	QLAST	
02285	REF	5	LAST 1419	17,2324	55'737 1		TS	DAPTEMP3	
0229	REF	6	LAST 1440	17,2325	11'461 1		CCS	SAVEHAND +1	
0230				17,2326	1 2331 0		TCF	+3	
02305				17,2327	1 2331 0		TCF	+2	
0231				17,2330	1 2331 0		TCF	+1	
02311				17,2331	6 0000 1		DOUBLE		
02312				17,2332	6 0000 1		DOUBLE		
02315	REF	2	LAST 1440	17,2333	6 2301 1		AD	LINRAT	
0232				17,2334	0 0006 1		EXTEND		
0233	REF	7	LAST 1440	17,2335	7 1461 1		MP	SAVEHAND +1	
02331	REF	278	LAST 1440	17,2336	3 0001 0		CA	L	

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02332				17,2337	0 0006 1	EXTEND		
02333	REF	8	LAST 1440	17,2340	7 1442 0	MP	STIK SENS	
02334	REF	3	LAST 1428	17,2341	57'454 0	XCH	RLAST	
02335				17,2342	4 0000 0	COM		
02336	REF	4	LAST 1441	17,2343	6 1454 0	AD	RLAST	
02337	REF	3	LAST 148	17,2344	55'740 1	TS	DAPIEMP4	
0234	RFF	5	LAST 1440	17,2345	4 1453 0	CS	QLAST	INTERVAL.
02345	REF	14	LAST 1435	17,2346	6 1420 0	AD	DMEGAQ	
0235	REF	1		17,2347	55'434 1	TS	QRATEDIF	
02355	RFF	5	LAST 1441	17,2350	4 1454 1	CS	RLAST	
0236	REF	8	LAST 1435	17,2351	6 1421 1	AD	DMEGAR	
02365	REF	1		17,2352	55'435 0	TS	REATEDIF	
0237	REF	2	LAST 1441	17,2353	53'435 0	DXCH	QRATEDIF	TRANSFORM RATES FROM Q,R TO U,V AXES
02371	REF	2	LAST 1436	17,2354	0 3100 0	TC	R0T45DEG	
02372	REF	1		17,2355	53'425 1	DXCH	URATEDIF	
02373	REF	6	LAST 1440	17,2356	11'737 1	CCS	DAPIEMP3	CHECK IF Q COMMAND CHANGE EXCEEDS
02374				17,2357	0 2362 1	TC	+3	BREAKOUT LEVEL. IF NOT, CHECK R.
02375				17,2360	0 2362 1	TC	+2	
02376				17,2361	0 2362 1	TC	+1	
02377	REF	6	LAST 1429	17,2362	6 1474 1	AD	-RATFDB	
02378				17,2363	0 0006 1	EXTEND		
02379				17,2364	6 2366 0	BZMF	+2	
0238	REF	1		17,2365	1 2404 1	TCF	ENTERUV -2	BREAKOUT LEVEL EXCEEDED. DIRECT RATE.
02381	REF	4	LAST 1441	17,2366	11'740 1	CCS	DAPIEMP4	R COMMAND BREAKOUT CHECK.
02382				17,2367	0 2372 0	TC	+3	
02383				17,2370	0 2372 0	TC	+2	
02384				17,2371	0 2372 0	TC	+1	
02385	REF	7	LAST 1441	17,2372	6 1474 1	AD	-PATEDB	
02386				17,2373	0 0006 1	EXTEND		
02387				17,2374	6 2376 1	BZMF	+2	
02388	REF	2	LAST 1441	17,2375	1 2404 1	TCF	ENTERUV -2	BREAKOUT LEVEL EXCEEDED. DIRECT RATE.
02389	REF	47	LAST 1440	17,2376	3 1273 0	CA	RCSFLAGS	BREAKOUT LEVEL NOT EXCEEDED. CHECK FOR
023891	RFF	2	LAST 1427	17,2377	7 4741 0	MASK	QRBIT	DIRECT RATE CONTROL LAST TIME.
0239				17,2400	0 0006 1	EXTEND		
02391				17,2401	1 2403 0	BZF	+2	
02392	REF	3	LAST 1441	17,2402	1 2406 0	TCF	ENTERUV	CONTINUE DIRECT RATE CONTROL.
02407	RFF	2	LAST 1440	17,2403	1 2616 0	TCF	STILLRCS	PSEUDO-AUTO CONTROL.
02408	REF	1		17,2404	3 2277 1	CA	40CYCL	
02409	REF	2	LAST 1416	17,2405	55'455 0	TS	TCQR	
02414				17,2406	0 0004 0	ENTERUV	INHINT	DIRECT RATE CONTROL.
02415	REF	59	LAST 1438	17,2407	0 4674 0	TC	IBNKCALL	
02416	REF	13	LAST 1438	17,2410	40153 1	FCADR	ZATTEROR	
02417				17,2411	0 0003 1	RELINT		
02418	RFF	290	LAST 1440	17,2412	3 4755 1	CA	ZERO	
02419	REF	6	LAST 1428	17,2413	55'446 1	TS	DYERROR	
0242	REF	7	LAST 1441	17,2414	55'447 0	TS	DYERROR +1	
02421	REF	6	LAST 1428	17,2415	55'450 0	TS	DZERROR	
02422	REF	7	LAST 1441	17,2416	55'451 1	TS	DZERROR +1	
02423	REF	2	LAST 1441	17,2417	11'424 0	CCS	URATEDIF	
02424				17,2420	1 2423 1	TCF	+3	

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02425				17,2421	1 2423 1	TCF	+2	
02426				17,2422	1 2423 1	TCF	+1	
02427	REF	2	LAST 1430	17,2423	6 1474 1	AD	TARGETDB	IF TARGET DB IS EXCEEDED, CONTINUE
02428				17,2424	0 0006 1	EXTEND		DIRECT RATE CONTRDL.
02429	REF	1		17,2425	6 2441 1	BZMF	VDB	
0243	REF	1		17,2426	11'425 1	CCS	VRATEDIF	
024301				17,2427	1 2432 1	TCF	+3	
024302				17,2430	1 2432 1	TCF	+2	
024303				17,2431	1 2432 1	TCF	+1	
024304	RFF	3	LAST 1442	17,2432	6 1474 1	AD	TARGETDB	
024305				17,2433	0 0006 1	EXTEND		
024306				17,2434	6 2436 1	BZMF	+2	
024307	REF	1		17,2435	1 2452 1	TCF	QRTIME	
024308	REF	291	LAST 1441	17,2436	3 4755 1	CA	ZERO	
024309	REF	2	LAST 1442	17,2437	55'425 1	TS	VRATEDIF	
02431	REF	2	LAST 1442	17,2440	1 2452 1	TCF	QRTIME	
024311	REF	3	LAST 1442	17,2441	11'425 1	CCS	VRATEDIF	
02432				17,2442	0 2445 0	TC	+3	
02433				17,2443	0 2445 0	TC	+2	
02434				17,2444	0 2445 0	TC	+1	
02436	REF	4	LAST 1442	17,2445	6 1474 1	AD	TARGETDB	IF TARGET DB IS EXCEEDED, CONTINUE
02438				17,2446	0 0006 1	EXTEND		DIRECT RATE CONTRDL. IF NOT, FIRE AND
0244	REF	1		17,2447	6 2461 0	BZMF	TOPSEUDO	SWITCH TO PSEUDO-AUTO CONTROL ON NEXT
02441	REF	292	LAST 1442	17,2450	3 4755 1	CA	ZERO	PASS.
02442	REF	3	LAST 1441	17,2451	55'424 0	TS	VRATEDIF	
02443	REF	3	LAST 1441	17,2452	3 1455 1	CA	TCQR	DIRECT RATE TIME CHECK.
02446				17,2453	0 0006 1	EXTEND		
02448				17,2454	6 2461 0	BZMF	+5	BRANCH IF TIME EXCEEDS 4 SEC.
02449	REF	48	LAST 1441	17,2455	4 1273 1	CS	RCSFLAGS	
0245	REF	3	LAST 1441	17,2456	7 4741 0	MASK	QRBIT	
02451	RFF	49	LAST 1442	17,2457	27'273 1	ADS	RCSFLAGS	BIT 11 IS 1.
02452				17,2460	0 2464 0	TC	+4	
02453	REF	4	LAST 1442	17,2461	4 4741 0	CS	QRBIT	
02454	REF	50	LAST 1442	17,2462	7 1273 1	MASK	RCSFLAGS	
02455	REF	51	LAST 1442	17,2463	55'273 1	TS	RCSFLAGS	BIT 11 IS 0.
02456	REF	1		17,2464	3 2530 0	CA	HANDADR	
02458	REF	2	LAST 1439	17,2465	55'475 1	TS	REIADR	
0250	REF	168	LAST 1440	17,2466	3 4753 1	CA	DNE	
0251	REF	4	LAST 1439	17,2467	55'476 1	TS	AXISCTR	
0252	REF	38	LAST 1439	17,2470	3 4751 0	CA	FOUR	
0253	REF	10	LAST 1439	17,2471	55'741 0	TS	NUMBERT	
0254	REF	5	LAST 1442	17,2472	51'476 0	INDEX	AXISCTP	
0255	REF	3	LAST 1407	17,2473	51'535 0	INDEX	SKIPU	
0256				17,2474	1 2475 1	TCF	+1	
0257	REF	39	LAST 1442	17,2475	3 4751 0	CA	FOUR	
0258	REF	6	LAST 1442	17,2476	51'476 0	INDEX	AXISCTP	
0259	REF	4	LAST 1442	17,2477	55'535 1	TS	SKIPU	
0260	REF	1		17,2500	1 2737 1	TCF	LODPER	

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0268	RFF	7	LAST	1442	17,2501	51'476 0	INDEX	AXISCTR			
0269	REF	4	LAST	1442	17,2502	11'424 0	CCS	URATEDIF	INDEX	AXIS	QUANTITY
0270	REF	293	LAST	1442	17,2503	3 4755 1	CA	ZERO	0	-U	1/JETACC+AOSU
0271					17,2504	1 2506 1	TCF	+2	1	+U	1/JETACC+AOSU
0272	REF	169	LAST	1442	17,2505	3 4753 1	CA	ONE	16	-V	1/JETACC+AOSV
0273	RFF	8	LAST	1443	17,2506	51'476 0	INDEX	AXISCTR	17	+V	1/JETACC+AOSV
0274	RFF	1			17,2507	6 3657 0	AD	AXISDIFF	JETACC = 2 JET ACCELERATION (1 FOR FAIL)		
0275	REF	509	LAST	1439	17,2510	50 000 1	INDEX	A			
0276	REF	1			17,2511	4 1571 1	CS	1/ANET2 +1			
0277					17,2512	0 0006 1	EXTEND				
0278	REF	9	LAST	1443	17,2513	5 1476 0	INDEX	AXISCTR	URATEDIF IS SCALED AT PI/4 RAD/SEC		
0279	REF	5	LAST	1443	17,2514	7 1424 0	MP	URATEDIF	JET TIME IN A SCALED 32 SEC		
0280	RFF	408	LAST	1434	17,2515	54 002 1	TS	Q			
0281	REF	510	LAST	1443	17,2516	20 001 1	DAS	A			
0282	REF	409	LAST	1443	17,2517	6 0002 0	AD	Q			
0283	REF	511	LAST	1443	17,2520	54 000 0	TS	A	OVERFLOW SKIP		
0284					17,2521	1 2523 0	TCF	+2			
0285	REF	410	LAST	1443	17,2522	3 0002 0	CA	Q	RIGHT SIGN AND BIGGER THAN 150MS		
0286	REF	10	LAST	1443	17,2523	51'476 0	SETTIME	INDEX	AXISCTR		
0287	REF	6	LAST	1439	17,2524	55'525 0	TS	IJU	SCALED AT 10.67 WHICH IS CLOSE TO 10.24		
0288	REF	2	LAST	1439	17,2525	1 2661 0	TCF	AFTERTJ			
0289	REF	294	LAST	1443	17,2526	3 4755 1	ZEROTJ	CA	ZERO		
0290	REF	1			17,2527	1 2523 0	TCF	SETTIME			
0291	REF	1			17,2530	02467 0	HANDADR	GENADR	BACKHAND		
A0292	GTS WILL BE TRIED IF										
A0293	1. USEQRJTS= 0,										
A0294	2. ALLOWGTS POS,										
A0295	3. JETS ARE OFF(Q,R-AXES)										
0296	RFF	4	LAST	864	17,2531	3 4736 1	TRYGTS	CAF	USEQRJTS	IS JET USE MANDATORY. (AS LONG AS	
0297	REF	60	LAST	1440	17,2532	7 0111 1	MASK	DAPBOOLS	USEQRJTS BIT IS NOT BIT 15, CCS IS SAFE)		
0298	REF	512	LAST	1443	17,2533	10 000 0	CCS	A			
0299	REF	1			17,2534	1 2060 1	TCF	RCS			
0300	REF	2	LAST	1407	17,2535	11'501 0	CCS	ALLOWGTS	NO. DOES AOSTASK OK CONTROL FOR GTS?		
0301					17,2536	1 2540 0	TCF	+2			
0302	REF	2	LAST	1443	17,2537	1 2060 1	TCF	RCS			
0303					17,2540	0 0006 1	EXTEND				
0304	REF	6	LAST	1408	17,2541	00 005 1	READ	CHAN5			
0305	REF	513	LAST	1443	17,2542	10 000 0	CCS	A			
0306	REF	1			17,2543	1 2547 1	TCF	CHKINGTS			
0307					17,2544	0 0006 1	GOTOGTS	EXTEND			
0308	REF	1			17,2545	3 2562 1	DCA	GTSCADR			
0309					17,2546	52 006 0	DTCB				
0310	REF	3	LAST	1440	17,2547	11'631 0	CHKINGTS	CCS	INGTS	WAS THE TRIM GIMBAL CONTROLLING	
0311					17,2550	1 2552 0	TCF	+2	YES. SET UP A DAMPED NULLING DRIVE.		
0312	REF	3	LAST	1443	17,2551	1 2060 1	TCF	RCS	NO. NULLING WAS SET UP BEFORE. DO RCS		

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0313				17,2552	0 0004	0		INHINT
0314	REF	60	LAST 1441	17,2553	0 4674	0		TC IBNKCALL
0315	REF	1		17,2554	43450	1		CADR TIMEGMEL
0316				17,2555	0 0003	1		RELINT
0317	REF	295	LAST 1443	17,2556	3 4755	1		CAF ZERO
0318	REF	4	LAST 1443	17,2557	551631	0		TS INGT5
0319	REF	4	LAST 1443	17,2560	1 2060	1		TCF RCS
0320	REF	25	LAST 1436	E6,1633				EBANK= CDUXD
0321	REF	1		17,2561	03263	0	GTSCADR	2CADR GTS
0321	REF	1		17,2562	42106	0		

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P0322 SUBROUTINE TO COMPUTE Q,R-AXES ATTITUDE ERRORS FOR USE IN THE RCS AND GTS CONTROL LAWS AND THE DISPLAYS.

0325	REF	14	LAST	1432	17,2563	30 033 1	QERRCALC	CAE	CDUY	Q-ERROR CALCULATION
0326					17,2564	0 0006 1		EXTEND		
0327	REF	7	LAST	1432	17,2565	21'634 0		MSU	COUYD	COU ANGLE - ANGLE DESIRED (Y-AXIS)
0328	REF	27	LAST	1429	17,2566	55'735 0		TS	DAPTEMP1	SAVE FOR RERRCALC
0329					17,2567	0 0006 1		EXTEND		
0330	REF	4	LAST	1419	17,2570	7 1413 1		MP	M21	(CDUY-CDUYD)*M21 SCALED AT PI RADIANS
0331	REF	4	LAST	1432	17,2571	55'750 0		TS	E	
0332	REF	17	LAST	1419	17,2572	30 034 0		CAE	COUZ	SECOND TERM CALCULATION:
0333					17,2573	0 0006 1		EXTEND		
0334	REF	7	LAST	1416	17,2574	21'635 1		MSU	COUZD	COU ANGLE - ANGLE DESIRED (Z-AXIS)
0335	REF	9	LAST	1421	17,2575	55'736 0		TS	DAPTEMP2	SAVE FOR RERRCALC
0336					17,2576	0 0006 1		EXTEND		
0337	REF	7	LAST	1419	17,2577	7 1415 1		MP	M22	(COUZ-CDUZD)*M22 SCALED AT PI RADIANS
0338	REF	3	LAST	1403	17,2600	6 1300 0		AO	DELQERDR	KALCMANU INTERFACE ERROR
0339	REF	5	LAST	1445	17,2601	6 1750 1		AO	E	
0340	REF	4	LAST	1438	17,2602	57'446 0		XCH	QERROR	SAVE Q-ERROR FOR EIGHT-BALL DISPLAY.
0341	REF	28	LAST	1445	17,2603	31'735 1	RERRCALC	CAE	DAPTEMP1	R-ERROR CALCULATION:
0342					17,2604	0 0006 1		EXTEND		CDU ANGLE - ANGLE DESIRED (Y-AXIS)
0343	REF	4	LAST	1419	17,2605	7 1414 0		MP	M31	(COUY-CDUYD)*M31 SCALED AT PI RADIANS
0344	REF	6	LAST	1445	17,2606	55'750 0		TS	E	
0345	REF	10	LAST	1445	17,2607	31'736 1		CAE	DAPTEMP2	SECOND TERM CALCULATION:
0346					17,2610	0 0006 1		EXTEND		COU ANGLE - ANGLE DESIRED (Z-AXIS)
0347	REF	5	LAST	1419	17,2611	7 1416 1		MP	M32	(CDUZ-CDUZD)*M32 SCALED AT PI RADIANS
0348	REF	3	LAST	1403	17,2612	6 1301 1		AD	DELRRERDR	KALCMANU INTERFACE ERROR
0349	REF	7	LAST	1445	17,2613	6 1750 1		AO	E	
0350	REF	4	LAST	1438	17,2614	57'450 1		XCH	RERROR	SAVE R-ERROR FOR EIGHT-BALL DISPLAY.
0351	REF	411	LAST	1443	17,2615	0 0002 0		TC	Q	

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P03511 "ATTSTEER" IS THE ENTRY POINT FOR Q,R-AXES (U,V-AXES) ATTITUDE CONTROL USING THE REACTION CONTROL SYSTEM

03513 REF 3 LAST 1441 17,2616 ATTSTEER EQUALS STILLRCS "STILLRCS" IS THE RCS EXIT FROM TRYGTS.

0352	REF	5	LAST	1445	17,2616	3 1450 1	STILLRCS	CA	RERROR
0353	REF	514	LAST	1443	17,2617	22 000 1		LXCH	A
03535	REF	5	LAST	1445	17,2620	3 1446 0		CA	QERROR
0354	REF	3	LAST	1441	17,2621	0 3100 0		TC	ROT45DEG
0355	REF	2	LAST	145	17,2622	53'750 0		DXCH	JERROR

A0359 PREPARES CALL TO TJETLAW (OR SPSRCS(DOCKED))
 A0360 PREFORMS SKIP LOGIC ON U OR Y AXIS IF NEEDED.

0361	REF	1			17,2623	3 3045 0	TJLAW	CA	TJLAWADP
0362	REF	3	LAST	1442	17,2624	55'475 1		TS	RETJADR
0363	REF	170	LAST	1443	17,2625	3 4753 1		CA	ONE
0364	REF	11	LAST	1443	17,2626	55'476 1		TS	AXISCTR
0365	REF	12	LAST	1446	17,2627	51'476 0		INDEX	AXISCTR
0366	REF	5	LAST	1442	17,2630	51'535 0		INDEX	SKIPU
0367					17,2631	1 2632 0		TCF	+1
0368	REF	40	LAST	1442	17,2632	3 4751 0		CA	FOUR
0369	REF	13	LAST	1446	17,2633	51'476 0		INDEX	AXISCTR
0370	REF	6	LAST	1446	17,2634	55'535 1		TS	SKIPU
0371	REF	2	LAST	1442	17,2635	1 2737 1		TCF	LOOPER
0372	REF	14	LAST	1446	17,2636	51'476 0		INDEX	AXISCTR
0373	REF	3	LAST	1446	17,2637	3 1747 1		CA	UERROR
0374	REF	8	LAST	1445	17,2640	55'750 0		TS	E
0375	REF	15	LAST	1446	17,2641	51'476 0		INDEX	AXISCTR
0376	REF	12	LAST	1436	17,2642	3 1424 1		CA	OMEGAU
0377	REF	2	LAST	144	17,2643	55'425 1		TS	EDOT
0378	REF	61	LAST	1443	17,2644	3 0111 0		CA	DAPBOOLS
0379	REF	9	LAST	1433	17,2645	7 4737 1		MASK	CSMDCKCD
0380	REF	515	LAST	1446	17,2646	10 000 0		CCS	A
0381					17,2647	1 2652 0		TCF	+3
0382	REF	2	LAST	1433	17,2650	0 3207 1		TC	TJETLAW
0383	REF	3	LAST	1443	17,2651	1 2661 0		TCF	AFTERTJ
0384	REF	62	LAST	1446	17,2652	4 0111 1	+3	CS	DAPBOOLS
0385	REF	5	LAST	1443	17,2653	7 4736 0		MASK	USEQRJTS
0386	REF	516	LAST	1446	17,2654	10 000 0		CCS	A
0387	REF	5	LAST	1440	17,2655	55'627 1		TS	CONTROLER
0388	REF	2	LAST	1433	17,2656	0 3700 0		TC	SPSRCS
0389	REF	41	LAST	1446	17,2657	3 4751 0		CAF	FOUR
03891	REF	11	LAST	1442	17,2660	55'741 0		TS	NUMBERT

DOCKED. IF GIMBAL USABLE DO GTS CONTROL
 ON THE NEXT PASS.
 USEQRJTS BIT MUST NOT BE BIT 15.
 GIMBAL USABLE. STORE POSITIVE VALUE.
 DETERMINE RCS CONTROL.
 ALWAYS CALL FOR 2-JET CONTROL ABOUT U,V.
 FALL THROUGH TO JET SELECTION, ETC.

A0390

Q,R-JET-SELECTION-LOGIC

A0391	INPUT:	AXISCTR	0,1 FOR U,V
A03911		SNUFFBIT	ZERO TJETU,V AND TRANS. ONLY IF SET IN A DPS BURN
A0392		TJU,TJV	JET TIME SCALED 10.24 SEC.
A0393		NUMBERT	INDICATES NUMBER OF JETS AND TYPE OF POLICY
A0394		RETJADR	WHERE TO RETURN TO

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A0395
A0396
A0397

OUTPUT: NO.01V)JETS PATE DERIVATION FEEBACK
CHANNEL 5
SKIPU,SKIRV FOR LESS THAN 150MS FIRING

A0398
A0399
A0400
A0401

NOTES: IN CASE OF FAILURE IN DESIRED ROTATION POLICY, "ALL" UNFAILED
JETS OF THE DESIRED POLICY ARE SELECTED. SINCE THERE ARE ONLY
TWO JETS, THIS MEANS THE OTHER ONE OR NONE. THE ALARM IS SENT
IF NONE CAN BE FOUND.

A0402
A0403

TIMES LESS THAN 14 MSEC ARE TAKEN TO CALL FOR A SINGLE-JET
MINIMUM IMPULSE, WITH THE JET CHOSEN SEMI-RANDOMLY.

0405	REF	28	LAST 1332	17,2661	3 0101	1	AFTERTJ	CA	FLAGWRO5	IF SNUFFBIT SET DURING A DPS BURN GO TO
04051	REF	1		17,2662	7 4737	1		MASK	SNUFFBIT	XTRANS; THAT IS, INHIBIT CONTROL.
04052				17,2663	0 0006	1		EXTEND		
04053	REF	1		17,2664	1 2675	0		BZF	DOROTAT	
04054	REF	19	LAST 1437	17,2665	4 0106	1		CS	FLGWRO10	
04055	REF	14	LAST 1437	17,2666	7 4737	1		MASK	APSELBIT	
04056				17,2667	0 0006	1		EXTEND		
04057	REF	2	LAST 1447	17,2670	1 2675	0		BZF	DOROTAT	
04058	REF	63	LAST 1446	17,2671	3 0111	0		CA	DAPBCOLS	
04059	REF	6	LAST 1437	17,2672	7 4744	0		MASK	ORIFTBIT	
0406				17,2673	0 0006	1		EXTFNO		
04061	REF	3	LAST 1439	17,2674	1 3015	1		BZF	XTRANS	
04062	REF	100	LAST 1439	17,2675	3 4752	0	OOROTAT	CAF	TWO	
0407	REF	279	LAST 1440	17,2676	54 001	1		TS	L	
0408	REF	16	LAST 1446	17,2677	51'476	0		INDEX	AXISCTR	
0409	REF	7	LAST 1443	17,2700	11'525	0		CCS	TJU	
0410				17,2701	1 2706	0		TCF	+5	
0411	REF	1		17,2702	1 2731	1		TCF	NOROTAT	
0412				17,2703	1 2705	0		TCF	+2	
0413	REF	2	LAST 1447	17,2704	1 2731	1		TCF	NOROTAT	
0414				17,2705	22 007	0		ZL		
0415	REF	171	LAST 1446	17,2706	6 4753	1		AD	ONF	
0416	REF	5	LAST 1432	17,2707	55'735	0		TS	ABSTJ	
0417	REF	17	LAST 1447	17,2710	3 1476	0		CA	AXISCTR	
0418	REF	280	LAST 1447	17,2711	6 0001	0		AD	L	
0419	REF	8	LAST 1437	17,2712	55'742	0		TS	ROTINDEX	0 1 2 3 = -U -V -+U +V
0420	REF	6	LAST 1447	17,2713	3 1735	1		CA	ABSTJ	
0421	REF	1		17,2714	6 3042	1		AO	-150MS	
0422				17,2715	0 0006	1		EXTEND		
0423	REF	1		17,2716	6 2742	1		BZMF	DOSKIP	
0424	REF	2	LAST 1437	17,2717	0 3130	0		TC	SELCTSUB	
0425	REF	18	LAST 1447	17,2720	51'476	0		INDEX	AXISCTR	
0426	REF	1		17,2721	3 3037	0		CA	INDEXES	

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0427	REF 281	LAST 1447	17,2722	54 001 1	TS	L	
0428	REF 7	LAST 1438	17,2723	3 1737 0	CA	POLYTEMP	
04289			17,2724	0 0004 0	INHINT		
0429	REF 282	LAST 1448	17,2725	50 001 0	INDEX	L	
0430	REF 4	LAST 1432	17,2726	0 5745 1	TC	WRITEP	
04301			17,2727	0 0003 1	RELINT		
0431	REF 1		17,2730	1 3003 0	TCF	FEEDBACK	
0432	REF 19	LAST 1447	17,2731	51'476 0	NOROTAT	INDEX	AXISCTR
0433	REF 2	LAST 1447	17,2732	3 3037 0	CA	INDEXES	
04331			17,2733	0 0004 0	INHINT		
0434	REF 517	LAST 1446	17,2734	50 000 1	INDEX	A	
0435	REF 5	LAST 1448	17,2735	0 5744 0	TC	WRITEP -1	
04351			17,2736	0 0003 1	RELINT		
0436	REF 20	LAST 1448	17,2737	11'476 1	LOOPER	CCS	AXISCTR
0437	REF 4	LAST 1446	17,2740	0 1475 0	TC	RETJADR	
0438	REF 1		17,2741	1 3173 0	TCF	CLOSEOUT	
0439	REF 7	LAST 1447	17,2742	4 1735 0	DOSKIP	CS	ABSTJ
0440	REF 2	LAST 1439	17,2743	6 3041 1	AD	+TJMINT6	14MS
0441			17,2744	0 0006 1	EXTEND		
0442	REF 1		17,2745	6 2764 0	BZME	NOTMIN	
0443	REF 8	LAST 1448	17,2746	27'735 0	ADS	ABSTJ	
0444	REF 21	LAST 1448	17,2747	51'476 0	INDEX	AXISCTR	
0445	REF 8	LAST 1447	17,2750	11'525 0	CCS	TJU	
0446	REF 3	LAST 1448	17,2751	3 3041 1	CA	+TJMINT6	
0447			17,2752	1 2754 1	TCF	+2	
0448	REF 4	LAST 1448	17,2753	4 3041 0	CS	+TJMINT6	
0449	REF 22	LAST 1448	17,2754	51'476 0	INDEX	AXISCTR	
0450	REF 9	LAST 1448	17,2755	55'525 0	TS	TJU	
0451	REF 4	LAST 1437	17,2756	11'477 0	CCS	SENSE TYP	ENSURE MIN-IMPULSE NOT AGAINST TRANS
0452	REF 2	LAST 1448	17,2757	1 2763 0	TCF	NOTMIN -1	
0453			17,2760	0 0006 1	EXTEND		
0454	REF 4	LAST 394	17,2761	00 004 0	READ	LOSCALAR	
0455	REF 172	LAST 1447	17,2762	7 4753 0	MASK	DNE	
0456	REF 12	LAST 1446	17,2763	55'741 0	TS	NUMBERT	
0457	REF 3	LAST 1447	17,2764	0 3130 0	NOTMIN	TC	SELCTSUB
0458	REF 23	LAST 1448	17,2765	51'476 0	INDEX	AXISCTR	
0459	REF 3	LAST 1448	17,2766	3 3037 0	CA	INDEXES	
0460			17,2767	0 0004 0	INHINT		
0461	REF 5	LAST 1432	17,2770	55'467 1	TS	T6FURTHA +1	
0462	REF 8	LAST 1448	17,2771	3 1737 0	CA	POLYTEMP	
0463	REF 6	LAST 1448	17,2772	51'467 0	INDEX	T6FURTHA +1	
0464	REF 6	LAST 1448	17,2773	0 5745 1	TC	WRITEP	

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0465 REF 9 LAST 1448 17,2774 3 1735 1
 0466 REF 7 LAST 1448 17,2775 55'466 0
 0467 REF 2 LAST 1432 17,2776 0 3046 0

CA ABSTJ
 TS T6FURTHA
 TC JTLST

IN QR BANK BY NOW

0468 17,2777 0 0003 1

RELINT

0469 REF 296 LAST 1444 17,3000 3 4755 1
 0470 REF 24 LAST 1448 17,3001 51'476 0
 0471 REF 7 LAST 1446 17,3002 55'535 1

CA ZFRD
 INDEX AXISCTR
 TS SKIPU

0472 RFF 44 LAST 1382 17,3003 4 6244 1
 0473 REF 13 LAST 1448 17,3004 6 1741 1
 0474 17,3005 0 0006 1
 0475 17,3006 6 3011 1

FEEDBACK CS THREE
 AD NUMBERT
 EXTEND
 BZMF +3

0476 REF 101 LAST 1447 17,3007 3 4752 0
 0477 17,3010 1 3012 0
 0478 REF 173 LAST 1448 17,3011 3 4753 1
 0479 REF 25 LAST 1449 17,3012 51'476 0
 0480 REF 2 LAST 148 17,3013 55'522 1
 0481 REF 3 LAST 1446 17,3014 1 2737 1

CA TWO
 TCF +2
 CA ONE
 INDEX AXISCTR
 TS NO.UJFTS
 TCF LOOPFR

0482 RFF 257 LAST 1449 17,3015 3 4755 1
 0483 REF 10 LAST 1448 17,3016 55'525 0
 0484 REF 3 LAST 1439 17,3017 55'526 0
 0485 REF 42 LAST 1446 17,3020 3 4751 0
 0486 17,3021 0 0004 0

XTRANS CA ZERO
 TS TJU
 TS TJV
 CA FOUR
 INHINT

0487 REF 8 LAST 1449 17,3022 57'535 0
 0488 17,3023 0 0006 1
 0489 17,3024 1 3026 1
 0490 REF 1 17,3025 0 5750 0
 0491 REF 43 LAST 1449 17,3026 3 4751 0
 0492 REF 2 LAST 1407 17,3027 57'536 0
 0493 17,3030 0 0003 1

XCH SKIPU
 EXTEND
 BZF +2
 TC WRITEV -1
 CA FOUR
 XCH SKIPV
 RELINT

0494 17,3031 0 0006 1
 0495 REF 2 LAST 1448 17,3032 1 3173 0
 0496 17,3033 0 0004 0
 0497 REF 1 17,3034 0 5761 1
 0498 17,3035 0 0003 1

EXTEND
 BZF CLOSEOUT
 INHINT
 TC WRITEV -1
 RELINT

0499 REF 3 LAST 1449 17,3036 1 3173 0
 0500 17,3037 00004 0
 0501 17,3040 00015 0
 0502 17,3041 00026 0
 0503 17,3042 77417 0
 0504 17,3043 00600 1
 0505 17,3044 00266 0

TCF CLOSEOUT
 INDEXES DEC 4
 DEC 13
 DEC 22
 -150MS DFC -240
 BIT8,9 OCT 00600
 SCLNORM OCT 266

05051 REF 1 17,3045 02626 1

TJLAWADR GENADR TJLAW +3

RETURN ADDRESS FOR RCS ATTITUDE CONTROL

L Q,R-AXES RCS AUTOPILOT

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A0506
A0507THE JET LIST:
THIS IS A WAITLIST FOR T6RUPTS.A0508
A0509
A0510
A0511
A0512
A0513CALLED BY:
CA TJ TIME WHEN NEXT JETS WILL BE WRITTEN
TS T6FURTHA
CA INDEX AXIS TO BE WRITTEN AT IJ (FROM NOW)
TS T6FURTHA +1
TC JTLSTA0514
A0515
A0516
A0517
A0518EXAMPLE- U-AXIS AUTOPILOT WILL WRITE ITS ROTATION CODE OF
JETS INTO CHANNEL 5. IF IT DESIRES TO TURN OFF THIS POLICY WITHIN
150MS AND THEN FIRE NEXTU, A CALL TO JTLST IS MADE WITH T6FURTHA
CONTAINING THE TIME TO TURN OFF THE POLICY, T6FURTHA +1 THE INDEX
OF THE U-AXIS(4), AND NEXTU WILL CONTAIN THE "U-TRANS" POLICY OR ZERO.A0519
A0520THE LIST IS EXACTLY 3 LONG.(THIS LEADS TO SKIP LOGIC AND 150MS LIMIT)
THE INPUT IS THE LAST MEMBER OF THE LISTA0521
A0522RETURNS BY:
+ TC QA0523
A0524
A0525
A0526
A0527
A0528
A0529DEFINITIONS:(OUTPUT)
TIME6 TIME OF NEXT RUPT
T6NEXT DELTA TIME TO NEXT RUPT
T6FURTHA DELTA TIME FROM 2ND TO LAST RUPT
NXT6ADR AXIS INDEX Q - P-AXIS
T6NEXT +1 AXIS INDEX 4 - U-AXIS
T6FURTHA +1 AXIS INDEX 13 - V-AXIS
JTLST CS T6FURTHA0530 REF 8 LAST 1449 17,3046 4 1466 0
0531 REF 5 LAST 1407 17,3047 6 0031 0
0532 17,3050 0 0006 1
0533 REF 1 17,3051 6 3063 1AD TIME6
EXTEND
BZMF MIDORLST TIME6 - T IS IN A0534 REF 4 LAST 1407 17,3052 23'463 1
0535 REF 9 LAST 1407 17,3053 53'465 0
0536 REF 9 LAST 1450 17,3054 53'467 1
0537 REF 6 LAST 1450 17,3055 54 031 1
0538 REF 5 LAST 1450 17,3056 23'463 1LXCH NXT6ADR
DXCH T6NEXT
DXCH T6FURTHA
TS TIME6
LXCH NXT6ADR0539 REF 55 LAST 1440 17,3057 3 4735 1
0540 17,3060 0 0006 1
0541 REF 24 LAST 1428 17,3061 05 013 0
0542 REF 412 LAST 1445 17,3062 0 0002 0TURNON CA BIT15
EXTEND
WOR CHAN13
TC Q0543 REF 10 LAST 1450 17,3063 6 1464 0
0544 17,3064 0 0006 1
0545 REF 1 17,3065 6 3074 1MIDORLST AD T6NEXT
EXTEND
BZMF LASTCHG TIME6 + T6NEXT - T IS IN A

0546 REF 11 LAST 1450 17,3066 23'465 1

LXCH T6NEXT +1

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0547	REF	10	LAST	1450	17,3067	53'467 1		DXCH	T6FURTHA	
0548					17,3070	0 0006 1		EXTEND		
0549	REF	7	LAST	1450	17,3071	60 031 0		SU	TIME6	
0550	REF	12	LAST	1450	17,3072	53'465 0		DXCH	T6NEXT	
0551	REF	413	LAST	1450	17,3073	0 0002 0		TC	0	
0552	REF	518	LAST	1448	17,3074	4 0000 0	LASTCHG	CS	A	
0553	REF	31	LAST	1388	17,3075	6 4754 0		AD	NEGO	
0554	REF	11	LAST	1451	17,3076	55'466 0		TS	T6FURTHA	
0555	REF	414	LAST	1451	17,3077	0 0002 0		TC	0	
0556	REF	1			17,3100	55'735 0	ROT45DEG	TS	ROTEMP1	
0557	REF	283	LAST	1448	17,3101	6 0001 0		AD	L	
0558	REF	1			17,3102	55'736 0		TS	ROTEMP2	
0559					17,3103	1 3111 1		TCF	+6	
0560	REF	519	LAST	1451	17,3104	10 000 0		CCS	A	
0561	REF	38	LAST	1417	17,3105	3 4733 1		CA	PDSMAX	
0562					17,3106	1 3110 0		TCF	+2	
0563	REF	9	LAST	1423	17,3107	3 4735 1		CA	NEGMAX	
0564	REF	2	LAST	1451	17,3110	55'736 0		TS	ROTEMP2	Q+R
0565	REF	2	LAST	1451	17,3111	4 1735 0		CS	ROTEMP1	
0566	REF	284	LAST	1451	17,3112	6 0001 0		AD	L	
0567	REF	3	LAST	1451	17,3113	55'735 0		TS	ROTEMP1	R-Q
0568					17,3114	1 3120 0		TCF	+4	
0569					17,3115	0 0006 1		EXTEND		
0570	REF	39	LAST	1451	17,3116	7 4733 0		MP	PDSMAX	
0571	REF	285	LAST	1451	17,3117	3 0001 0		CA	L	
0572					17,3120	0 0006 1		EXTEND		
0573	REF	1			17,3121	7 3127 1		MP	.707	
0574	REF	3	LAST	1451	17,3122	57'736 1		XCH	ROTEMP2	
0575					17,3123	0 0006 1		EXTEND		
0576	REF	2	LAST	1451	17,3124	7 3127 1		MP	.707	
0577	REF	4	LAST	1451	17,3125	23'736 1		LXCH	ROTEMP2	
0578	REF	415	LAST	1451	17,3126	0 0002 0		TC	0	
0579					17,3127	26501 1	.707	DEC	.70711	
0580	REF	9	LAST	1447	17,3130	51'742 1	SELCTSUB	INDEX	ROTINDEX	
0581	REF	1			17,3131	3 3162 1		CA	ALLJFTS	
0582	REF	14	LAST	1449	17,3132	51'741 1		INDEX	NUMBERT	
0583	REF	1			17,3133	7 3166 1		MASK	TYPEPOLY	
0584	REF	9	LAST	1448	17,3134	55'737 1		TS	POLYTEMP	
0585	REF	7	LAST	227	17,3135	7 1262 1		MASK	CH5MASK	
0586	REF	520	LAST	1451	17,3136	10 000 0		CCS	A	
0587					17,3137	1 3141 1		TCF	+2	

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0588	RFF 416	LAST 1451	17,3140	0 0002 0	TC	Q		
0589	REF 45	LAST 1449	17,3141	3 6244 0	CA	THREE		
0590	RFF 15	LAST 1451	17,3142	55'741 0	FAILOOP	TS	NUMBRT	
0591	RFF 10	LAST 1451	17,3143	51'742 1	INDEX	ROTI	INDEX	
0592	REF 2	LAST 1451	17,3144	3 3162 1	CA	ALLJETS		
0593	RFF 16	LAST 1452	17,3145	51'741 1	INDEX	NUMBRT		
0594	RFF 2	LAST 1451	17,3146	7 3166 1	MASK	TYPEPOLY		
0595	REF 10	LAST 1451	17,3147	55'737 1	TS	POLYTEMP		
0596	RFF 8	LAST 1451	17,3150	7 1262 1	MASK	CH5MASK		
0597			17,3151	0 0006 1	EXTFND			
0598	REF 1		17,3152	1 3140 0	BZF	FAILOOP -2		
0599	RFF 17	LAST 1452	17,3153	11'741 0	CCS	NUMBRT		
0600	RFF 2	LAST 1452	17,3154	1 3142 1	TCF	FAILOOP		
0601	REF 26	LAST 1449	17,3155	51'476 0	INDEX	AXISCTR		
0602	RFF 11	LAST 1449	17,3156	55'525 0	TS	TJU		
0603	RFF 50	LAST 1437	17,3157	0 5567 0	TC	ALARM		
0604			17,3160	02004 1	OCT	02004		
0605	RFF 3	LAST 1447	17,3161	1 2731 1	TCF	NOROTAT		
0606			17,3162	00110 1	ALLJETS	OCT	00110	-U 6 13
0607			17,3163	00022 1		OCT	00022	-V 2 9
0608			17,3164	00204 1		OCT	00204	+U 5 14
0609			17,3165	00041 1		OCT	00041	+V 1 10
0610			17,3166	00125 1	TYPEPOLY	OCT	00125	-X 1 5 9 13
0611			17,3167	00252 1		OCT	00252	+X 2 6 10 14
0612			17,3170	00146 1		OCT	00146	A 2 5 10 13
0613			17,3171	00231 1		OCT	00231	B 1 6 9 14
0614			17,3172	00377 1		OCT	00377	ALL 1 2 5 6 9 10 13 14

R0615 THE FOLLOWING SETS THE INTERRUPT FLIP-FLOP AS SOON AS POSSIBLE, WHICH PERMITS A RETURN TO THE INTERRUPTED JOB.

0617	REF 1		17,3173	3 3175 1	CLOSEOUT	CA	ADRRUPT	
0618	RFF 1		17,3174	0 7753 1		TC	MAKERUPT	
0619	REF 1		17,3175	03176 1	ADRRUPT	ADRES	ENDJASK	
0620	RFF 5	LAST 1423	17,3176	53'752 1	ENDJASK	DXCH	DAPARRUPT	
0621	RFF 13	LAST 1423	17,3177	52 011 0		DXCH	ARRUPT	
0622	RFF 2	LAST 1423	17,3200	53'754 1		DXCH	DAPBQRPT	
0623	RFF 4	LAST 1423	17,3201	56 017 1		XCH	BRUPT	
0624	REF 417	LAST 1452	17,3202	22 002 0		LXCH	Q	
0625	RFF 10	LAST 1451	17,3203	3 4735 1		CAF	NF3MAX	
0626	RFF 4	LAST 1423	17,3204	53'756 0		DXCH	DAPZRUPT	
0627	REF 2	LAST 1423	17,3205	52 016 1		DXCH	ZRUPT	
0628	RFF 1		17,3206	1 5272 1		TCF	NDQRSM	
0629			7753			BLOCK	3	
0630	REF 4	LAST 1296	6000			SETLOC	FFTAG6	
0631			7753			BANK		

NEGATIVE DAPZRUPT SIGNALS JASK IS OVFR.

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					COUNT*	\$/DAP
0632	REF	1				
0633				7753	0 0006 1	MAKERUPT EXTEND
0634	REF	2	LAST 1452	7754	07 753 1	EDRUPT MAKERUPT

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R0001 PROGRAM DESCRIPTION

R0002 DESIGNED BY: R. D. GOSS AND P. S. WEISSMAN

R0003 CODED BY: P. S. WEISSMAN 28 FEBRUARY 1968

R0004 TJETLAW IS CALLED AS A SUBROUTINE WHEN THE LEM IS NOT DOCKED AND THE AUTOPILOT IS IN THE AUTOMATIC OR
R0006 ATTITUDE-HOLD MODE TO CALCULATE THE JET-FIRING-TIME (TJET) REQUIRED FOR THE AXIS INDICATED BY AXISCTR:

R0008 -1 INDICATES THE P-AXIS

R0009 +0 INDICATES THE U-AXIS

R0010 +1 INDICATES THE V-AXIS.

R0011 THE REGISTERS E AND EDOT CONTAIN THE APPROPRIATE ATTITUDE ERROR AND ERROR RATE AND SENSETYP SHOWS WHETHER
R0013 UNBALANCED COUPLES ARE PREFERRED. TJETLAW ALSO USES VARIOUS FUNCTIONS OF ACCELERATION AND DEADBAND WHICH ARE
R0015 COMPUTED IN THE 1/ACCONT SECTION OF 1/ACCS AND ARE STORED IN SUCH AN ORDER THAT THEY CAN BE CONVENIENTLY
R0017 ACCESSED BY INDEXING.

R0018 THE SIGN OF THE REQUIRED ROTATION IS CARRIED THROUGH TJETLAW AS ROTSENSE AND IS FINALLY APPLIED TO TJET JUST
R0020 PREVIOUS TO ITS STORAGE IN THE LOCATION CORRESPONDING TO THE AXIS (TJP, TJU OR TJV). THE NUMBER OF JETS THAT
R0022 TJETLAW ASSUMES WILL BE USED IS INDICATED BY THE SETTING OF NUMBERT FOR THE U- OR V-AXIS. TWO JETS ARE ALWAYS
R0024 ASSUMED FOR THE P-AXIS ALTHOUGH FOUR JETS WILL BE FIRED WHEN FIREECT IS MORE NEGATIVE THAN -4.0 DEGREES
R0026 (FIREECT IS THE DISTANCE TO A SWITCH CURVE IN THE PHASE PLANE) AND A LONG FIRING IS CALLED FOR.

R0028 IN ORDER TO AVOID SCALING DIFFICULTIES, SIMPLE ALGORITHMS TAGGED RUFLAW1, -2 AND -3 ARE RESORTED TO WHEN THE
R0030 ERROR AND/OR ERROR RATE ARE LARGE.

R0031 CALLING SEQUENCE:

R0032 TC TJETLAW (MUST BE IN JASK)

R0033 OR

R0034 INHINT (MUST BE IN JASK)

R0035 TC IBNKCALL

R0036 CADR TJETLAW

R0037 RELINT

R0038 EXIT: RETURN TO Q.

R0039 INPUT:

R0040 FROM THE CALLER: E, EDOT, AXISCTR, SENSETYP, TJP, -U, -V.

R0041 FROM 1/ACCONT: 48 ERASABLES BEGINNING AT BLOCKTOP (INCLUDING FLAT, ZONE3LIM AND ACCSWU, -V).

R0043 OUTPUT:

R0044 TJP, -U OR -V, NUMBERT (DAPTEMP5), FIREECT (DAPTEMP3).

R0045 DERRIS:

R0046 A, L, Q, E, EDOT, DAPTEMP1-6, DAPTREG1-4.

R0047 ALARM: NONE

0048 17,3207

0049 REF 4 LAST 1436 17,2000

0050 17,3207

0051 REF 13 LAST 1433 E6,1524

BANK 17
SETLOC DAPS2
BANK
FBANK= TJP

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0052	REF	1				COUNT* \$1/DAPTJ		
0053				17,3207	0 0006 1	TJETLAW	EXTEND	SAVE Q FOR RETURN.
0054	REF	1		17,3210	23'743 0		QXCH HOLDQ	
R0055 SET INDEXERS TO CORRESPOND TO THE AXIS AND TO THE SIGN OF EDOT								
0056	REF	27	LAST 1452	17,3211	51'476 0	INDEX	AXISCTR	AXISDIFF(-1)=NO OF LOCATIONS BFR P AND U
0057	REF	2	LAST 1443	17,3212	3 3657 0	CAF	AXISDIFF	AXISDIFF(0) = 0
0058	REF	1		17,3213	55'744 0	TS	ADRSDIF1	AXISDIFF(+1)=NO OF LOCATIONS BET V AND U
0059	REF	3	LAST 1446	17,3214	31'425 0	CAF	EDOT	IF EDOT NEGATIVE, PICK UP SET OF VALUES
0060				17,3215	0 0006 1	EXTEND		THAT ALLOW USE OF SAME CODING AS FOR
0061	REF	1		17,3216	6 3223 1	BZMF	NEGEDOT	POSITIVE EDOT.
0062	REF	2	LAST 1455	17,3217	31'744 1	CAF	ADRSDIF1	SET A SECOND INDEXER WHICH MAY BE
0063	REF	1		17,3220	55'742 0	TS	ADRSDIF2	MODIFIED BY A DECISION FOR MAX JETS.
0064	REF	1		17,3221	3 3661 0	CAF	SENSOR	FOR POSITIVE EDOT, ROTSENSE IS
0065	REF	1		17,3222	1 3233 1	TCF	SETSENSE	INITIALIZED POSITIVE.
0066	REF	9	LAST 1446	17,3223	4 1750 0	NEGEDOT	CS	F
0067	REF	10	LAST 1455	17,3224	55'750 0		TS	E
0068	REF	4	LAST 1455	17,3225	4 1425 1		CS	EDOT
0069	REF	5	LAST 1455	17,3226	55'425 1		TS	EDOT
0070	REF	66	LAST 1438	17,3227	3 4753 1		CAF	BIT1
0071	REF	3	LAST 1455	17,3230	27'744 0		ADS	ADRSDIF1
0072	REF	2	LAST 1455	17,3231	55'742 0		TS	ADRSDIF2
0073	REF	2	LAST 1455	17,3232	4 3661 1		CS	SENSOR
0074	REF	1		17,3233	55'736 0	SETSENSE	TS	ROTSENSE
R0075 TEST MAGNITUDE OF E (ATTITUDE ERROR, SINGLE-PRECISION, SCALED AT PI RADIANS):								
R0077	IF GREATER THAN (OR EQUAL TO) PI/16 RADIANS, GO TO THE SIMPLIFIED TJET ROUTINE.							
R0079	IF LESS THAN PI/16 RADIANS. RESCALE TO PI/4.							
0080	REF	11	LAST 1455	17,3234	31'750 1		CAF	E
0081				17,3235	0 0006 1		EXTEND	
0082	REF	50	LAST 1438	17,3236	7 4747 0		MP	BITS
0083	REF	521	LAST 1451	17,3237	10 000 0		CCS	A
0084	REF	1		17,3240	1 3621 0		TCF	RUFLAW2
0085	REF	1		17,3241	1 3243 0		TCF	SCALEE
0086	REF	1		17,3242	1 3565 0		TCF	RUFLAW1
0087	REF	60	LAST 1438	17,3243	3 4737 0	SCALEE	CAF	BIT13
0088				17,3244	0 0006 1		EXTEND	
0089	REF	286	LAST 1451	17,3245	7 0001 1		MP	L
0090	REF	12	LAST 1455	17,3246	55'750 0		TS	E
R0091 TEST MAGNITUDE OF EDOT (ERROR RATE SCALED AT PI/4 RADIANS/SECOND)								
R0092	IF GREATER THAN (OR EQUAL TO) PI/32 RADIANS/SECOND, GO TO THE SIMPLIFIED TJET ROUTINE.							
R0094	IF LESS THAN PI/32 RADIANS/SECOND, THEN RESCALE TO PI/32 RADIANS/SECOND.							
0096	REF	6	LAST 1455	17,3247	31'425 0		CAF	EDOT
							PICK UP SINGLE-PRECISION ERROR-RATE	

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0097				17,3250	0 0006 1		EXTEND		FOR THIS AXIS=
0098	REF	58	LAST 1426	17,3251	7 4750 0		MP	3IT4	SHIFT RIGHT ELEVEN BITS, IF THE A-REG IS
0099				17,3252	0 0006 1		EXTEND		ZERO, THEN RESCALE AND USE FINELAW.
0100	REF	1		17,3253	1 3255 1		BZF	SCALEDOT	
0101	REF	1		17,3254	1 3627 0		TCF	RUFLAW3	
R0102	***	FINELAW STARTS HERE ***							
0103	REF	7	LAST 1455	17,3255	23'425 0	SCALEDOT	LXCH	EDDT	EDDT IS SCALED AT PI/32 RADIANS/SECOND.
0104	REF	8	LAST 1456	17,3256	31'425 0		CAE	EDDT	COMPUTE (EDDT)(EDDT)
0105				17,3257	0 0006 1		EXTEND		
0106				17,3260	7 0000 0		SQUARE		PRODUCT SCALED AT PI(2)/2(10) RAD/SEC.
0107				17,3261	0 0006 1		EXTEND		
0108	REF	61	LAST 1455	17,3262	7 4737 1		MP	BIT13	SHIFT RIGHT TWO BITS TO RESCALE EDOT SQ
0109	REF	1		17,3263	55'735 0		TS	EDOTSQ	TO PI(2)/2(8) RAD(2)/SEC(2).
0110	REF	13	LAST 1455	17,3264	11'750 0	ERRTEST	CCS	E	DOES BIG ERROR (TWO DEGREES BEYOND THE
0111	REF	1		17,3265	6 3662 0		AD	-2DEG	DEADBAND) REQUIRE MAXIMUM JETS?
0112				17,3266	1 3270 0		TCF	+2	
0113	REF	2	LAST 1456	17,3267	6 3662 0		AD	-2DEG	
0114				17,3270	0 0006 1		EXTEND		
0115	REF	4	LAST 1455	17,3271	5 1744 1		INDEX	ADRS DIF1	
0116	REF	1		17,3272	61'601 1		SU	FIREDB	
0117				17,3273	0 0006 1		EXTEND		
0118	REF	1		17,3274	6 3301 0		BZMF	SENSTEST	IF NOT: ARE UNBALANCED JETS PREFERRED?
0119	REF	102	LAST 1449	17,3275	3 4752 0	MAXJETS	CAF	TWO	IF YES : INCREMENT ADDRESS LOCATOR AND
0120	REF	3	LAST 1455	17,3276	27'742 0		ADS	ADRS DIF2	SET SWITCH FOR JET SELECT LOGIC TO 4.
0121	REF	44	LAST 1449	17,3277	3 4751 0		CAF	FOUR	(ALWAYS DO THIS FOR P-AXIS)
0122	REF	1		17,3300	1 3304 1		TCF	TJCALC	
0123	REF	5	LAST 1448	17,3301	11'477 0	SENSTEST	CCS	SENSETYP	DOES TRANSLATION PREFER MIN JETS.
0124	REF	2	LAST 1456	17,3302	1 3304 1		TCF	TJCALC	YES. USE MIN-JET PARAMETERS.
0125	REF	1		17,3303	1 3275 0		TCF	MAXJETS	NO. GET MAX-JET PARAMETERS.
0126	REF	18	LAST 1452	17,3304	55'741 0	TJCALC	TS	NUMBERT	SET TO +0,1,4 FOR (U,V-AXES) JET SELECT.
R0127	BEGINNING OF TJET CALCULATIONS:								
0128	REF	2	LAST 1456	17,3305	4 1735 0		CS	EDOTSQ	SCALED AT PI(2)/2(8).
0129				17,3306	0 0006 1		EXTEND		
0130	REF	4	LAST 1456	17,3307	5 1742 1		INDEX	ADRS DIF2	
0131	REF	8	LAST 149	17,3310	7 1567 0		MP	1/ANET1	.5/ACC SCALED AT 2(6)/PI SEC(2)/RADIAN.
0132	REF	5	LAST 1456	17,3311	51'744 1		INDEX	ADRS DIF1	
0133	REF	2	LAST 1456	17,3312	6 1601 1		AD	FIREDB	DEADBAND SCALED AT PI/4 RADIAN.
0134				17,3313	0 0006 1		EXTEND		
0135	REF	14	LAST 1456	17,3314	61'750 1		SU	E	ATTITUDE ERROR SCALED AT PI/4 RADIAN.
0136	REF	2	LAST 1433	17,3315	55'737 1		TS	FIREFCT	-E-.5(EDOTSQ)/ACC-DB AT PI/4 RADIAN.
0137				17,3316	0 0006 1		EXTEND		
0138	REF	1		17,3317	6 3477 0		BZMF	ZONE1,2,3	
0139	REF	6	LAST 1456	17,3320	51'744 1	ZONE4,5	INDEX	ADRS DIF1	
0140	REF	1		17,3321	31'573 1		CAE	1/ACOST	.5/ACC SCALED AT 2(6)/PI WHERE

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0141			17,3322	0 0006 1	EXTEND		ACC = MAX(AMIN, AOS-).
0142	REF	3	LAST 1456	17,3323 7 1735 0	MP	EDOTSQ	SCALED AT PI/2(8).
0143	REF	15	LAST 1456	17,3324 6 1750 1	AD	F	SCALED AT PI/4
0144	REF	7	LAST 1456	17,3325 51'744 1	INDEX	ADRSOIF1	
0145	REF	1		17,3326 6 1603 0	AD	COASTDB	SCALED AT PI/4 POS. FOR NEG. INTERCEPT.
0146				17,3327 0 0006 1	EXTEND		TEST E+.5(EDOTSQ)/ACC+DB AT PI/4 RADIAN.
0147	REF	1		17,3330 6 3363 1	BZMF	ZONE5	IF FUNCTION NEGATIVE, FIND TJET.
A0148							IF FUNCTION POSITIVE, IN ZONE 4.
RO149			ZONE 4 IS THE COAST REGION. HOWEVER, IF THE JETS ARE ON AND DRIVING TOWARD				
RO151			A. THE AXIS WITHIN + OR - (DB + FLAT) FOR DRIFTING FLIGHT, OR				
RO152			B. THE USUAL TARGET PARABOLA FOR POWERED FLIGHT				
RO153			THEN THE THRUSTERS ARE KEPT ON.				
0154	REF	28	LAST 1455	17,3331 51'476 0	ZONE4	INDEX	AXISCTR
0155	REF	1		17,3332 4 1525 0	CS	TJETU	IS THE CURRENT VALUE IN TJET NON-ZERO
0156				17,3333 0 0006 1	EXTEND		WITH SENSE OPPOSITE TO EDOT,
0157	REF	2	LAST 1455	17,3334 7 1736 0	MP	ROISENSE	(I.E., ARE JETS ON AND FIRING TOWARD
0158				17,3335 0 0006 1	EXTEND		THE DESIRABLE STATE).
0159	REF	1		17,3336 6 3357 0	BZMF	COASTTJ	NO. COAST.
0160	REF	1		17,3337 11'555 1	JETSON	CCS	FLAT
0161	REF	1		17,3340 1 3351 1	TCF	DRIFT/ON	YES. IS THIS DRIFTING OR POWERED FLIGHT?
0162	REF	3	LAST 1456	17,3341 4 1737 1	CS	FIREFCT	POWERED (OR ULLAGE). CAN TARGET PARABOLA
0163	REF	8	LAST 1457	17,3342 51'744 1	INDEX	ADRSOIF1	BE REACHED FROM THIS POINT IN THE
0164	REF	1		17,3343 6 1605 0	AD	AXISDIST	PHASE PLANE]
0165				17,3344 0 0006 1	EXTEND		
0166	REF	2	LAST 1457	17,3345 6 3357 0	BZME	COASTTJ	NO. SET TJET = 0.
0167	REF	1		17,3346 0 3463 0	TC	Z123COMP	YES. CALCULATE TJET AS THOUGH IN ZONE 1
0168	REF	4	LAST 1457	17,3347 31'737 0	CAE	FIREFCT	AFTER COMPUTING THE REQUIRED
0169	REF	1		17,3350 1 3517 0	TCF	ZONF1	PARAMETERS.
0170	RFF	9	LAST 1457	17,3351 51'744 1	DRIFT/ON	INDEX	ADRSOIF1
0171	REF	3	LAST 1456	17,3352 4 1601 0	CS	FIREDB	CAN TARGET STRIP OF AXIS BE REACHED FROM
0172				17,3353 6 0000 1	DOUBLE		THIS POINT IN THE PHASE PLANE]
0173	REF	5	LAST 1457	17,3354 6 1737 0	AD	FIREFCT	
0174				17,3355 0 0006 1	EXTEND		
0175				17,3356 6 3361 0	BZMF	+3	
0176	REF	298	LAST 1449	17,3357 3 4755 1	COASTTJ	CAF	ZFRO
0177	RFF	1		17,3360 1 3423 0	TCF	RETURN TJ	NO. SET TJET = 0.
0178	RFF	2	LAST 1457	17,3361 0 3463 0	TC	Z123COMP	YES. CALCULATE TJET AS THOUGH IN ZONE 2
0179	REF	1		17,3362 1 3504 1	TCF	ZONE2,3	OR 3 AFTER COMPUTING REQUIRED VALUES.
0180	REF	287	LAST 1455	17,3363 54 001 1	ZONE5	TS	L
0181	REF	3	LAST 1457	17,3364 11'736 0	CCS	ROTSFENSE	TEMPORARILY STORE FUNCTION IN L.
0182				17,3365 1 3371 0	TCF	+4	MODIFY ADRSOIF2 FOR ACCESSING I/ANET2
0183	RFF	21	LAST 1399	17,3366 0 5677 1	TC	CCSHOLF	AND ACCEPTZ5, WHICH MUST BE PICKED UP
0184	RFF	103	LAST 1456	17,3367 4 4752 1	CS	TWO	FROM THE NEXT LOWER REGISTER IE THE
							(ACTUAL) ERROR RATE IS NEGATIVE.

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0185	REF	5	LAST 1456	17,3370	27'742 0	ADS	ADRSDF2	
0186	REF	288	LAST 1457	17,3371	30 001 0	CAE	L	
0187				17,3372	0 0006 1	EXTEND		
0188	REF	6	LAST 1458	17,3373	5 1742 1	INDEX	ADRSDF2	TTOAXIS AND HH ARE THE PARAMETERS UPON
0189	REF	1		17,3374	7 1576 0	MP	ACCCT25	WHICH THE APPROXIMATIONS TO TJET ARE
0190				17,3375	20 001 1	DDOUBL		BASED.
0191				17,3376	20 001 1	DDOUBL		
0192	REF	1		17,3377	53'746 1	DXCH	HH	DOUBLE PRECISION H SCALED AT 8 SEC(2).
0193	REF	7	LAST 1458	17,3400	51'742 1	INDEX	ADRSDF2	
0194	REF	2	LAST 1443	17,3401	31'570 1	CAE	1/ANET2	SCALED AT 2(7)/PI SEC(2)/RAD.
0195				17,3402	0 0006 1	EXTEND		
0196	REF	9	LAST 1456	17,3403	7 1425 1	MP	EDOT	SCALED AT PI/2(5)
0197	REF	1		17,3404	55'740 1	TS	TTOAXIS	SCALED AT 4 SEC.
R0198	TEST	WHETHER TJET GREATER THAN 50 MSEC.						
0199				17,3405	0 0006 1	EXTEND		
0200	REF	1		17,3406	7 3671 0	MP	-.05AT2	H - .05 TTOAXIS - .00125 G.T. ZERO
0201	REF	2	LAST 1458	17,3407	6 1745 0	AD	HH	(SCALED AT 8 SEC(2)) .
0202	REF	8	LAST 1302	17,3410	6 7745 0	AD	NEG2	
0203				17,3411	0 0006 1	EXTEND		
0204	REF	1		17,3412	6 3440 1	BZMF	FORMULA1	
R0205	TEST	WHETHER TJET GREATER THAN 150 MSEC.						
0206	REF	2	LAST 1458	17,3413	31'740 0	CAE	TTOAXIS	
0207				17,3414	0 0006 1	EXTEND		
0208	REF	1		17,3415	7 3672 0	MP	-.15AT2	H - .15 TTOAXIS - .01125 G.T. ZERO
0209	REF	3	LAST 1458	17,3416	6 1745 0	AD	HH	(SCALED AT 8 SEC(2))
0210	REF	1		17,3417	6 3663 1	AD	-.0112A8	
0211				17,3420	0 0006 1	EXTEND		
0212	REF	1		17,3421	6 3450 0	BZMF	FORMULA2	
R0213	IF	TJET GREATER THAN 150 MSEC, ASSIGN IT VALUE OF 250 MSEC, SINCE THIS						
R0214	IS	ENOUGH TO ASSURE NO SKIP NEXT CSP (100 MSEC).						
0215	REF	38	LAST 1330	17,3422	3 4741 1	FULLTIME CAF	BIT11	250 MSEC SCALED AT 4 SEC.
R0216	RETURN	TO CALLING PROGRAM WITH JET TIME SCALED AS TIME6 AND SIGNED.						
0217				17,3423	0 0006 1	RETURN TJ	EXTEND	
0218	REF	4	LAST 1457	17,3424	7 1736 0	MP	ROTSENSE	ALL BRANCHES TERMINATE HERE WITH TJET
0219	REF	29	LAST 1457	17,3425	51'476 0	INDEX	AXISCTR	(SCALED AT 4 SEC) IN THE ACCUMULATOR.
0220	REF	2	LAST 1457	17,3426	55'525 0	TS	TJETU	ROTSENSE APPLIES SIGN AND CHANGES SCALE.
0221				17,3427	0 0006 1	EXTEND		
0222	REF	30	LAST 1458	17,3430	5 1476 0	INDEX	AXISCTR	
0223	REF	2	LAST 149	17,3431	7 1547 1	MP	ACCSWU	SET SWITCH FOR JET SELECT IF ROTATION IS
0224	REF	289	LAST 1458	17,3432	30 001 0	CAE	L	
0225				17,3433	0 0006 1	EXTEND		IN A SENSE FOR WHICH 1/ACCS HAS FORCED
0226				17,3434	6 3437 1	BZMF	+3	A MAX-JET CALCULATION.
0227	REF	45	LAST 1456	17,3435	3 4751 0	CAF	FCUP	

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0228 REF 19 LAST 1456 17,3436 55'741 0
 0229 REF 2 LAST 1455 17,3437 0 1743 0

TS NUMBERT
 TC HOLOQ

RETURN VIA SAVED Q.

R0230 TJET = $H/(.025 + T/OAXIS)$ FOR TJET LESS THAN 50 MSEC.

0231 REF 1 17,3440 4 3670 1
 0232 REF 3 LAST 1458 17,3441 6 1740 0
 0233 REF 4 LAST 1458 17,3442 53'746 1
 0234 17,3443 0 0006 1
 0235 REF 5 LAST 1459 17,3444 11'745 1
 0236 17,3445 0 0006 1
 0237 REF 90 LAST 1418 17,3446 7 4736 0
 0238 REF 1 17,3447 1 3560 0

FORMULA1 CS --.025AT4
 AO T/OAXIS
 OXCH HH
 EXTEND
 DV HH
 EXTEND
 MP BIT14
 TCF CHKMINIJ

.025 SEC SCALED AT 4.
 SCALED AT 4 SECONOS.
 STORE DENOMINATOR IN FIRST WORD OF H,
 WHICH NEED NOT BE PRESERVED. PICK UP
 DP H AND DIVIDE BY DENOMINATOR.
 RESCALE TJET FROM 2 TO USUAL 4 SEC.
 CHECK THAT TJET IS NOT LESS THAN MINIMUM

R0239 TJET = $(H + .00375)/(0.1 + T/OAXIS)$ FOR TJET GREATER THAN 50 MSEC.

0240 17,3450 0 0006 1
 0241 REF 1 17,3451 3 3674 1
 0242 REF 6 LAST 1459 17,3452 21'746 1
 A0243
 0244 REF 4 LAST 1459 17,3453 31'740 0
 0245 REF 1 17,3454 6 3664 0
 0246 REF 7 LAST 1459 17,3455 53'746 1
 0247 17,3456 0 0006 1
 0248 REF 8 LAST 1459 17,3457 11'745 1
 0249 17,3460 0 0006 1
 0250 REF 91 LAST 1459 17,3461 7 4736 0
 0251 REF 2 LAST 1457 17,3462 1 3423 0

FORMULA2 EXTEND
 OCA .00375A8
 DAS HH
 CAE T/OAXIS
 AO .1AT4
 OXCH HH
 EXTEND
 DV HH
 EXTEND
 MP BIT14
 TCF RETURNIJ

.00375 SEC(2) SCALED AT 8.
 STORE NUMERATOR IN OP H, WHICH NEED NOT
 BE PRESERVED.
 SCALED AT 4 SEC.
 0.1 SEC SCALED AT 4.
 STORE DENOMINATOR IN FIRST WORD OF H,
 WHICH NEED NOT BE PRESERVED. PICK UP
 DP NUMERATOR AND DIVIDE BY DENOMINATOR
 RESCALE TJET FROM 2 TO USUAL 4 SEC.
 END SUBROUTINE.

R0252 SUBROUTINIZED COMPUTATIONS REQUIRED FOR ALL ENTRIES INTO CODING FOR ZONES 1, 2, AND 3.

R0254 REACHED BY TC FROM 3 POINTS IN TJETLAW.

0255 REF 5 LAST 1458 17,3463 4 1736 0
 0256 REF 6 LAST 1459 17,3464 55'736 0
 0257 REF 10 LAST 1458 17,3465 31'425 0
 0258 17,3466 0 0006 1
 0259 REF 8 LAST 1458 17,3467 5 1742 1
 0260 REF 9 LAST 1456 17,3470 7 1567 0
 0261 REF 5 LAST 1459 17,3471 55'740 1
 0262 REF 1 17,3472 6 3675 0
 0263 17,3473 0 0006 1
 0264 17,3474 6 3476 1
 0265 REF 1 17,3475 1 3422 1
 0266 17,3476 0 0002 0

Z123COMP CS
 TS
 CAE
 EXTEND
 INDEX
 MP
 TS
 AO
 EXTEND
 BZMF
 TCF
 RETURN

USED IN RETURNIJ SECTION TO RESCALE TJET
 AS TIME6 AND GIVE IT PROPER SIGN.
 SCALED AT $PI/2(5)$ RAD/SEC.
 SCALED AT $2(7)/PI$ SEC(2)/RAD.
 STORE TIME-TO-AXIS SCALED AT 4 SECONOS.
 IS TIME TO AXIS LESS THAN 150 MSEC.
 NO. FIRE JETS, DO NOT CALCULATE TJET.
 YES. GO ON TO FIND TJET

0267 REF 3 LAST 1457 17,3477 0 3463 0 ZON1,2,3 TC Z123COMP

SUBROUTINIZED PREPARATION FOR ZONE1,2,3.

R0268 IF THE (NEG) DISTANCE BEYOND PARABOLA IS LESS THAN FLAT, USE SPECIAL
 R0269 LOGIC TO ACQUIRE MINIMUM IMPULSE LIMIT CYCLE. DURING POWERED FLIGHT

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R0270 OR ULLAGE, FLAT = 0

0271	REF	6	LAST 1457	17,3500	31'737 0	CAF	FIREFCT	SCALED AT PI/4 RAD.
0272	REF	2	LAST 1457	17,3501	6 1555 0	AD	FLAT	
0273				17,3502	0 0006 1	EXTEND		
0274	REF	2	LAST 1457	17,3503	6 3517 1	BZMF	ZONE1	NOT IN SPECIAL ZONES.

R0275 FIRE FOR AXIS OR, IE CLOSE, FIRE MINIMUM IMPULSE. IF ON AXIS, COAST.

0276	RFE	1		17,3504	4 1556 1	ZONE2,3	CS	ZONE3LIM	HEIGHT OF MIN-IMPULSE ZONE SET BY 1/ACCS
0277	REF	6	LAST 1459	17,3505	6 1740 0		AD	TTOAXIS	35 MSEC IN DRIFTING FLIGHT
0278				17,3506	0 0006 1		EXTEND		ZERO WHEN TRYING TO ENTER GTS CONTROL.
0279	REF	1		17,3507	6 3512 1		BZMF	ZONE3	
0280	RFE	7	LAST 1460	17,3510	31'740 0	ZONE2	CAF	TTOAXIS	FIRE TO AXIS.
0281	REF	3	LAST 1459	17,3511	1 3423 0		TCE	RETURNJTJ	
0282	RFE	11	LAST 1459	17,3512	11'425 1	ZONE3	CCS	EDOT	CHECK IF EDOT IS ZERO.
0283	RFE	64	LAST 1439	17,3513	3 4746 0		CAF	RIT6	FIRE A ONE-JET MINIMUM IMPULSE.
0284	REF	4	LAST 1460	17,3514	1 3423 0		TCF	RETURNJTJ	TJET = +0.
0285	REF	22	LAST 1457	17,3515	0 5677 1		TC	CCSHCLE	CANNOT BE BECAUSE NEG EDOT COMPLEMENTED.
0286	RFE	5	LAST 1460	17,3516	1 3423 0		TCF	RETURNJTJ	TJET = +0.

0287				17,3517	0 0006 1	ZONE1	EXTEND		
0288	RFE	10	LAST 1457	17,3520	5 1744 1		INDEX	ADRSDIF1	
0289	REF	2	LAST 1457	17,3521	61'605 0		SU	AXISDIST	SCALED AT PI/4 RAD.
0290				17,3522	0 0006 1		EXTEND		
0291	REF	9	LAST 1459	17,3523	5 1742 1		INDEX	ADRSDIF2	
0292	REF	1		17,3524	7 1575 0		MP	ACCFCCTZ1	SCALED AT 2(7)/PI SEC(2)/RAD.
0293				17,3525	20 001 1		DDOUBL		
0294				17,3526	20 001 1		DDOUBL		
0295	REF	9	LAST 1459	17,3527	53'746 1		DXCH	HH	DOUBLE PRECISION H SCALED AT 8 SEC(2).

R0296 TEST WHETHER TOTAL TIME REQUIRED GREATER THAN 150 MSEC:

R0297 ²
 R0298 IS .5(.150 - TTOAXIS) - H ² NEGATIVE (SCALED AT 8 SECONDS)

0299	REF	8	LAST 1460	17,3530	31'740 0	CAF	TTOAXIS	TTOAXIS SCALED AT 4 SECONDS.
0300	RFE	2	LAST 1459	17,3531	6 3675 0	AD	-TJMAX	-.150 SECOND SCALED AT 4.
0301				17,3532	0 0006 1	EXTEND		
0302				17,3533	7 0000 0	SQUARE		
0303				17,3534	0 0006 1	EXTEND		
0304	RFE	10	LAST 1460	17,3535	61'745 0	SU	HH	HIGH WORD OF H SCALED AT 8 SEC(2).
0305				17,3536	0 0006 1	EXTEND		
0306	RFE	2	LAST 1459	17,3537	6 3422 0	BZME	FULLTIME	YES. NEED NOT CALCULATE TJET.

R0307 TEST WHETHER TIME BEYOND AXIS GREATER THAN 50 MSEC TO DETERMINE WHICH APPROXIMATION TO USE.

0309	REF	11	LAST 1460	17,3540	31'745 0	CAF	HH	
0310	REF	9	LAST 1458	17,3541	6 7745 0	AD	NEG2	
0311				17,3542	0 0006 1	EXTEND		
0312	REF	1		17,3543	6 3553 1	BZMF	FORMULA3	

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R0313 TJET = H/0.1 + TIOAXIS + .0375 FOR APPROXIMATION OVER MORE THAN 50 MSEC.

0315	REF	1		17,3544	3 3665 1	CAF	.1AT2	STORE .1 SEC SCALED AT 2 FOR DIVISION.
0316	REF	12	LAST 1460	17,3545	53'746 1	DXCH	HH	DP H SCALED AT 8 SEC(2) NEED NOT BE
0317				17,3546	0 0006 1	EXTEND		PRESERVED.
0318	REF	13	LAST 1461	17,3547	11'745 1	DV	HH	QUOTIENT SCALED AT 4 SECONDS.
0319	REF	9	LAST 1460	17,3550	6 1740 0	AD	TIOAXIS	SCALED AT 4 SEC.
0320	REF	1		17,3551	6 3666 1	AD	.0375AT4	.0375 SEC SCALED AT 4.
0321	REF	6	LAST 1460	17,3552	1 3423 0	TCF	RETURN TJ	END COMPUTATION.

R0322 TJET = H/.025 + TIOAXIS FOR APPROXIMATION OVER LESS THAN 50 MSEC.

0323	REF	1		17,3553	4 3667 1	FORMULA3	CS	-.025AT2	STORE +.025 SEC SCALED AT 2 FOR DIVISION
0324	REF	14	LAST 1461	17,3554	53'746 1	DXCH	HH		PICK UP DP H AT 8, WHICH NEED NOT BE
0325				17,3555	0 0006 1	EXTEND			PRESERVED.
0326	REF	15	LAST 1461	17,3556	11'745 1	DV	HH		QUOTIENT SCALED AT 4 SECONDS.
0327	REF	10	LAST 1461	17,3557	6 1740 0	AD	TIOAXIS		SCALED AT 4 SEC.

R0328 IF COMPUTED JET TIME IS LESS THAN TJMIN, TJET IS SET TO ZERO.

R0329 MINIMUM IMPULSES REQUIRED IN ZONE 3 ARE NOT SUBJECT TO THIS CONSTRAINT, NATURALLY.

0331	REF	1		17,3560	6 3677 1	CHKMINTJ	AD	-TJMIN	IS COMPUTED TIME LESS THAN THE MINIMUM.
0332				17,3561	0 0006 1	EXTEND			
0333	REF	3	LAST 1457	17,3562	6 3357 0	BZMF	COAST TJ		YES, SET TIME TO ZERO.
0334	REF	1		17,3563	6 3676 0	AD	TJMIN		NO, RESTORE COMPUTED TIME.
0335	REF	7	LAST 1461	17,3564	1 3423 0	TCF	RETURN TJ		END COMPUTATION.

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P0336 *** ROUGHLAW ***

R0337 BEFORE ENTRY TO RUFLAW:

R0338 1. INOEXERS ADRSDIF1 AND ADRSDIF2 ARE SET ON BASIS OF AXIS, AND SIGN OF EDOT.
 R0340 2. IF EDOT WAS NEGATIVE, E AND EDOT ARE ROTATED INTO UPPER HALF-PLANE AND ROTSENSE IS MADE NEGATIVE.
 R0342 3. E IS SCALED AT PI RADIANS AND EDOT AT PI/4 RAD/SEC.
 R0343 (EXCEPT THE RUFLAW3 ENTRY WHEN E IS AT PI/4)

R0344 RUFLAW1: ERROR MORE NEGATIVE THAN PI/16 RAD. FIRE TO A RATE OF PI/32 RAD/SEC (IF JET TIME EXCEEDS 20 MSEC.).

R0346 RUFLAW2: ERROR MORE POSITIVE THAN PI/16 RAD. FIRE TO OPPOSING RATE OF PI/32 RAD/SEC.

R0348 RUFLAW3: ERROR RATE GREATER THAN PI/32 RAD/SEC AND ERROR WITHIN BOUNDS. COAST IF BELOW FIREFCT, FIRE IF ABOVE

0350	REF	51	LAST	1432	17,3565	4 4740	1	RUFLAW1	CS	BIT12	DECREMENT EDOT BY PI/32 RAD/SEC, WHICH
0351	REF	12	LAST	1460	17,3566	27'425	1		ADS	EDOT	IS THE TARGET RATE.
0352					17,3567	0 0006	1		EXTEND		
0353	REF	1			17,3570	6 3611	1		BZMF	SMALRATE	BRANCH IF RATE LESS THAN TARGET.
0354	REF	1			17,3571	0 3647	1		TC	RUFSETUP	REVERSE ROTSENSE AND INDICATE MAX JETS.
0355	REF	13	LAST	1462	17,3572	31'425	0		CAE	EDDT	PICK UP DESIRED RATE CHANGE.

0356					17,3573	0 0006	1	RUFLAW12	EXTEND		COMPUTE TJET
0357	REF	10	LAST	1460	17,3574	5 1742	1		INDEX	ADRSDIF2	=(DESIRED RATE CHANGE)/(2-JET ACCEL.)
0358	REF	10	LAST	1459	17,3575	7 1571	1		MP	1/ANET1 +2	
0359	REF	3	LAST	989	17,3576	6 7740	0		AD	-1/8	IF TJET, SCALED AT 32 SEC, EXCEEDS
0360					17,3577	0 0006	1		EXTEND		4 SECONDS, SET TJET TO TJMAX.
0361					17,3600	6 3602	0		BZMF	+2	
0362	REF	3	LAST	1460	17,3601	1 3422	1		TCF	FULLTIME	
03621					17,3602	0 0006	1		EXTEND		
03622	REF	4	LAST	1462	17,3603	1 3422	1		BZF	FULLTIME	
0363	REF	52	LAST	1462	17,3604	6 4740	0		AD	BIT12	RESTORE COMPUTED TJET TO ACCUMULATOR.
0364	REF	522	LAST	1455	17,3605	20 001	1		DAS	A	
0365	REF	523	LAST	1462	17,3606	20 001	1		DAS	A	
0366	REF	524	LAST	1462	17,3607	20 001	1		DAS	A	RESCALED TJET AT 4 SECONDS.
0367	REF	2	LAST	1459	17,3610	1 3560	0		TCF	CHKMINTJ	RETURN AS FROM FINELAW.

0368	REF	2	LAST	1462	17,3611	0 3651	0	SMALRATE	TC	RUFSETUP +2	SET NUMBERT AND FIREFCT FOR MAXIMUM JETS
0369	REF	7	LAST	1459	17,3612	11'736	0		CCS	ROTSENSE	
0370	REF	174	LAST	1449	17,3613	3 4753	1		CAF	ONE	MODIFY INOEXER TO POINT TO 1/ANET
0371					17,3614	1 3616	1		TCF	+2	CORRESPONDING TO THE PROPER SENSE.
0372	REF	13	LAST	1280	17,3615	3 7746	0		CAF	NEGONE	
0373	REF	11	LAST	1462	17,3616	27'742	0		ADS	ADRSDIF2	

0374	REF	14	LAST	1462	17,3617	4 1425	1		CS	EDOT	PICK UP (PI/32-EDOT)=DESIRED CHANGE.
0375	REF	1			17,3620	1 3573	1		TCF	RUFLAW12	

0376	REF	3	LAST	1462	17,3621	0 3647	1	RUFLAW2	TC	RUFSETUP	REVERSE ROTSENSE AND INDICATE MAX JETS.
0377	REF	53	LAST	1462	17,3622	3 4740	0		CAF	BIT12	
0378	REF	15	LAST	1462	17,3623	6 1425	0		AD	EDOT	PICK UP (PI/32+EDOT)=DESIRED RATE CHANGE
0379	REF	525	LAST	1462	17,3624	54 000	0		TS	A	IF OVERFLOW SKIP, FIRE FOR FULL TIME.

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0380	REF	2	LAST	1462	17,3625	1 3573	1	TCF	RUFLAW12	OTHERWISE, COMPUTE JET TIME.
0381	REF	5	LAST	1462	17,3626	1 3422	1	TCF	FULL TIME	
0382	REF	4	LAST	1462	17,3627	0 3647	1	RUFLAW3	TC	EXECUTE COMMON RUFLAW SUBROUTINE.
0383	REF	11	LAST	1460	17,3630	51 744	1	INDEX	ADRS DIF1	
0384	REF	4	LAST	1457	17,3631	4 1601	0	CS	FIREDB	CALCULATE DISTANCE FROM SWITCH CURVE
0385	REF	16	LAST	1457	17,3632	6 1750	1	AD	E	$1/ANET1*EDOT*EDDT + E - FIREDB = 0$
0386					17,3633	0 0006	1	EXTEND		SCALED AT 4 PI RADIAN
0387	REF	39	LAST	1458	17,3634	7 4741	0	MP	BIT11	
0388	REF	16	LAST	1462	17,3635	57 425	0	XCH	EDDT	
0389					17,3636	0 0006	1	EXTEND		
0390					17,3637	7 0000	0	SQUARE		
0391					17,3640	0 0006	1	EXTEND		
0392	REF	12	LAST	1463	17,3641	5 1744	1	INDEX	ADRS DIF1	
0393	REF	11	LAST	1462	17,3642	7 1571	1	MP	$1/ANET1 + 2$	
0394	REF	17	LAST	1463	17,3643	6 1425	0	AD	EDDT	
0395					17,3644	0 0006	1	EXTEND		
0396	REF	4	LAST	1461	17,3645	6 3357	0	BZMF	COASTTJ	COAST IF BELOW IT.
0397	REF	6	LAST	1463	17,3646	1 3422	1	TCF	FULL TIME	FIRE FOR FULL PERIOD IF ABOVE IT.

R0398 SUBROUTINE USED IN ALL ENTRIES TO ROUGHLAW.

0399	REF	8	LAST	1462	17,3647	4 1736	0	RUFSETUP	CS	ROTSENSE	REVERSE ROTSENSE WHEN ENTER HERE.
0400	REF	9	LAST	1463	17,3650	55 736	0		TS	ROTSENSE	
0401	REF	46	LAST	1458	17,3651	3 4751	0	+2	CAF	FCUP	REQUIRE MAXIMUM (2) JETS IN U,V-AXES.
0402	REF	20	LAST	1459	17,3652	55 741	0		TS	NUMBERT	
0403	REF	11	LAST	1452	17,3653	3 4735	1		CAF	NEGMAX	SUGGEST MAXIMUM (4) JETS IN P-AXIS.
0404	REF	7	LAST	1460	17,3654	55 737	1		TS	FIREFCT	
0405	REF	418	LAST	1452	17,3655	0 0002	0		TC	Q	

R0406 CCNASTANTS FOR TJETLAW

0407					17,3656	77757	1		DEC	-16	AXISDIFF(INDEX) = NUMBER OF REGISTERS
0408					17,3657	00000	1	AXISDIFF	DEC	+0	BETWEEN STORED 1/ACCS PARAMETERS FOR
0409					17,3660	00020	0		DEC	16	THE INDEXED AXIS AND THE U-AXIS.
0410					17,3661	14400	0	SENSOR	OCT	14400	RATIO OF TJET SCALING WITHIN TJETLAW
A0411											(4 SEC) TO SCALING FOR T6 (10.24 SEC).
0412					17,3662	76447	1	-2DEG	DEC	-.04444	-2.0 DEGREES SCALED AT 45.
0413					17,3663	77750	0	-.0112A8	DEC	-.00141	-.01125 SEC(2) SCALED AT 8.
0414					17,3664	00632	0	.1AT4	DEC	.025	0.1 SECOND SCALED AT 4.
0415					17,3665	01463	1	.1AT2	DEC	.05	0.1 SEC SCALED AT 2.
0416					17,3666	00232	1	.0375AT4	DEC	.00938	.0375 SEC SCALED AT 4.
0417					17,3667	77462	1	-.025AT2	DEC	-.0125	-.025 SEC SCALED AT 2.
0418					17,3670	77631	0	-.025AT4	DEC	-.00625	
0419					17,3671	77145	1	-.05AT2	DEC	-.025	
0420					17,3672	75462	0	-.15AT2	DEC	-.075	
0421					17,3673	00007	0	.00375A8	2DEC	.00375	8-3
0421					17,3674	25605	0				
0422					17,3675	76631	1	-TJMAX	DEC	-.0375	LARGEST CALCULATED TIME. .150 SEC AT 4.
0423					17,3676	00122	0	TJMIN	DEC	.005	SMALLEST ALLOWABLE TIME. .020 SEC AT 4.

L TJET LAW

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0424

17,3677 77655 1 -TJMIN DEC -.005

L KALMAN FILTER

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0001 RFF 3 LAST 1449 E6,1522 EBANK= NO.UJETS
 0002 16,3624 BANK 16
 0003 REF 3 LAST 1416 16,2000 SETLOC DAPS1
 0004 16,3624 BANK

COUNT* \$\$/DAP

0005 REF 1
 0006 REF 104 LAST 1457 16,3624 3 4752 0 RATELOOP CA TWO
 0007 REF 3 LAST 148 16,3625 55'742 0 TS DAPTEMP6
 00071 16,3626 6 0000 1 DOUBBLE
 00072 REF 419 LAST 1463 16,3627 54 002 1 TS 0
 0008 REF 4 LAST 1465 16,3630 51'742 1 INDEX DAPTEMP6
 0009 REF 14 LAST 1454 16,3631 11'524 1 CCS TJP
 0010 16,3632 1 3634 1 TCF +2
 0011 REF 1 16,3633 1 3653 0 TCF LOOPRATE
 0012 RFF 1 16,3634 6 3714 0 AD -100MST6
 0013 16,3635 0 0006 1 EXTEND
 0014 REF 1 16,3636 6 3672 1 BZMF SMALLTJU
 0015 REF 5 LAST 1465 16,3637 51'742 1 INDEX DAPTEMP6
 0016 RFF 15 LAST 1465 16,3640 11'524 1 CCS TJP
 0017 REF 2 LAST 1465 16,3641 3 3714 0 CA -100MST6
 0018 16,3642 1 3644 0 TCE +2
 0019 RFF 3 LAST 1465 16,3643 4 3714 1 CS -100MST6
 0020 REF 6 LAST 1465 16,3644 51'742 1 INDEX DAPTEMP6
 0021 REF 16 LAST 1465 16,3645 27'524 1 ADS TJP
 0022 RFE 7 LAST 1465 16,3646 51'742 1 INDEX DAPTEMP6
 0023 REF 17 LAST 1465 16,3647 11'524 1 CCS TJP
 0024 REF 1 16,3650 4 3600 0 CS -100MS 0.1 AT 1
 0025 16,3651 1 3653 0 TCE +2
 0026 REF 2 LAST 1465 16,3652 3 3600 1 CA -100MS
 0027 16,3653 0 0006 1 LOOPRATE EXTEND
 0028 REF 8 LAST 1465 16,3654 5 1742 1 INDEX DAPTEMP6
 0029 REF 3 LAST 1431 16,3655 7 1521 1 MP NO.PJETS
 0030 RFF 290 LAST 1458 16,3656 3 0001 0 CA L
 0031 REF 9 LAST 1465 16,3657 51'742 1 INDEX DAPTEMP6
 00311 REF 29 LAST 1445 16,3660 55'735 0 TS DAPTEMP1 SIGNED TORQUE AT 1 JET-SEC FOR FILTER
 00312 16,3661 0 0006 1 EXTEND
 00313 RFF 61 LAST 1405 16,3662 7 4742 0 MP BIT10 RESCALE TO 32; ONE BIT ABOUT 2 JET-MSEC
 00314 16,3663 0 0006 1 EXTEND
 00315 REF 1 16,3664 6 3715 1 BZMF NEGTCRK
 00316 RFF 420 LAST 1465 16,3665 50 002 0 STORTORK INDEX 0 INCRFMNT DOWNLIST REGISTER.
 00317 REF 7 LAST 148 16,3666 27'513 0 ADS DOWNTORK NOTE: NOT INITIALIZED; OVERFLOWS.

0032 RFF 10 LAST 1465 16,3667 11'742 0 CCS DAPTEMP6
 0033 REF 2 LAST 1417 16,3670 1 3625 1 TCF RATELOOP +1
 0034 REF 1 16,3671 1 3701 0 TCF ROTORQUE
 0035 REF 299 LAST 1457 16,3672 3 4755 1 SMALLTJU CA ZFRO
 0036 REF 11 LAST 1465 16,3673 51'742 1 INDEX DAPTEMP6
 0037 REF 18 LAST 1465 16,3674 57'524 0 XCH TJP
 0038 16,3675 0 0006 1 EXTEND

L KALMAN FILTER

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0039	REF	3	LAST	1094	16,3676	7 4760	0	MP	ELEVEN	10.24 PLUS
0040	REF	291	LAST	1465	16,3677	3 0001	0	CA	L	
0041	REF	2	LAST	1465	16,3700	1 3653	0	TCF	LODPRATE	
0042	REF	11	LAST	1445	16,3701	3 1736	1	ROTORQUE CA	DAPTEMP2	
0043	REF	7	LAST	1441	16,3702	6 1737	0	AD	DAPTEMP3	
0044					16,3703	0 0006	1	EXTEND		
0045	REF	1			16,3704	7 1532	0	MP	1JACCR	
0046	REF	3	LAST	1422	16,3705	55'745	1	TS	JETRATER	
0047	REF	8	LAST	1466	16,3706	4 1737	1	CS	DAPTEMP3	
0048	REF	12	LAST	1466	16,3707	6 1736	1	AD	DAPTEMP2	
0049					16,3710	0 0006	1	EXTEND		
0050	REF	1			16,3711	7 1531	0	MP	1JACCO	
0051	REF	3	LAST	1421	16,3712	55'744	0	TS	JETRATER	
0052	REF	1			16,3713	1 2305	1	TCF	BACKP	
0053					16,3714	77537	0	-100MST6 DEC	-160	
R0054										
0055					16,3715	4 0000	0	NEGTORK COM		
0056	REF	421	LAST	1465	16,3716	24 002	0	INCR	Q	
0057	REF	1			16,3717	1 3665	0	TCF	STOR TORK	

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0001				21,3263				BANK	21
0002	REF	1		F6,1446				EBANK=	QDIFF
0003	REF	1		21,2000				SETLOC	DAPS4
0004				21,3263				BANK	

COUNT* \$\$/DAPGT

R0005 CONTROL REACHES THIS POINT UNDER EITHER OF THE FOLLOWING TWO CONDITIONS ONCE THE DESCENT ENGINE AND THE DIGITAL
 R0007 AUTOPILOT ARE BOTH ON:

R0008 A) THE TRIM GIMBAL CONTROL LAW WAS ON DURING THE PREVIOUS Q,R-AXIS TIME5 INTERRUPT (OR THE DAPIDLER
 R0010 INITIALIZATION WAS SET FOR TRIM GIMBAL CONTROL AND THIS IS THE FIRST PASS), OR
 R0012 B) THE Q,R-AXES RCS AUTOPILOT DETERMINED THAT THE VEHICLE WAS ENTERING (OR HAD JUST ENTERED) A COAST
 R0014 ZONE WITH A SMALL OFFSET ANGULAR ACCELERATION.

R0015 GTS IS THE ENTRY TO THE GIMBAL TRIM SYSTEM FOR CONTROLLING ATTITUDE ERRORS AND RATES AS WELL AS ACCELERATIONS.

0018	REF	14	LAST	1462	21,3263	3 7746	0	GTS	CAF	NEGONE	MAKE THE NEXT PASS THROUGH THE DAP BE
0019	REF	6	LAST	1446	21,3264	55'627	1		TS	CONTROLLER	THROUGH RCS CONTROL,
0020	REF	47	LAST	1463	21,3265	3 4751	0		CAF	FOUR	AND ENSURE THAT IT IS NOT A SKIP.
0021	REF	9	LAST	1449	21,3266	55'535	1		TS	SKIPU	
0022	REF	3	LAST	1449	21,3267	55'536	1		TS	SKIPV	
00225	REF	105	LAST	1465	21,3270	3 4752	0		CAF	TWO	
0023	REF	5	LAST	1444	21,3271	55'631	0		TS	INGIS	SET INDICATOR OF GTS CONTROL POSITIVE.
0024	REF	7	LAST	1423	21,3272	55'630	1		TS	QGIMTIMR	SET TIMERS TO 200 MSEC TO AVOID BOTH
0025	REF	5	LAST	1423	21,3273	55'632	0		TS	RGIMTIMP	RUNAWAY AND INTERFERENCE BY NULLING.

R0026 THE DRIVE SETTING ALGORITHM

R0027 $DEL = \text{SGN}(\text{OMEGA} * K + \text{ALPHA} * \text{ABS}(\text{ALPHA}) / 2).$

R0028 $\text{NEGUSUM} = \text{ERROR} * K(2) + DEL(\text{OMEGA} * K * DEL + \text{ALPHA}(2)/2)(3/2) + \text{ALPHA}(\text{OMEGA} * K * DEL + \text{ALPHA}(2)/3)$

R0030 $\text{DRIVE} = -\text{SGN}(\text{NEGUSUM})$

0035	REF	27	LAST	1299	21,3274	3 0021	1		CA	SR	SAVE THE SR. SHIFT IT LEFT TO CORRECT
0036	REF	526	LAST	1462	21,3275	6 0000	1		AD	A	FOR THE RIGHT SHIFT DUE TO EDITING.
0037	REF	1			21,3276	55'476	1		TS	SAVE SR	

0042	REF	106	LAST	1467	21,3277	3 4752	0	GTS GO+ON	CAF	TWO	SET INDEXER FOR R-AXIS CALCULATIONS.
0043	REF	1			21,3300	55'746	1		TS	QRCNTR	
0044	REF	9	LAST	1422	21,3301	3 1541	0		CA	AOSR	
0045					21,3302	0 0006	1			EXTEND	
0046	REF	47	LAST	1425	21,3303	7 4751	1		MP	BIT3	
0047	REF	3	LAST	1435	21,3304	3 1435	1		CA	EDDTR	
0048	REF	1			21,3305	1 3314	0		TCF	GTSQAXIS	

0049	REF	300	LAST	1465	21,3306	3 4755	1	GQQTRIMG	CAF	ZERO	SET INDEXER FOR Q-AXIS CALCULATIONS
0050	REF	2	LAST	1467	21,3307	55'746	1		TS	QRCNTR	

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0051	REF	21	LAST	1435	21,3310	3 1537 1	CA	AOSQ	
0052					21,3311	0 0006 1	EXTEND		
0053	REF	48	LAST	1467	21,3312	7 4751 1	MP	BIT3	
0054	REF	5	LAST	1436	21,3313	3 1434 0	CA	EDDTQ	
0055	REF	1			21,3314	53'744 0	GTSQAXIS	OXCH	WCENTRAL
0056					21,3315	0 0006 1	EXTEND		
0057	REF	3	LAST	1467	21,3316	5 1746 0	INDEX	QRCNTR	PICK UP K AND K(2) FOR THIS AXIS
0058	REF	4	LAST	147	21,3317	3 1504 1	DCA	KQ	
0059	REF	2	LAST	147	21,3320	53'742 0	OXCH	KCENTRAL	
0061	REF	4	LAST	1468	21,3321	51'746 0	INDEX	QRCNTR	QDIFF, RDIFF ARE STORED IN D.P.
0062	REF	2	LAST	1467	21,3322	31'446 0	CAE	QDIFF	
0063					21,3323	0 0006 1	ALGORITHM	EXTEND	Q(R)DIFF IS THETA (ERROR) SCALED AT PI.
0064	REF	1			21,3324	7 1742 0	MP	K2CENTRAL	FORM K(2)*THETA IN D.P.
0065	REF	1			21,3325	23'735 1	LXCH	K2THETA	
0066					21,3326	0 0006 1	EXTEND		FORM K(2)*THETA*SE2 IN D.P.
0067	REF	38	LAST	1440	21,3327	7 4743 1	MP	BIT9	
0068	REF	2	LAST	1468	21,3330	53'736 0	OXCH	K2THETA	
0069					21,3331	0 0006 1	EXTEND		
0070	REF	39	LAST	1468	21,3332	7 4743 1	MP	BIT9	
0071	REF	3	LAST	1468	21,3333	27'736 0	ADS	K2THETA +1	
0072	REF	2	LAST	1468	21,3334	31'743 0	CAE	WCENTRAL	GET OMEGA
0073					21,3335	0 0006 1	EXTEND		
0074	REF	3	LAST	1468	21,3336	7 1741 0	MP	KCENTRAL	FORM K*OMEGA IN D.P.
0075	REF	1			21,3337	23'741 1	LXCH	OMEGA.K	
0076					21,3340	0 0006 1	EXTEND		FORM OMEGA*K*SE1 IN D.P.
0077	REF	54	LAST	1462	21,3341	7 4740 1	MP	BIT12	
0078	REF	2	LAST	1468	21,3342	53'742 0	OXCH	OMEGA.K	
0079					21,3343	0 0006 1	EXTEND		
0080	REF	55	LAST	1468	21,3344	7 4740 1	MP	BIT12	
0081	REF	3	LAST	1468	21,3345	27'742 0	ADS	OMEGA.K +1	
0082	REF	1			21,3346	31'744 1	CAE	ACENTRAL	FORM ALPHA(2)/2 IN D.P.
0083					21,3347	0 0006 1	EXTEND		
0084					21,3350	7 0000 0	SQUARE		
0085	REF	1			21,3351	53'740 1	OXCH	A2CENTRAL	
0086	REF	2	LAST	1468	21,3352	31'744 1	CAE	ACENTRAL	GET ALPHA*ABS(ALPHA)/2, IF ALPHA GREATER
A0087									THAN 0. OTHERWISE TAKE NEGATIVE OF ABOVE
0088					21,3353	0 0006 1	EXTEND		
0089					21,3354	6 3360 1	BZMF	+4	
0090					21,3355	0 0006 1	EXTEND		
0091	REF	2	LAST	1468	21,3356	3 1740 0	DCA	A2CENTRAL	
0092					21,3357	1 3362 1	TCF	+3	
0093					21,3360	0 0006 1	EXTEND		
0094	REF	3	LAST	1468	21,3361	4 1740 1	DCS	A2CENTRAL	
0095	REF	1			21,3362	53'750 0	OXCH	FUNCTION	SAVE AS SGN(ALPHA)*ALPHA(2)/2

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0096				21,3363	0 0006	1		EXTEND		
0097	REF	4	LAST 1468	21,3364	3 1742	1		DCA	OMEGA.K	
0098	REF	2	LAST 1468	21,3365	21'750	0		DAS	FUNCTION	FORM FUNCT1
0099	REF	3	LAST 1469	21,3366	11'747	0		CCS	FUNCTION	DEL = +1 FOR FUNCT1 GREATER THAN ZERO.
0100	REF	1		21,3367	1 3373	1		TCF	POSFNCT1	OTHERWISE DEL = -1
0101				21,3370	1 3372	0		TCF	+2	
0102	REF	1		21,3371	1 3375	1		TCF	NEGFNCT1	
0103	REF	4	LAST 1469	21,3372	11'750	0		CCS	FUNCTION +1	USE LOW ORDER WORD SINCE HIGH IS ZERO
0104	RFF	67	LAST 1455	21,3373	3 4753	1	POSFNCT1	CAF	BIT1	
0105				21,3374	1 3376	1		TCF	+2	
0106	REF	68	LAST 1469	21,3375	4 4753	0	NEGFNCT1	CS	BIT1	
0107	REF	1		21,3376	55'745	1		TS	DEL	
0108	REF	2	LAST 1469	21,3377	11'745	1		CCS	DEL	MAKE OMEGA*K REALLY DEL*OMEGA*K
0109	REF	1		21,3400	1 3405	1		TCF	FUNCT2	(NOTHING NEED BE DONE)
0110	REF	2	LAST 1469	21,3401	1 3405	1		TCF	FUNCT2	
0111				21,3402	0 0006	1		EXTEND		
0112	REF	5	LAST 1469	21,3403	4 1742	0		DCS	OMEGA.K	
0113	REF	6	LAST 1469	21,3404	53'742	0		DXCH	OMEGA.K	CHANGE SIGN OF OMEGA*K
0114				21,3405	0 0006	1	FUNCT2	EXTEND		
0115	REF	7	LAST 1469	21,3406	3 1742	1		DCA	OMEGA.K	
0116	REF	5	LAST 1469	21,3407	53'750	0		DXCH	FUNCTION	DEL*OMEGA*K
0117				21,3410	0 0006	1		EXTEND		
0118	REF	4	LAST 1468	21,3411	3 1740	0		DCA	A2CNTRAL	
0119	REF	6	LAST 1469	21,3412	21'750	0		DAS	FUNCTION	DEL*OMEGA*K + ALPHA(2)/2
0120	REF	5	LAST 1469	21,3413	31'737	0	FUNCT3	CAE	A2CNTRAL	CALCULATE (2/3)*ALPHA(2)/2 = ALPHA(2)/3
0121				21,3414	0 0006	1		EXTEND		
0122	REF	1		21,3415	7 3446	0		MP	.66667	
0123	REF	6	LAST 1469	21,3416	53'740	1		DXCH	A2CNTRAL	
0124	REF	292	LAST 1466	21,3417	56 001	0		XCH	L	
0125				21,3420	0 0006	1		EXTEND		
0126	REF	2	LAST 1469	21,3421	7 3446	0		MP	.66667	
0127	REF	7	LAST 1469	21,3422	27'740	1		ADS	A2CNTRAL +1	
0128	REF	293	LAST 1469	21,3423	54 001	1		TS	L	
0129				21,3424	1 3426	0		TCF	+2	
0130	REF	8	LAST 1469	21,3425	27'737	1		ADS	A2CNTRAL	
0131	REF	8	LAST 1469	21,3426	53'742	0		DXCH	OMEGA.K	DEL*OMEGA*K + ALPHA(2)/3 = G
0132	REF	9	LAST 1469	21,3427	21'740	1		DAS	A2CNTRAL	
0133	REF	10	LAST 1469	21,3430	31'737	0		CAE	A2CNTRAL	G*ALPHA IN D.P.
0134				21,3431	0 0006	1		EXTEND		
0135	REF	3	LAST 1468	21,3432	7 1744	0		MP	ACENTRAL	
0136	REF	11	LAST 1469	21,3433	53'740	1		DXCH	A2CNTRAL	
0137	REF	294	LAST 1469	21,3434	56 001	0		XCH	L	
0138				21,3435	0 0006	1		EXTEND		
0139	REF	4	LAST 1469	21,3436	7 1744	0		MP	ACENTRAL	
0140	RFF	12	LAST 1469	21,3437	27'740	1		ADS	A2CNTRAL +1	
0141	REF	295	LAST 1469	21,3440	54 001	1		TS	L	

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0142				21,3441	1 3443 0	TCF	+2	
0143	REF	13	LAST 1469	21,3442	27'737 1	ADS	A2CNTRAL	
0144	REF	14	LAST 1470	21,3443	53'740 1	DXCH	A2CNTRAL	FIRST AND THIRD TERMS
0145	REF	4	LAST 1468	21,3444	21'736 0	DAS	K2THETA	SUMMED IN D.P.
0146	REF	1		21,3445	1 3561 1	TCF	RSTOFGTS	
0147				21,3446	25253 1	DEC	.66667	
0148				16,3720		BANK	16	
0149	REF	5	LAST 1423	16,1500		EBANK=	NEGUQ	
0150	REF	4	LAST 1465	16,2000		SETLOC	DAPS1	
0151				16,3720		BANK		
R0152	THE WRCHN12 SUBROUTINE SETS BITS 9,10,11,12 OF CHANNEL 12 ON THE BASIS OF THE CONTENTS OF NEGUQ,NEGUR WHICH ARE							
R0154	THE NEGATIVES OF THE DESIRED ACCELERATION CHANGES. ACDT+C12 SETS Q(R)ACCDOT TO REFLECT THE NEW DRIVES.							
R0156	WARNING: ACDT+C12 AND WRCHN12 MUST BE CALLED WITH INTERRUPT INHIBITED.							
0157				16,3720	07400 1	BGIM	OCTAL 07400	
0158	REF	8	LAST 1294	0066		CHNL12	EQUALS ITEMP6	
0159	REF	6	LAST 1470	16,3721	4 1500 1	ACDT+C12	CS NEGUQ	
0160				16,3722	0 0006 1	EXTEND		GIM8AL DRIVE REQUESTS.
0161	REF	4	LAST 147	16,3723	7 1507 0	MP	ACCDOTQ	
0162	REF	4	LAST 1423	16,3724	23'510 1	LXCH	QACCDOT	
0163	REF	3	LAST 1423	16,3725	4 1502 0	CS	NEGUR	
0164				16,3726	0 0006 1	EXTEND		
0165	REF	1		16,3727	7 1511 1	MP	ACCDOTR	
0166	REF	4	LAST 1423	16,3730	23'512 0	LXCH	RACCDOT	
0167	REF	7	LAST 1470	16,3731	11'500 1	CCS	NEGUQ	
0168	REF	62	LAST 1465	16,3732	3 4742 1	CAF	BIT10	
0169				16,3733	1 3735 1	TCF	+2	
0170	REF	40	LAST 1468	16,3734	3 4743 0	CAF	BIT9	
0171	REF	1		16,3735	54 066 0	TS	CHNL12	
0172	REF	4	LAST 1470	16,3736	11'502 0	CCS	NEGUR	
0173	REF	56	LAST 1468	16,3737	3 4740 0	CAF	BIT12	
0174				16,3740	1 3742 1	TCF	+2	
0175	REF	40	LAST 1463	16,3741	3 4741 1	CAF	BIT11	
0176	REF	2	LAST 1470	16,3742	26 066 0	ADS	CHNL12	(STORED RESULT NOT USED AT PRESENT)
0177	REF	1		16,3743	4 3720 0	CS	BGIM	
0178				16,3744	0 0006 1	EXTEND		
0179	REF	71	LAST 1423	16,3745	02 012 0	RAND	CHAN12	
0180	REF	3	LAST 1470	16,3746	6 0066 1	AD	CHNL12	
0181				16,3747	0 0006 1	EXTEND		
0182	REF	72	LAST 1470	16,3750	01 012 0	WRITE	CHAN12	
R0183								

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0184 REF 2 LAST 1422 16,3751 4 4747 0
0185 REF 52 LAST 1442 16,3752 7 1273 1
0186 REF 53 LAST 1471 16,3753 55,273 1

CS CALLGMBL
MASK RCSFLAGS
TS RCSFLAGS

TURN OFF REQUEST FOR ACOT+C12 EXECUTION.

0187 REF 422 LAST 1466 16,3754 0 0002 0

TC Q

RETURN TO CALLER.

0188
0189 REF 3 LAST 1468 21,3447
0190 REF 2 LAST 1467 E6,1446
0191 21,2000
21,3447

BANK 21
EBANK= QDIFF
SETLOC JAPS4
BANK

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R0193- TIMEGMBL COMPUTES THE DRIVE TIME NEEDED FOR THE TRIM GIMBAL TO POSITION THE DESCENT ENGINE NOZZLE SO AS TO NULL
R0195- THE OFFSET ANGULAR ACCELERATION ABOUT THE Q (OR R) AXIS. INSTEAD OF USING AOSQ(R), TIMEGMBL USES .4*AOSQ(R),
R0197- SCALED AT R1/8. FOR EACH AXIS, THE DRIVE TIME IS COMPUTED AS ABS(ALPHA/ACCDOT). A ZERO
R0199- ALPHA OR ACCDOT OR A ZERO QUOTIENT TURNS OFF THE GIMBAL DRIVE IMMEDIATELY. OTHERWISE, THE GIMBAL IS TURNED ON
R0201- DRIVING IN THE CORRECT DIRECTION. THE Q(R)GIMTMR IS SET TO TERMINATE THE DRIVE AND Q(R)ACCDOT
R0203- IS STORED TO REFLECT THE NEW ACCELERATION DERIVATIVE. NEGUQ(R) WILL CONTAIN +1,+0,-1 FOR A Q(R)ACCDOT VALUE
R0205- WHICH IS NEGATIVE, ZERO, OR POSITIVE.

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R0208 DUTRUTS: NEW GIMBAL DRIVE BITS IN CHANNEL 12, NEGUQ, NEGUR, QACCDOT AND RACCDOT, THE LAST SCALED AT $\pi/2(7)$.
R0210 Q(R)GIMTIMR WILL BE SET TO TIME AND TERMINATE GIMBAL DRIVE(S)

~~R0212 EXITS: VIA TC 0.~~

RO213 ALARMS, ABORTS, : NONE

R0214 SUBROUTINES: ACOT+C12, IBNKCALL

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R0215  WARNING: THIS SUBROUTINE WRITES INTO CHANNEL 12 AND USES THE ITEMS. THEREFORE IT MAY ONLY BE CALLED WITH
R0217  INTERRUPT INHIBITED.

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R0218 ERASABLE STORAGE CONFIGURATION (NEEDED BY THE INDEXING METHODS):

A0219	NEGUQ	ERASE +2	NEGATIVE OF Q-AXIS GIMBAL DRIVE
A0220	(SPWORD)	EQUALS NEGUQ +1	ANY S.P. ERASABLE NUMBER, NOW THRSTCMD
A0221	NEGUR	EQUALS NEGUQ +2	NEGATIVE OF R-AXIS GIMBAL DRIVE
A0222	ACCDOTQ	ERASE +2	Q-JERK TERM SCALED AT PI/2(7) RAD/SEC(3)
A0223	(SRWORD)	EQUALS ACCDOTQ +1	ANY S.P. ERASABLE NUMBER NOW QACCDOT
A0224	ACCDOTR	EQUALS ACCDOTQ +2	R-JERK TERM SCALED AT PI/2(7) RAD/SEC(3)
A0225			ACCDOTQ,ACCDOTR ARE MAGNITUDES.
A0226	ADSQ	ERASE +4	Q-AXIS ACC.,D.P. AT RI/2 R/SEC(2)
A0227	ADSR	EQUALS ADSQ +2	R-AXIS ACCELERATION SCALED AT PI/2 R/S2

0228	REF	9	LAST	1470	0066		QRNDXER	EQUALS	ITEMR6	
0229					21,3447	23146 0	DCT23146	DCIAL	23146	DECIMAL .6
0230	REF	34	LAST	1421	0063		NZACCDOT	EQUALS	ITEMR3	

0231	REF	175	LAST 1462	21,3450	3 4753 1	TIMEGMBL	CAF	ONE	INITIALIZE ALLOWGTS.
0232	REF	3	LAST 1443	21,3451	55,501 0		TS	ALLOWGTS	

0233	REF	107	LAST	146 7	21,3452	3 4752	0	CAF	TWO	SET UP LOOP FOR R AXIS.
0234	REF	423	LAST	147 1	21,3453	22 002	0	LXCH	Q	SAVE RETURN ADDRESS.
0235	REF	24	LAST	1404	21,3454	22 071	1	LXCH	RUPTRGZ	

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0236				21,3455	1 3457 0		TCF	+2	
0237	REF	301	LAST 1467	21,3456	3 4755 1	TIMQGMBL	CAF	ZERO	NOW 00 THE Q-AXIS
0238	REF	1		21,3457	54 066 0		TS	QRNDXER	
0239	REF	2	LAST 1473	21,3460	50 066 1		INOEX	QRNOXER	
0240	REF	5	LAST 1470	21,3461	3 1507 1		CA	ACCCOOT	ACCCOOT IS PRESUMED TO BE AT PI/2(7).
0241				21,3462	0 0006 1		EXTEND		
0242	REF	1		21,3463	6 3533 1		BZMF	TGOFFNOW	IS ACCDOT LESS THAN OR EQUAL TO 0?
0243	REF	1		21,3464	54 063 0		TS	NZACCCOOT	NO. STORE NON-ZERO, POSITIVE ACCDOT.
0244	REF	3	LAST 1473	21,3465	50 066 1	ALPHATRY	INOEX	QRNOXER	
0245	REF	22	LAST 1468	21,3466	4 1537 0		CS	AOSQ	
0246				21,3467	0 0006 1		EXTEND		
0247	REF	2	LAST 1473	21,3470	1 3533 0		BZF	TGOFFNOW	IS ALPHA ZERO?
0248	REF	424	LAST 1472	21,3471	54 002 1		TS	Q	SAVE A COPY OF -AOS.
0249				21,3472	0 0006 1		EXTEND		NO. RESCALE FOR TIMEGMBL USE.
0250	REF	1		21,3473	7 3447 1		MP	OCT23146	OCTAL 23146 IS DECIMAL .6
0251	REF	425	LAST 1473	21,3474	6 0002 0		AO	Q	-1.6*AOS AT PI/2 = -.4*AOS AT PI/8.
0252	REF	296	LAST 1469	21,3475	54 001 1		TS	L	WAS THERE OVERFLOW?
0253	REF	1		21,3476	1 3503 0		TCF	SETNEGU	NO. COMPUTE DRIVE TIME.
0254	REF	527	LAST 1467	21,3477	4 0000 0		CS	A	RECOVER -SGN(AOS) IN THE A REGISTER.
0255	REF	4	LAST 1473	21,3500	50 066 1		INOEX	QRNOXER	YES. START DRIVE WITHOUT WAITLIST.
0256	REF	8	LAST 1470	21,3501	57 500 0		XCH	NE3UQ	
0257	REF	1		21,3502	1 3537 1		TCF	NOTALLOW	KNOCK DOWN THE ALLOWGTS FLAG.
0258				21,3503	0 0006 1	SETNEGU	EXTEND		
0259	REF	1		21,3504	6 3511 1		BZMF	POSALPH	
0260				21,3505	4 0000 0		COM		
0261	REF	29	LAST 1421	21,3506	54 062 1		TS	ITEMP2	STORE -ABS(.4*AOS) SCALED AT PI/8.
0262	REF	69	LAST 1469	21,3507	4 4753 0		CS	BIT1	
0263	REF	2	LAST 1473	21,3510	1 3513 1		TCF	POSALPH +2	
0264	REF	30	LAST 1473	21,3511	54 062 1	POSALPH	TS	ITEMP2	STORE -ABS(.4*AOS) SCALED AT PI/8.
0265	REF	70	LAST 1473	21,3512	3 4753 1		CA	BIT1	
0266	REF	5	LAST 1473	21,3513	50 066 1	+2	INDEX	QRNDXER	SGN(AOS) INTO NEGU
0267	REF	9	LAST 1473	21,3514	55 500 1		TS	NE3UQ	STORE SGN(ALPHA) AS NEGU
0268	REF	2	LAST 1473	21,3515	3 0063 1		CA	NZACCCOOT	
0269				21,3516	0 0006 1		EXTEND		
0270	REF	57	LAST 1470	21,3517	7 4740 1		MP	BIT12	2*ACCCOOT, SCALED AT PI/8.
0271	REF	31	LAST 1473	21,3520	6 0062 0		AD	ITEMP2	-ABS(ALPHA) + 2*ACCCOOT, AT PI/8.
0272				21,3521	0 0006 1		EXTEND		
0273	REF	2	LAST 1473	21,3522	6 3537 0		BZMF	NOTALLOW	IS DRIVE TIME MORE THAN TWO SECONDS?
0274	REF	32	LAST 1473	21,3523	4 0062 1		CS	ITEMP2	NO. COMPUTE DRIVE TIME.
0275				21,3524	0 0006 1		EXTEND		ABS(ALPHA) AT PI/8.
0276	REF	1		21,3525	7 3560 0		MP	OCT00240	DECIMAL 10/1024
0277				21,3526	0 0006 1		EXTEND		QUOTIENT IS DRIVE TIME AT WAITLIST.
0278	REF	3	LAST 1473	21,3527	10 063 0		OV	NZACCCOOT	ABS(ALPHA)/ACCCOOT AT 2(14)/100

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0279				21,3530	0 0006 1		EXTEND			
0280	REF	3	LAST 1473	21,3531	1 3533 0		BZF	TGOFFNOW	DRIVE TIME MUST BE GREATER THAN ZERO.	
0281	REF	1		21,3532	1 3545 1		TCF	DRIVEON		
0282	REF	302	LAST 1473	21,3533	3 4755 1	TGOFFNOW	CAF	ZERO	TURN OFF GIMBAL NOW.	
0283	REF	6	LAST 1473	21,3534	50 066 1		INDEX	QRNDXER		
0284	REF	10	LAST 1473	21,3535	55'500 1		TS	NEGUO		
0285	REF	1		21,3536	1 3547 0		TCF	DONEYET		
0286	REF	4	LAST 829	21,3537	3 6010 0	NOTALLOW	CAF	OCT31		
0287	REF	7	LAST 1474	21,3540	50 066 1		INDEX	QRNDXER		
0288	REF	8	LAST 1467	21,3541	55'630 1		TS	QGIMTIMR		
0289	REF	303	LAST 1474	21,3542	3 4755 1		CAF	ZERO	DRIVE TIME IS MORE THAN 2 SECONDS, SO	
0290	REF	4	LAST 1472	21,3543	55'501 0		TS	ALLOWGTS	DO NOT PERMIT FURTHER GTS ATTITUDE-RATE	
A0291									CONTROL UNTIL AOSTASK APPROVES.	
0292	REF	2	LAST 1474	21,3544	1 3547 0		TCF	DONEYET	NO WAITLIST CALL IS MADE.	
0293	REF	8	LAST 1474	21,3545	50 066 1	DRIVEON	INDEX	QRNDXER		
0294	REF	9	LAST 1474	21,3546	55'630 1		TS	QGIMTIMR	CHOOSE Q OR R AXIS.	
0295	REF	9	LAST 1474	21,3547	10 066 0	DONEYET	CCS	QRNDXER		
0296	REF	1		21,3550	1 3456 1		TCF	TIMQGM8L		
0297	REF	16	LAST 1356	21,3551	52 073 1		DXCH	RUPTREG3	PROTECT IBNKCALL ERASABLES. ACDT+C12	
0298	REF	33	LAST 1473	21,3552	52 063 0		DXCH	ITEMP2	LEAVES ITEMS2,3 ALONE.	
0299	REF	61	LAST 1444	21,3553	0 4674 0		TC	IBNKCALL	TURN OF CHANNEL BITS, SET Q(R)ACCDOTS.	
0300	REF	2	LAST 1422	21,3554	35721 0		CADR	ACDT+C12		
0301	REF	34	LAST 1474	21,3555	52 063 0		DXCH	ITEMP2	RESTORE ERASABLES FOR IBNKCALL.	
0302	REF	17	LAST 1474	21,3556	52 073 1		DXCH	RUPTREG3		
0303	REF	25	LAST 1472	21,3557	0 0071 1		TC	RUPTREG2	RETURN TO CALLER.	
0304				21,3560	00240 1	OCT00240	OCTAL	00240	DECIMAL 10/1024	

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P0305 THE FOLLOWING SECTION IS A CONTINUATION OF THE TRIM GIMBAL CONTROL FROM THE LAST GTS ENTRY. THE QUANTITY NEGUSUM
R0307 IS COMPUTED FOR EACH AXIS (Q,R), .707*DEL*FUNCTION(3/2) + K2THETA = NEGUSUM. NEW DRIVES ARE ENTERED TO CH 12.

0309	REF	7	LAST 1469	21,3561	11'747 0	RSTOFGTS	CCS	FUNCTION	
0310	REF	1		21,3562	1 3603 0		TCF	GOODARG	FUNCTION IS POSITIVE. GET 3/2 POWER.
0311				21,3563	1 3565 0		TCF	+2	HIGH ORDER WORD IS ZERO. TRY THE LOWER.
0312	REF	1		21,3564	1 3571 0		TCF	ZEROOT	NEGATIVE. USE ZERO FOR 3/2 POWER.
0313	REF	8	LAST 1475	21,3565	4 1750 0		CS	FUNCTION +1	IF ARG IS LESS THAN 2(-18), THEN THE 3/2
0314	REF	41	LAST 1470	21,3566	6 4741 1		AD	BIT11	POWER IS LESS THAN 2(-27). USE ZERO.
0315				21,3567	0 0006 1		EXTEND		
0316	REF	1		21,3570	6 3574 1		BZMF	ZEROHIGH	BRANCH IF ARG NOT LESS THAN 2(-18).
0317				21,3571	0 0006 1	ZEROOT	EXTEND		
0318	REF	304	LAST 1474	21,3572	3 4756 1		DCA	ZERO	
0319	REF	1		21,3573	1 3714 1		TCF	NEGUSUM	
0320	REF	3	LAST 1065	21,3574	3 4317 0	ZEROHIGH	CA	FOURTEEN	ARG LESS THAN 2(-14) MEANS 3/2 POWER
A0321									WILL BE LESS THAN 2(-21).
0322	REF	1		21,3575	55'737 1		TS	SHFTFLAG	
0323	REF	108	LAST 1472	21,3576	3 4752 0		CA	TWO	
0324	REF	1		21,3577	55'740 1		TS	ININDEX	INITIALIZE THE SHIFT LOOP.
A0325									COLLECT THE 14 MOST SIGNIFICANT BITS OF
0326	REF	9	LAST 1475	21,3600	57'750 1		XCH	FUNCTION +1	THE 28 INTO THE HIGH ORDER WORD.
0327	REF	10	LAST 1475	21,3601	57'747 1		XCH	FUNCTION	
0328	REF	1		21,3602	1 3616 1		TCF	SCALLOOP	
0329	REF	1		21,3603	3 5742 0	GOODARG	CA	TWFLVF	
0330	REF	2	LAST 1475	21,3604	55'740 1		TS	ININDEX	INITIALIZE THE SHIFT LOOP.
0331	REF	305	LAST 1475	21,3605	3 4755 1		CA	ZERO	THERE ARE SIGNIFICANT BITS IN THE HIGH
0332	REF	2	LAST 1475	21,3606	55'737 1		TS	SHFTFLAG	ORDER WORD, SO SET SHFTFLAG TO ZERO.
0333	REF	2	LAST 1475	21,3607	1 3616 1		TCF	SCALLOOP	
0334	REF	11	LAST 1475	21,3610	3 1747 1	SCALSTRT	CA	FUNCTION	
0335	REF	1		21,3611	1 3633 0		TCF	SCALDONE	
0336	REF	10	LAST 1460	21,3612	3 7745 0	MULBUSH	CA	NEG2	IF ARG IS NOT LESS THAN 1/4, INDEX IS
0337	REF	3	LAST 1475	21,3613	27'740 1		ADS	ININDEX	ZERO, INDICATING NO SHIFT NEEDED.
0338				21,3614	0 0006 1		EXTEND		BRANCH IF ARG IS NOT LESS THAN 1/4.
0339	REF	1		21,3615	6 3610 0		BZMF	SCALSTRT	OTHERWISE COMPARE ARG WITH A REFERENCE
A0340									WHICH IS 4 TIMES LARGER THAN THE LAST.
0341	REF	12	LAST 1475	21,3616	4 1747 0	SCALLOOP	CS	FUNCTION	
0342	REF	4	LAST 1475	21,3617	51'740 0		INDEX	ININDEX	
0343	REF	56	LAST 1450	21,3620	6 4735 1		AD	BIT15	REFERENCE MAGNITUDE LESS OR EQUAL TO 1/4
0344				21,3621	0 0006 1		EXTEND		
0345	REF	1		21,3622	6 3612 1		BZMF	MULBUSH	IF ARG IS NOT LESS THAN REFERENCE, GO
A0346									AROUND THE MULBERRY BUSH ONCE MORE.
0347	REF	5	LAST 1475	21,3623	51'740 0		INDEX	ININDEX	

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0348	REF	57	LAST	1475	21,3624	3 4735 1	CA	BIT15	THIS IS THE SCALE MAGNITUDE 2**(-ININDEX) IS THE SHIFT DIVISOR. RESCALE ARGUMENT.	
0349	REF	426	LAST	1473	21,3625	56 002 0	XCH	Q		
0350					21,3626	0 0006 1	EXTEND			
0351	REF	13	LAST	1475	21,3627	3 1750 1	DCA	FUNCTION		
0352					21,3630	0 0006 1	EXTEND			
0353	REF	427	LAST	1476	21,3631	10 002 1	DV	Q		
0354	REF	14	LAST	1476	21,3632	55'747 0	TS	FUNCTION	ININDEX AND SHFTFLAG PRESERVE INFO FOR RESCALING AFTER ROOT PROCESS. AFTER 3/2 POWER IS TAKEN, SCALE FACTOR OF SQRT(1/2) WILL BE NEEDED, SO FACTOR OF 1/2 IS INCLUDED NOW, BEFORE SQRT.	
A0355										
0356					21,3633	0 0006 1	SCALDONE	EXTEND		
0357	REF	62	LAST	1456	21,3634	7 4737 1	MP	BIT13		
0358	REF	1			21,3635	55'743 1	TS	HALFARG		
0359	REF	1			21,3636	3 3761 1	CA	STARTER	INITIAL GUESS FOR SQRT ALGORITHM.	
0360	REF	1			21,3637	0 3763 0	TC	ROOTCYCL		
0361	REF	2	LAST	1476	21,3640	0 3763 0	TC	ROOTCYCL		
0362	REF	3	LAST	1476	21,3641	0 3763 0	TC	ROOTCYCL		
0363					21,3642	0 0006 1	EXTEND		SQRT(1/2)*SQRT(ARG) IN A. SQRT(1/2)*ARG*SQRT(ARG) IN A,L.	
0364	REF	15	LAST	1476	21,3643	7 1747 0	MP	FUNCTION		
0365	REF	16	LAST	1476	21,3644	53'750 0	DXCH	FUNCTION		
0366	REF	3	LAST	1475	21,3645	3 1737 0	DOSHIFT	CA	SHFTFLAG	HOW MANY SHIFT BITS ARE THERE? 2**(-ININDEX) WAS SHIFT DIVISOR.
0367	RFF	6	LAST	1475	21,3646	6 1740 0	AD	ININDEX		
0368	REF	28	LAST	1467	21,3647	54 021 0	TS	SR	THIS MANY SHIFTS ARE REQUIRED. Q BOUNDS ARE ZERO AND 24 (DECIMAL).	
0369	REF	29	LAST	1476	21,3650	6 0021 1	AD	SR		
0370	REF	428	LAST	1476	21,3651	54 002 1	SAVESHFT	TS		
0371					21,3652	0 0006 1	EXTEND			
0372	REF	1			21,3653	6 3701 1	BZMF	SUMNEGU	BRANCH IF SHIFTING IS UNNECESSARY.	
0373	REF	4	LAST	1475	21,3654	4 4317 1	CS	FOURTEEN	Q = 0(MOD 3), SO A REG IS NON-ZERO. BRANCH IF SMALL SHIFT SUFFICES.	
0374	REF	429	LAST	1476	21,3655	6 0002 0	AD	Q		
0375					21,3656	0 0006 1	EXTEND			
0376	REF	1			21,3657	6 3664 0	BZMF	MINISHFT		
0377	REF	430	LAST	1476	21,3660	54 002 1	MAXISHFT	TS	Q	14 BIT SHIFT RIGHT NOW.
0378	REF	306	LAST	1475	21,3661	3 4755 1	CA	ZERO		
0379	REF	17	LAST	1476	21,3662	57'747 1	XCH	FUNCTION		
0380	REF	18	LAST	1476	21,3663	55'750 0	TS	FUNCTION +1		
0381	REF	431	LAST	1476	21,3664	50 002 0	MINISHFT	INDEX	Q	C(Q) ARE GREATER THAN ZERO. 2**(-Q) WILL BE SHIFT MULTIPLIER.
0382	REF	58	LAST	1476	21,3665	3 4735 1	CA	BIT15		
0383	REF	432	LAST	1476	21,3666	54 002 1	TS	Q		
0384					21,3667	0 0006 1	EXTEND			
0385	REF	19	LAST	1476	21,3670	7 1750 0	MP	FUNCTION +1		
0386	REF	297	LAST	1473	21,3671	56 001 0	XCH	L		
0387	RFF	307	LAST	1476	21,3672	3 4755 1	CA	ZERO	LOWER WORD SHIFTED NOW.	
0388	REF	20	LAST	1476	21,3673	53'750 0	DXCH	FUNCTION		
0389					21,3674	0 0006 1	EXTEND			
0390	REF	2	LAST	1476	21,3675	6 3701 1	BZMF	SUMNEGU	BRANCH IF UPPER WORD WAS ZERO.	

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0391				21,3676	0 0006 1		EXTEND		SHIFT UPPER WORD.
0392	REF 433	LAST 1476		21,3677	7 0002 1		MP Q		
0393	REF 21	LAST 1476		21,3700	21,750 0		DAS	FUNCTION	NO OVERFLOW POSSIBLE.
0394	RFF 3	LAST 1469		21,3701	4 1745 1	SUMNEGU	CS	DEL	INCLUDE DEL FACTOR IN PRODUCT TERM.
0395				21,3702	0 0006 1		EXTEND		
0396	REF 1			21,3703	6 3707 1		BZMF	SUMTERMS	
0397				21,3704	0 0006 1		EXTEND		DEL FACTOR IS MINUS ONE.
0398	REF 22	LAST 1477		21,3705	4 1750 0		DCS	FUNCTION	
0399	RFF 2	LAST 1475		21,3706	1 3713 0		TCF	NEGUSUM -1	NOW ADD IN THE K2THETA TERM.
0400				21,3707	0 0006 1	SUMTERMS	EXTEND		
0401	REF 3	LAST 1477		21,3710	1 3714 1		BZF	NEGUSUM	BRANCH IF DEL IS ZERO.
0402				21,3711	0 0006 1		EXTEND		DEL FACTOR IS +1.
0403	REF 23	LAST 1477		21,3712	3 1750 1		DCA	FUNCTION	
0404	REF 5	LAST 1470		21,3713	21,736 0		DAS	K2THETA	NOW ADD IN THE K2THETA TERM.
0405	REF 6	LAST 1477		21,3714	11,735 0	NEGUSUM	CCS	K2THETA	TEST SIGN OF HIGH ORDER PART.
0406	REF 1			21,3715	1 3721 1		TCF	NEGDRIVE	
0407				21,3716	1 3720 0		TCF	+2	
0408	RFF 1			21,3717	1 3723 0		TCF	POS DRIVE	
0409	REF 7	LAST 1477		21,3720	11,736 0		CCS	K2THETA +1	SIGN TEST FOR LOW ORDER PART.
0410	REF 71	LAST 1473		21,3721	3 4753 1	NEGDRIVE	CA	BIT1	
0411				21,3722	1 3724 1		TCF	+2	STOP GIMBAL DRIVE FOR A ZERO NEGUSUM.
0412	REF 72	LAST 1477		21,3723	4 4753 0	POS DRIVE	CS	BIT1	
0413	REF 298	LAST 1476		21,3724	54 001 1		TS	L	SAVE FOR DRIVE REVERSAL TEST.
0414	REF 5	LAST 1468		21,3725	51,746 0		INDEX	QRCNTR	
0415	REF 11	LAST 1474		21,3726	57,500 0		XCH	NEGUQ	
0416				21,3727	0 0006 1		EXTEND		
0417	REF 299	LAST 1477		21,3730	7 0001 1		MP	L	MULTIPLY OLD NEGU AND NEW NEGU.
0418	RFF 300	LAST 1477		21,3731	10 001 1		CCS	L	
0419	REF 1			21,3732	1 3747 1		TCF	LOUPE	NON-ZERO GIMBAL DRIVE BEING CONTINUED.
0420	REF 1			21,3733	1 3744 1		TCF	ZEROLOUP	NO REVERSAL PROBLEM HERE.
0421	REF 1			21,3734	1 3736 1		TCF	REVERSAL	NON-ZERO GIMBAL DRIVE BEING REVERSED.
0422	RFF 2	LAST 1477		21,3735	1 3744 1		TCF	ZEROLOUP	NO REVERSAL PROBLEM HERE.
0423	RFF 6	LAST 1477		21,3736	51,746 0	REVERSAL	INDEX	QRCNTR	A ZERO-DRIVE PAUSE IS NEEDED HERE. ZERO
0424	REF 5	LAST 1470		21,3737	55,510 0		TS	QACCDOT	IS IN A REGISTER FROM CCS ON (-1).
0425	REF 7	LAST 1477		21,3740	51,746 0		INDEX	QRCNTR	
0426	REF 1			21,3741	4 3760 1		CS	GMBLBITA	
0427				21,3742	0 0006 1		EXTEND		
0428	RFF 73	LAST 1470		21,3743	03 012 1		WAND	CHAN12	
0429	REF 54	LAST 1471		21,3744	4 1273 1	ZEROLOUP	CS	RCSFLAGS	SET UP REQUEST FOR ACOT+C12 CALL.
0430	REF 3	LAST 1471		21,3745	7 4747 0		MASK	CALLGM8L	

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R0454  LDCATION (LDC) BY A TC RODTCYCL, AND RETURNS (TC Q) TO LDC +1.

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R0465

SUBROUTINE RDDTCYCL: BY CRAIG WORK,3 APRIL 68
RDDTCYCL IS A SUBROUTINE WHICH EXECUTES ONE NEWTON SQUARE ROOT ALGORITHM ITERATION. THE INITIAL GUESS AT THE SQUARE ROOT IS PRESUMED TO BE IN THE A REGISTER AND ONE-HALF THE SQUARE IS TAKEN ERDM HALFARG. THE NEW APPROXIMATION TO THE SQUARE ROOT IS RETURNED IN THE A REGISTER. DEBRIS: A,L,SR,SCRATCH. RDDTCYCL IS CALLED FROM LOCATION (LDC) BY A TC RDDTCYCL, AND RETURNS (TC 0) TO LDC +1.

0457	REF	1			21,3763	55'742 0	RODTCYCL	TS	SCRATCH	STORE X
0458	REF	31	LAST	1478	21,3764	54 021 0		TS	SR	X/2 NOW IN SR
0459	REF	2	LAST	1476	21,3765	3 1743 0		CA	HALFARG	ARG/2 IN THE A PFG
0460					21,3766	22 007 0		ZL		PREPARE EDR DIVISION
0461					21,3767	0 0006 1			EXTEND	
0462	REF	2	LAST	1478	21,3770	11'742 0		DV	SCRATCH	(ARG/X)/2
0463	REF	32	LAST	1478	21,3771	6 0021 1		AD	SR	(X + ARG/X)/2 IN THE A REG
0464	REF	434	LAST	1477	21,3772	0 0002 0		TC	0	

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R0001 PROGRAM NAME: 1/ACCS
R0002 PROGRAM WRITTEN BY: BOB COVELLI AND MIKE HOUSTON
R0003 LAST MODIFICATION: FEB. 21, 1968

R0004 PROGRAM DESCRIPTION:

R0005 1/ACCS PROVIDES THE INTERFACE BETWEEN THE GUIDANCE PROGRAMS AND THE DIGITAL AUTOPILOT. WHENEVER THERE IS A
R0007 CHANGE IN THE MASS OF THE VEHICLE, IN THE DEADBAND SELECTED, IN THE VEHICLE CONFIGURATION (ASCENT-DESCENT-
R0009 DOCKED), AND DURING A FRESH START OR A RESTART, 1/ACCS IS CALLED TO COMMUNICATE THE DATA CHANGES TO THE DAP.

R0011 THE INPUTS TO 1/ACCS ARE MASS, ACCELERATION (ABDELV), DEADBAND (DB), OFFSET ACCELERATIONS (AOSQ AND AOSR),
R0013 STAGE VERIFY BIT (CHAN30,BIT2), DOCKED BIT (DAPBOOLS,BIT13), DRIET BIT (DAPBOOLS,BIT8), USEQRJTS (DAPBOOLS,
R0015 BIT14), AND SURFACE FLAG (FLAGWR08,BIT8), AND CH5MASK.

R0016 1/ACCS COMPUTES THE JET ACCELERATIONS (IJACC, IJACCQ, IJACCR) AS FUNCTIONS OF MASS. IJACCQ AND IJACCV ARE
R0018 FORMED BY RESOLVING IJACCQ AND IJACCR. IN THE DESCENT CASE, THE DESCENT ENGINE MOMENT ARM (L,PVT-CG) IS ALSO
R0020 COMPUTED AS A FUNCTION OF MASS. THE RATE OF CHANGE OF ACCELERATION DUE TO ROTATION OF THE GIMBAL (ACCDOTQ,
R0022 ACCDOTR) IS ALSO COMPUTED IN THE DESCENT CASE.

R0023 AFTER THE ABOVE COMPUTATIONS, THE PROGRAM 1/ACCONT COMPUTES THE RECIPROCAL NET ACCELERATIONS ABOUT THE P, U,
R0025 AND V AXES (2 JETS FOR P AXIS, BOTH 1 AND 2 JETS FOR U AND V AXES), AND THE RECIPROCAL COAST ACCELERATIONS ABOUT
R0027 THE P, U, AND V AXES. THE ACCELERATION FUNCTIONS (ACCFCTZ1 AND ACCFCTZ5) ARE ALSO COMPUTED FOR THESE AXES. THE
R0029 FIRE AND COAST OF DEADBANDS AND AXISDIST ARE COMPUTED FOR EACH AXIS. FLAT AND ZONEBLIM, THE WIDTH AND HEIGHT OF THE
R0031 MINIMUM IMPULSE ZONE, ARE COMPUTED. 1/ACCONT ALSO SETS ACCSWU AND ACCSWV, WHICH INDICATE WHEN 1 JET ACCELERATION
R0033 IS NOT SUFFICIENT TO PRODUCE MINIMUM ACCELERATION. AT THE COMPLETION OF 1/ACCS, THE ACCSOKAY BIT IS SET.

R0035 SUBROUTINES CALLED:

R0036 TIMEGMBL
R0037 MAKECAOR
R0038 ROT45DEG

R0039 CALLING SEQUENCE:

A0040 TC BANKCALL (1/ACCS MUST BE CALL BY BANKCALL
A0041 CADR 1/ACCS

R0042 NORMAL EXIT: VIA BANKJUMP ALARM AND ABORT EXIT MODES: NONE.

R0043 INPUT/OUTPUT: SEE PROGRAM DESCRIPTION

R0044 DFBRS:

R0045 ALL OF THE EXECUTIVE TEMPORARY REGISTERS, EXCEPT FIXLOC AND OVIND, AND THE CORE SET AREA FROM MPAC TO BANKSET.

R0047 RESTRICTIONS:

R0048 1/ACCS MUST BE CALLED BY BANKCALL
R0049 EBANK IS SET TO 6, BUT NOT RESTORED.

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0050				20,2447			BANK 20	
0051	REF	5	LAST 1409	20,2000			SETLOC DAPS3	
0052				20,2447			BANK	

0053	REF	3	LAST 58 TO 59:	3	4*	COUNT* \$\$/DAPAD
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0054	REF	24	LAST 1478	E6,1537	EBANK= AOSQ
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R0055 ENTRY IS THROUGH 1/ACCJOB OR 1/ACCSET WHEN 1/ACCS IS TO BE DONE AS A SEPARATE NOVAC JOB.

R0057 IT IS POSSIBLE FOR MORE THAN ONE OF THESE JOBS TO BE SET UP CONCURRENTLY. HOWEVER, SINCE THERE IS NO CHECK OF
 R0059 NEWJOB, A SECOND MANIFESTATION CANNOT BE STARTED UNTIL THE FIRST IS COMPLETED.

0061	REF	308	LAST 1476	20,2447	3 4755 1	1/ACCSET CAF	ZERO	ENTRY FROM FRESH START/RESTART CODING.
0062	REF	25	LAST 1480	20,2450	55*537 0	TS	AOSQ	NULL THE OFFSET ESTIMATES FOR 1/ACCS.
0063	REF	10	LAST 1467	20,2451	55*541 1	TS	AOSR	
0064	REF	6	LAST 1422	20,2452	55*422 0	TS	ALPHAQ	NULL THE OFFSET ESTIMATES FOR DOWNLIST
0065	REF	5	LAST 1422	20,2453	55*423 1	TS	ALPHAR	

0066	REF	310	LAST 1397	20,2454	0 4616 1	1/ACCJOB TC	BANKCALL	1/ACCS ASSUMES ENTRY VIA BANKCALL.
0067	REF	2	LAST 864	20,2455	40461 0	CADR	1/ACCS +2	SKIP EBANK SETTING.

0068	REF	160	LAST 1385	20,2456	0 5155 0	TC	ENDOFJOB
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0069	REF	7	LAST 1403	20,2457	3 5015 0	1/ACCS CA	EBANK6	***** EBANK SET BUT NOT RESTORED *****
0070	REF	74	LAST 1404	20,2460	54 003 0	TS	EBANK	

0071	REF	16	LAST 1371	20,2461	0 4645 1	TC	MAKECADR	SAVE RETURN SO THAT BUF2 MAY BE USED
0072	REF	1		20,2462	54 117 1	TS	ACCRETRN	

R0073 DETERMINE MASS OF THE LEM.

0074	REF	64	LAST 1447	20,2463	3 0111 0	CA	DAPBOOLS	IS CSM DOCKED
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0075	REF	10	LAST 1446	20,2464	7 4737 1	MASK	CSMDOCKD	
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0076	REF	1		20,2465	54 157 0	TS	DOCKTEMP	STORE RECORD OF STATE IN TEMP (MPAC +3).
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0077	REF	528	LAST 1473	20,2466	10 000 0	CCS	A	
------	-----	-----	-----------	---------	----------	-----	---	--

0078	REF	5	LAST 329	20,2467	4 1332 0	CS	CSMMASS	DOCKED: LEMMASS = MASS - CSMMASS
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0079	REF	12	LAST 861	20,2470	6 1244 1	AD	MASS	LEM ALONE: LEMMASS = MASS
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0080	REF	11	LAST 329	20,2471	55*331 0	TS	LEMASS	
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R0081 ON THE BASIS OF APSFLAG:

R0082 SET THE P-AXIS RATE COMMAND LIMIT FOR 2-JET/4-JET CONTROL

R0083 SET MPAC, WHICH INDICATES THE PROPER SET OF COEFFICIENTS FOR THE LEM-ALONE F(MASS) CALCULATIONS

R0085 ENSURE THAT THE LEM MASS VALUE IS WITHIN THE ACCEPTABLE RANGE

00855				20,2472	0 0004 0	INHINT		
0086	REF	20	LAST 1447	20,2473	30 106 0	CAE	FLGWRD10	DETERMINE WHETHER STAGFD.
0087	REF	15	LAST 1447	20,2474	7 4737 1	MASK	APSFLBIT	
0088				20,2475	0 0006 1	EXTEND		
0089	REF	1		20,2476	1 2522 1	BZF	DPSFLITE	

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0090	REF	40	LAST	1451	20,2477	4 4733 0	CS	POS MAX	ASCENT (OR ON LUNAR SURFACE)
0091	REF	3	LAST	1430	20,2500	55'473 1	TS	-2JET LIM	ALWAYS 2 JETS FOR P-AXIS RATE COMMAND
0092	REF	8	LAST	1478	20,2501	3 5742 0	CAE	UCT14	INITIALIZE INDEX AT 12.
0093	REF	840	LAST	1397	20,2502	54 154 0	TS	MPAC	
0094	REF	12	LAST	1480	20,2503	4 1331 0	CS	LEM MASS	CHECK IF MASS TOO HIGH. CATCH STAGING.
0095	REF	3	LAST	227	20,2504	6 1400 1	AD	HIASCENT	
0096					20,2505	0 0006 1	EXTEND		
0097	REF	1			20,2506	6 2513 1	BZMF	MASSFIX	
0098	REF	13	LAST	1481	20,2507	4 1331 0	CS	LEM MASS	CHECK IF MASS TOO LOW. THIS LIMITS THE
0099	REF	1			20,2510	6 2001 1	AD	LJASCENT	DECREMENTING BY MASSMON.
0100					20,2511	0 0006 1	EXTEND		
0101	REF	1			20,2512	6 2540 1	BZMF	F(MASS)	
0102	REF	14	LAST	1481	20,2513	27'331 0	MASSFIX	ADS	LEM MASS
0103					20,2514	22 007 0	ZL		STORE THE VIOLATED LIMIT AS LEM MASS.
0104	REF	2	LAST	1480	20,2515	10 157 0	CCS	DOCK TEMP	ALSO CORRECT TOTAL MASS, ZEROING THE
0105	REF	6	LAST	1480	20,2516	31'332 1	CAE	CSMMASS	LOW-ORDER WORD.
0106	REF	15	LAST	1481	20,2517	6 1331 1	AD	LEM MASS	DOCKED: MASS = LEM MASS + CSMMASS
0107	REF	13	LAST	1480	20,2520	53'245 1	DXCH	MASS	LEM ALONE: MASS = LEM MASS
0108	REF	2	LAST	1481	20,2521	1 2540 0	TCF	F(MASS)	
0109	REF	63	LAST	1470	20,2522	4 4742 0	DPSFLITE	CS	BIT10
0110	REF	4	LAST	1481	20,2523	55'473 1	TS	-2JET LIM	FOUR JETS FOR P-AXIS RATE COMMAND ERRORS
0111	REF	38	LAST	1434	20,2524	3 6241 0	CAE	SIX	EXCEEDING 1.4 DEG/SEC (SCALED AT 45)
0112	REF	841	LAST	1481	20,2525	54 154 0	TS	MPAC	INITIALIZE INDEX AT 6.
0113	REF	16	LAST	1481	20,2526	4 1331 0	CS	LEM MASS	CHECK IF MASS TOO HIGH. SHOULD NEVER
0114	REF	1			20,2527	6 2002 1	AD	HIDESCNT	OCCUR EXCEPT PERHAPS BEFORE THE PAD
0115					20,2530	0 0006 1	EXTEND		LOAD IS DONE.
0116	REF	2	LAST	1481	20,2531	6 2513 1	BZMF	MASSFIX	
0117	REF	17	LAST	1481	20,2532	4 1331 0	CS	LEM MASS	CHECK IF MASS TOO LOW. THIS LIMITS THE
0118	REF	1			20,2533	6 2003 0	AD	LODESCNT	DECREMENTING BY MASSMON.
0119	REF	4	LAST	1481	20,2534	6 1400 1	AD	HIASCENT	
0120					20,2535	0 0006 1	EXTEND		
0121	REF	3	LAST	1481	20,2536	6 2540 1	BZMF	F(MASS)	
0122	REF	3	LAST	1481	20,2537	1 2513 0	TCF	MASSFIX	
0123	COMPUTATION OF FUNCTIONS OF MASS								
0124					20,2540	0 0003 1	F(MASS)	RELINT	
0125	REF	3	LAST	1481	20,2541	10 157 0	CCS	DOCK TEMP	
0126	REF	1			20,2542	1 3030 0	TCF	DOCKED	DOCKED: USE SEPERATE COMPUTATION.
0127	REF	109	LAST	1475	20,2543	3 4752 0	CA	TWO	
0128	REF	842	LAST	1481	20,2544	54 155 1	STCTR	TS	MPAC +1
0129	REF	110	LAST	1481	20,2545	4 4752 1	CS	TWO	
0130	REF	843	LAST	1481	20,2546	26 154 0	ADS	MPAC	JX=10,8,6 OR 4,2,0 TO INDEX COEFS.
0131	REF	18	LAST	1481	20,2547	31'331 1	STCTR1	CAE	LEM MASS
0131	REF	344	LAST	1481	20,2550	50 154 1	INDEX	MPAC	
0132	REF	1			20,2551	6 3006 1	AD	INERCONC	
0133	REF	845	LAST	1481	20,2552	54 156 1	TS	MPAC +2	MASS + C

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0134			20,2553	0 0006 1	EXTEND		
0135	REF 846	LAST 1481	20,2554	5 0154 1	INOEX	MPAC	
0136	REF 1		20,2555	3 2770 0	DCA	INERCONA	
0137			20,2556	0 0006 1	EXTENO		
0138	REF 847	LAST 1482	20,2557	10 156 1	OV	MPAC +2	
0139	REF 848	LAST 1482	20,2560	50 154 1	INDEX	MPAC	
0140	REF 1		20,2561	6 3005 1	AO	INERCONB	
0141	REF 849	LAST 1482	20,2562	50 155 0	INOEX	MPAC +1	1JACC(J)=A(JX)/(MASS+C(JX) + 8(JX)
0142	REF 8	LAST 1418	20,2563	55'530 1	TS	1JACC	1JACC(-1)=L,PVT-CG SCALED AT 8 FEET
0143	REF 350	LAST 1482	20,2564	10 155 1	CCS	MPAC +1	
0144	REF 1		20,2565	1 2544 1	TCF	STCTR	
0145	REF 1		20,2566	1 2570 0	TCF	COMMEQS	
0146	REF 1		20,2567	1 2607 0	TCF	LRESC	
0147	REF 2	LAST 1466	20,2570	3 1532 1	COMMEQS CA	1JACCR	SCALEO AT PI/4
0148	REF 2	LAST 1466	20,2571	6 1531 1	AO	1JACCQ	
0149			20,2572	0 0006 1	EXTEND		
0150	REF 1		20,2573	7 3026 1	MP	0.35356	.70711 SCALEO BY (+1)
0151	REF 1		20,2574	55'533 1	TS	1JACCU	
0152	REF 1		20,2575	55'534 0	TS	1JACCV	SCALEO AT PI/2 RAO/SEC**2
0158	REF 851	LAST 1482	20,2576	10 154 0	CCS	MPAC	COMPUTE L,PVT-CG IF IN OESCENT
0159	REF 309	LAST 1480	20,2577	3 4755 1	CAE	ZERO	ZERO SWITCHES AND GO TO 1/ACCONT IN
0160	REF 5	LAST 1474	20,2600	55'501 0	TS	ALLOWGTS	ASCENT
0161	REF 1		20,2601	1 3142 1	TCF	1/ACCONT -1	
0162	REF 111	LAST 1481	20,2602	4 4752 1	CS	TWO	
0163	REF 852	LAST 1482	20,2603	54 154 0	TS	MPAC	
0164	REF 176	LAST 1472	20,2604	4 4753 0	CS	ONE	
0165	REF 853	LAST 1482	20,2605	54 155 1	TS	MPAC +1	
0166	REF 1		20,2606	1 2547 1	TCF	STCTR1	
RO167	THIS SECTION COMPUTES THE RATE OF CHANGE OF ACCELERATION DUE TO THE ROTATION OF THE GIMBALS. THE EQUATION IMPL						
RO169	MENTED IN BOTH THE Y-X PLANE AND THE Z-X PLANE IS -- O(ALPHA)/DT = TL/I*(DELTA)/DT, WHERE						
RO171	T = ENGINE THRUST FORCE						
RO172	L = PIVOT TO CG DISTANCE OF ENGINE						
RO173	I = MOMENT OF INERTIA						
0174	REF 6	LAST 863	20,2607	31'246 0	LRESC CAE	ABDELV	SCALEO AT 2(13) CM/SEC(2)
0175			20,2610	0 0006 1	EXTENO		
0176	REF 14	LAST 1481	20,2611	7 1244 0	MP	MASS	SCALEO AT 8+16 KGS
0177	REF 1		20,2612	0 2724 1	TC	OVDVSUB	GET QUOTIENT WITH OVERFLOW PROTECTION
0178	REF 1		20,2613	03027 1	ADRES	GFACTM	
RO179	MASS IS DIVIDED BY ACCELERATION OF GRAVITY IN ORDER TO MATCH THE UNITS OF IXX,IYY,IZZ, WHICH ARE SLUG-FT(2).						
RO181	THE RATIO OF ACCELERATION FROM PIPAS TO ACCELERATION OF GRAVITY IS THE SAME IN METRIC OR ENGINEERING UNITS, SO						
RO183	THAT IS UNCONVERTED. 2.20462 CONVERTS KG. TO LB. NOW T IS IN A SCALEO AT 2(14).						
0185			20,2614	0 0006 1	EXTENO		
0186	REF 1		20,2615	7 1527 1	MP	L,PVT-CG	SCALEO AT 8 FEET.

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0187				20,2616	0 0004 0	INHINT		
0188	REE 854	LAST 1482		20,2617	54 154 0	TS	MPAC	
0189				20,2620	0 0006 1	EXTEND		
0190	REF 3	LAST 1482		20,2621	7 1532 0	MP	1JACCR	
0191	REF 2	LAST 1482		20,2622	0 2724 1	TC	DVOVSUB	GET QUOTIENT WITH OVERFLOW PROTECTION
0192	REF 1			20,2623	02000 0	ADRES	TORKJET1	
0193	REF 2	LAST 1470		20,2624	55'511 1	TS	ACCDOTR	SCALED AT PI/2(7)
0194	REF 855	LAST 1483		20,2625	3 0154 1	CA	MPAC	
0195				20,2626	0 0006 1	EXTEND		
0196	REF 3	LAST 1482		20,2627	7 1531 0	MP	1JACCO	
0197	REF 3	LAST 1483		20,2630	0 2724 1	TC	DVOVSUB	GET QUOTIENT WITH OVERFLOW PROTECTION
0198	REF 2	LAST 1483		20,2631	02000 0	ADRES	TORKJET1	
0199	REF 6	LAST 1473		20,2632	55'507 0	SPSCONT TS	ACCDOTQ	SCALED AT PI/2(7)
0200				20,2633	0 0006 1	EXTEND		
0201	REF 1			20,2634	7 3025 1	MP	DGBF	.3ACCDOTQ SCALED AT PI/2(8)
0202	REF 5	LAST 1468		20,2635	55'503 1	TS	KQ	
0203				20,2636	0 0006 1	EXTEND		
0204				20,2637	7 0000 0	SQUARE		
0205	REF 1			20,2640	55'504 0	TS	KQ2	KQ(2)
0206	REF 3	LAST 1483		20,2641	31'511 0	CAE	ACCDOTR	.3ACCDOTR AT PI/2(8)
0207				20,2642	0.0006 1	EXTEND		
0208	REF 2	LAST 1483		20,2643	7 3025 1	MP	DGBF	
0209	REF 1			20,2644	55'505 1	TS	KROAP	
0210				20,2645	0.0006 1	EXTEND		
0211				20,2646	7 0000 0	SQUARE		
0212	REF 1			20,2647	55'506 1	TS	KR2	
0213				20,2650	0 0006 1	EXTEND		NOW COMPUTE QACCDOT, RACCDOT, THE SIGNED
0214	REF 74	LAST 1477		20,2651	00 012 1	READ	CHAN12	JERK TERMS. STORE CHANNEL 12. WITH GIM
0215	REF 856	LAST 1483		20,2652	54 155 1	TS	MPAC +1	BAL DRIVE BITS 9 THROUGH 12. SET LOOP
0216	REF 58	LAST 1438		20,2653	3 4752 0	CAF	BIT2	INDEX TO COMPUTE RACCDOT, THEN QACCDOT.
0217	REF 1			20,2654	1 2656 1	TCF	LOOP3	
0218	REF 310	LAST 1482		20,2655	3 4755 1	CAF	ZERO	ACCDOTQ AND ACCDOTR ARE NOT NEGATIVE,
0219	REF 857	LAST 1483		20,2656	54 154 0	TS	MPAC	BECAUSE THEY ARE MAGNITUDES
0220	REF 858	LAST 1483		20,2657	3 0155 0	CA	MPAC +1	
0221	REF 859	LAST 1483		20,2660	50 154 1	INDEX	MPAC	MASK CHANNEL IMAGE FOR ANY GIMBAL MOTION
0222	REF 1			20,2661	7 3021 0	MASK	GIMBLBTS	
0223				20,2662	0 0006 1	EXTEND		
0224	REF 1			20,2663	1 2677 1	BZF	ZACCDOT	IF NONE, Q(R)ACCDOT IS ZERO.
0225	REF 860	LAST 1483		20,2664	3 0155 0	CA	MPAC +1	
0226	REF 861	LAST 1483		20,2665	50 154 1	INDEX	MPAC	GIMBAL IS MOVING. IS ROTATION POSITIVE.
0227	REF 2	LAST 1483		20,2666	7 3022 0	MASK	GIMBLBTS +1	
0228				20,2667	0 0006 1	EXTEND		
0229	REF 1			20,2670	1 2674 1	BZF	FRSTZERO	IF NOT POSITIVE, BRANCH
0230	REF 862	LAST 1483		20,2671	50 154 1	INDEX	MPAC	POSITIVE ROTATION, NEGATIVE Q(R)ACCDOT.
0231	REF 7	LAST 1483		20,2672	4 1507 0	CS	ACCDOTQ	
0232	REF 1			20,2673	1 2700 0	TCF	STACCDOT	

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0233	REF	863	LAST	1483	20,2674	50 154 1	FRSTZERO	INDEX	MPAC	NEGATIVE ROTATION, POSITIVE Q(R)ACCDOT.
0234	REF	8	LAST	1483	20,2675	3 1507 1		CA	ACCDOTQ	
0235	REF	2	LAST	1483	20,2676	1 2700 0		TCF	STACCDOT	
0236	REF	311	LAST	1483	20,2677	3 4755 1	ZACCDOT	CAF	ZERO	
0237	REF	864	LAST	1484	20,2700	50 154 1	STACCDOT	INDEX	MPAC	
0238	REF	6	LAST	1477	20,2701	55 1510 0		TS	QACCDOT	STORE Q(R)ACCDOT.
0239	REF	865	LAST	1484	20,2702	10 154 0		CCS	MPAC	
0240	REF	2	LAST	1483	20,2703	1 2655 1		TCF	LOOP3 -1	NOW DO QACCDOT.
0241	REF	65	LAST	1480	20,2704	4 0111 1		CS	DAP8COLS	IS GIMBAL USABLE?
0242	REF	6	LAST	1446	20,2705	7 4736 0		MASK	USEQRJTS	
0243					20,2706	0 0006 1		EXTEND		
0244	REF	1			20,2707	1 3576 1		BZF	DWNGTS	NO. BE SURE THE GIMBAL SWITCHES ARE DOWN
0245	REF	5	LAST	1408	20,2710	4 1274 0		CS	T5ADR	YES. IS THE DAP RUNNING?
0246	REF	1			20,2711	6 3655 1		AD	PAXISADR	
0247					20,2712	0 0006 1		EXTEND		
0248					20,2713	1 2715 1		BZF	+2	
0249	REF	2	LAST	1484	20,2714	1 3576 1		TCF	DWNGTS	NO. BE SURE THE GIMBAL SWITCHES ARE DOWN
0250	REF	6	LAST	1467	20,2715	11 1631 0		CCS	INGTS	YES. IS GTS IN CONTROL?
0251	REF	1			20,2716	1 2721 0		TCF	DOCKTEST	YES. PROCEED WITH 1/ACCS.
0252	REF	62	LAST	1474	20,2717	0 4674 0		TC	IBNKCALL	NO. NULL OFFSET AND FIND ALLOWGTS
0253	REF	2	LAST	1444	20,2720	43450 1		CADR	TIMEGMBL	
0254	REF	4	LAST	1481	20,2721	10 157 0	DOCKTEST	CCS	DOCKTEMP	BYPASS 1/ACCONT WHEN DOCKED.
0255	REF	1			20,2722	1 3561 1		TCF	1/ACCRET	
0256	REF	2	LAST	1482	20,2723	1 3143 0		TCF	1/ACCONT	

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P0257 SUBROUTINE: DVOVSUB

R0258 AUTHOR: C. WORK, MQD 0 12 JUNE 68

R0259 PURPOSE: THIS SUBROUTINE PROVIDES A SINGLE-PRECISION MACHINE LANGUAGE DIVISION OPERATION WHICH RETURNS
 R0261 (1) THE QUOTIENT, IF THE DIVISION WAS NORMAL.
 R0262 (2) NEGMAX, IF THE QUOTIENT WAS IMPROPER AND NEGATIVE.
 R0263 (3) POSMAX, IF THE QUOTIENT WAS IMPROPER AND POSITIVE OR IF THERE WAS A ZERO DIVISOR.
 R0265 THE CALLING PROGRAM IS PRESUMED TO BE A JOB IN THE F BANK WHICH CONTAINS DVOVSUB. E BANK MUST BE 6.
 R0267 THE DIVISOR FOR THIS ROUTINE MAY BE IN EITHER FIXED OR ERASABLE STORAGE. SIGN AGREEMENT IS
 R0269 ASSUMED BETWEEN THE TWO HALVES OF THE DIVIDEND. (THIS IS CERTAIN IF THE A AND L REGISTERS ARE THE RE-
 R0271 SULT OF A MULTIPLICATION OPERATION.)

R0272 CALL SEQUENCE:

A0273		L	TC	DVOVSUB
A0274		L +1	ADRES	(DIVISOR)
A0275		L +2	RETURN	HERE, WITH RESULT IN A,L

R0276 INPUT: DIVIDEND IN A,L (SIGN AGREEMENT ASSUMED), DIVISOR IN LOCATION DESIGNATED BY "ADRES".
 R0278 DIVISOR MAY BE IN THE DVOVSUB FBANK, FIXED-FIXED FBANK, EBANK 6, OR UNSWITCHED ERASABLE.

R0280 OUTPUT: QUOTIENT AND REMAINDER, OR POSMAX (NEGMAX), WHICHEVER IS APPROPRIATE.

R0282 DEBRIS: SCRATCHX, SCRATCHY, SCRATCHZ, A,L (NOTE: SCRATCHX, Y, Z ARE EQUATED TO MPAC +4, +5, AND +6.)

R0284 ABORTS OR ALARMS: NONE

R0285 EXITS: TO THE CALL POINT + 2.

R0286 SUBROUTINES CALLED: NONE.

0287	REF	1		20,2724	54 161 0	DVOVSUB	TS	SCRATCHY	SAVE UPPER HALF OF DIVIDEND
0288	REF	1		20,2725	54 160 1		TS	SCRATCHX	
0289	REF	435	LAST 1478	20,2726	50 002 0		INDEX	Q	OBTAIN ADDRESS OF DIVISOR.
0290				20,2727	3 0000 1		CA	0	
0291	REF	436	LAST 1485	20,2730	24 002 0		INCR	0	STEP Q FOR PROPER RETURN SEQUENCE.
0292	REF	529	LAST 1480	20,2731	50 000 1		INDEX	A	
0293				20,2732	3 0000 1		CA	0	PICK UP THE DIVISOR.
0294				20,2733	0 0006 1		EXTEND		RETURN POSMAX FOR A ZERO DIVISOR.
0295	REF	1		20,2734	1 2763 0		BZF	MAXPLUS	
0296	RFF	1		20,2735	54 162 0		TS	SCRATCHZ	STORE DIVISOR.
0297	REF	530	LAST 1485	20,2736	10 000 0		CCS	A	GET ABS(DIVISOR) IN THE A REGISTER.
0298	REF	73	LAST 1477	20,2737	6 4753 1		AD	BIT1	
0299	REF	1		20,2740	1 2742 0		ICF	ZEROPLUS	
0300	REF	74	LAST 1485	20,2741	6 4753 1		AD	BIT1	
0301	REF	2	LAST 1485	20,2742	56 161 1	ZEROPLUS	XCH	SCRATCHY	STORE ABS(DIVISOR). PICK UP TOP HALF OF
0302				20,2743	0 0006 1		EXTEND		DIVIDEND.
0303	REF	1		20,2744	6 2746 0		BZMF	GOODNEG	GET -ABS(DIVIDEND)

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0304	REF 531	LAST 1485	20,2745	4 0000 0	CS	A	
0305	REF 3	LAST 1485	20,2746	6 0161 1	GOODNEG	AD	SCRATCHY
0306			20,2747	0 0006 1		EXTEND	ABS(DIVISOR) - ABS(DIVIDEND)
0307	REF 1		20,2750	6 2755 1	BZMF	MAKEMAX	BRANCH IF DIVISION IS NOT PROPER.
0308	REF 2	LAST 1485	20,2751	3 0160 0	CA	SCRATCHX	RE-ESTABLISH THE DIVIDEND.
0309			20,2752	0 0006 1	EXTEND		
0310	REF 2	LAST 1485	20,2753	10 162 0	DV	SCRATCHZ	QUOTIENT IN THE A, REMAINDER IN L.
0311	REF 437	LAST 1485	20,2754	0 0002 0	TC	Q	RETURN TO CALLER.
0312	REF 3	LAST 1486	20,2755	10 160 1	MAKEMAX	CCS	SCRATCHX
0313	REF 3	LAST 1486	20,2756	10 162 0		CCS	SCRATCHZ
0314	REF 2	LAST 1485	20,2757	1 2763 0	TCF	MAXPLUS	
0315	REF 4	LAST 1486	20,2760	10 162 0		CCS	SCRATCHZ
0316	REF 12	LAST 1463	20,2761	3 4735 1	CAF	NEGMAX	+, - OR -, +
0317	REF 438	LAST 1486	20,2762	0 0002 0	TC	Q	
0318	REF 41	LAST 1481	20,2763	3 4733 1	MAXPLUS	CAF	POS MAX
0319	REF 439	LAST 1486	20,2764	0 0002 0	TC	Q	-, - OR +, +

R0320 COEFFICIENTS FOR THE JET ACCELERATION CURVE FITS
 R0321 THE CURVE FITS ARE OF THE FORM -

R0322 $1JACC = A/(MASS + C) + B$

R0323 A IS SCALED AT PI/4 RAD/SEC**2 B+16KG, B IS SCALED AT PI/4 RAD/SEC**2, AND C IS SCALED AT B +16 KG.

R0325 THE CURVE FIT FOR L,PVT-CG IS OF THE SAME FORM, EXCEPT THAT A IS SCALED AT B FT B+16 KG, B IS SCALED AT B FT,
 R0327 AND C IS SCALED AT B+16 KG.

0328			20,2765	01240 0	2DEC	+.0410511917	L	A	DESCENT
0328			20,2766	22513 0					
0329			20,2767	00141 0	INERCONA	2DEC	+.0059347674	1JACCP	A DESCENT
0329			20,2770	07416 0					
0330			20,2771	00030 1		2DEC	+.0014979264	1JACCQ	A DESCENT
0330			20,2772	21261 1					
0331			20,2773	00021 1		2DEC	+.0010451889	1JACCR	A DESCENT
0331			20,2774	03766 0					
0332			20,2775	00153 0		2DEC	+.0065443852	1JACCP	A ASCENT
0332			20,2776	07111 1					
0333			20,2777	00072 1		2DEC	+.0035784354	1JACCQ	A ASCENT
0333			20,3000	24103 0					
0334			20,3001	00135 0		2DEC	+.0056946631	1JACCR	A ASCENT
0334			20,3002	11511 1					
0335			20,3003	04754 0	DEC	+.155044	L	B	DESCENT
0336			20,3004	77142 0	DEC	-.025233	L	C	DESCENT

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0337	20,3005	00061 0	INERCONB DEC	+002989	1JACCP 8	DESCENT
0338	20,3006	00217 0	INERCONC DEC	+008721	1JACCP C	DESCENT
0339	20,3007	00464 1	DEC	+018791	1JACCP 8	DESCENT
0340	20,3010	75642 0	DEC	-068163	1JACCP C	DESCENT
0341	20,3011	00536 1	DEC	+021345	1JACCP 8	DESCENT
0342	20,3012	75705 1	DEC	-066027	1JACCP C	DESCENT

0343	20,3013	00001 0	DEC	+000032	1JACCP B	ASCENT
0344	20,3014	77616 0	DEC	-006923	1JACCP C	ASCENT
0345	20,3015	05154 1	DEC	+0162862	1JACCP 8	ASCENT
0346	20,3016	00052 0	DEC	+002588	1JACCP C	ASCENT
0347	20,3017	00231 1	DEC	+009312	1JACCP 8	ASCENT
0348	20,3020	77174 0	DEC	-023608	1JACCP C	ASCENT

0353	20,3021	01400 1	GIM8LBTS OCTAL	01400		
0354	20,3022	01000 0	OCTAL	01000		
0355	20,3023	06000 1	OCTAL	06000		
0356	20,3024	04000 0	OCTAL	04000		
0357	20,3025	23146 0	DG8E DEC	0.6		.3 SCALED AT 1/2
0358	20,3026	13241 1	0.35356 DEC	0.35356		.70711 SCALED AT 2
0359	20,3027	00337 0	GFACTM OCT	337		979.24/2.20462 AT 8+15

R0360 CSW-DCCKED INERTIA COMPUTATIONS

0361	REF 177	LAST 1482	20,3030	3 4753 1	DOCKED CA	ONE	COEFTR = 1 FOR INERTIA COEFFICIENTS
0362	REE 1		20,3031	54 160 1	SPSLOOP1 TS	COEECTR	= 7 FOR CG COEFFICIENTS
0363	REF 178	LAST 1487	20,3032	3 4753 1	CA	ONE	MASSCTR = 1 FOR CSM
0364	REE 1		20,3033	54 161 0	TS	MASSCTR	= 0 FOR LEM

0365	REF 2	LAST 1487	20,3034	50 160 0	INDEX	COEECTR	
0366	REF 1		20,3035	3 3125 1	CA	COEFF -1	COEFF -1 = C
0367			20,3036	0 0006 1	EXTEND		
0368	REF 19	LAST 1481	20,3037	7 1331 0	MP	LEMMASS	
0369			20,3040	0 0006 1	EXTEND		
0370	REF 7	LAST 1481	20,3041	7 1332 0	MP	CSMMASS	LET X = CSMMASS AND Y = LEMASS

0371	REF 3	LAST 1487	20,3042	50 160 0	INDEX	COEECTR	
0372	REF 2	LAST 1487	20,3043	6 3126 1	AD	COEFF	COEFF = F
0373	REF 866	LAST 1484	20,3044	54 154 0	TS	MPAC	MPAC = C X Y + F
0374			20,3045	1 3051 1	TCE	+4	

0375	REF 2	LAST 1487	20,3046	54 161 0	SPSLOOP2 TS	MASSCTR	LOOP TWICE THROUGH HERE TO OBTAIN
0376			20,3047	0 0006 1	EXTEND		MPAC = MPAC + (A X + D) X + (B Y + E) Y
0377	REF 4	LAST 1487	20,3050	26 160 1	DIM	COEECTR	LOOP #1 LOOP #2
0378	REF 5	LAST 1487	20,3051	50 160 0	INDEX	COEECTR	
0379	REF 3	LAST 1487	20,3052	3 3130 0	CA	COEFF +2	COEFF +2 = A OR 8
0380			20,3053	0 0006 1	EXTEND		
0381	REF 3	LAST 1487	20,3054	5 0161 1	INDEX	MASSCTR	
0382	REF 20	LAST 1487	20,3055	7 1331 0	MP	LEMMASS	
0383	REF 6	LAST 1487	20,3056	50 160 0	INDEX	COEECTR	

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0384	REF	4	LAST	1487	20,3057	6 3132 1	AD	COEFF +4	COEFF +4 = E OR D
0385					20,3060	0 0006 1	EXTFND		
0386	REF	4	LAST	1487	20,3061	5 0161 1	INDEX	MASSCTR	
0387	REF	21	LAST	1487	20,3062	7 1331 0	MP	LEMMASS	
0388	REF	867	LAST	1487	20,3063	26 154 0	ADS	MPAC	
0389	REF	5	LAST	1488	20,3064	10 161 0	CCS	MASSCTR	
0390	REF	1			20,3065	1 3046 1	TCF	SPSL00P2	
0391	REF	7	LAST	1487	20,3066	10 160 1	CCS	COEFFCTR	IF COEFFCTR IS POS, EXIT FROM LOOP WITH
0392					20,3067	1 3076 1	TCF	+7	CG X DELOOT = MPAC X 4 PI RAD-CM/SEC
0393					20,3070	00000 1	TORQCONS	20EC	CORRESPONDS TO 500 LB-FT
0394					20,3071	20354 1			
0394	REF	868	LAST	1488	20,3072	3 0154 1	CA	MPAC	
0395	REF	369	LAST	1488	20,3073	54 155 1	TS	MPAC +1	INERTIA = (MPAC +1) X 2(38) KG-CM(2)
0396	REF	24	LAST	1368	20,3074	3 4757 0	CA	SEVEN	
0397	REF	1			20,3075	1 3031 1	TCF	SPSL00P1	
0398	REF	64	LAST	1481	20,3076	3 4742 1	CA	BIT10	CORRESPONDS TO 1.4 DEG/SEC(2)
0399	REF	9	LAST	1482	20,3077	55'530 1	TS	1JACC	SCALED AT PI/4
0400	REF	42	LAST	1486	20,3100	3 4733 1	CA	POSMAX	SET INVERSE JET ACCELERATIONS TO POSMAX,
0401	REF	2	LAST	1430	20,3101	55'551 0	TS	1/ANETP	WHICH CORRESPONDS TO ACCEL. OF 1.4 D/SS.
0402	REF	3	LAST	1458	20,3102	55'571 1	TS	1/ANET2 +1	
0403	REF	4	LAST	1488	20,3103	55'572 1	TS	1/ANET2 +2	
0404	REF	5	LAST	1488	20,3104	55'611 1	TS	1/ANET2 +170	
0405	REF	6	LAST	1488	20,3105	55'612 1	TS	1/ANET2 +180	
0406					20,3106	0 0006 1	EXTEND		
0407	REF	1			20,3107	3 3071 1	OCA	TORQCONS	
0408					20,3110	0 0006 1	EXTEND		
0409	REF	370	LAST	1488	20,3111	10 155 1	DV	MPAC +1	
0410					20,3112	0 0004 0	INHINT		
0411	REF	4	LAST	1483	20,3113	55'531 0	TS	1JACCQ	SCALED AT PI/4
0412	REF	4	LAST	1483	20,3114	55'532 0	TS	1JACCR	
0413	REF	15	LAST	1482	20,3115	3 1244 1	CA	MASS	SCALED AT 2(16) KG
0414					20,3116	0 0006 1	EXTEND		
0415	REF	371	LAST	1488	20,3117	7 0154 0	MP	MPAC	SCALED AT 4 PI RAD-CM/SEC
0416					20,3120	0 0006 1	EXTEND		
0417	REF	7	LAST	1482	20,3121	7 1246 1	MP	ABDELV	SCALED AT 2(13) CM/SEC(2)
0418	REF	4	LAST	1483	20,3122	0 2724 1	TC	DVOVSU8	GET QUOTIENT WITH OVERFLOW PROTECTION
0419	REF	372	LAST	1488	20,3123	00155 0	ADRES	MPAC +1	
0420	REF	4	LAST	1483	20,3124	55'511 1	TS	ACCDOTR	
0421	REF	1			20,3125	1 2632 0	TCF	SPSCONT	CONTINUE K, KSQ CALCULATIONS

A0422
A0423
$$2 \quad 2$$

COEFFICIENTS FOR CURVE FIT OF THE FORM $Z=A X^2+B Y^2+C X Y+D X+E Y+F$

0424		20,3126	06176 1	COEFF	DEC	.19518	C	COEFFICIENT OF INERTIA
0425		20,3127	77650 1		DEC	-.00529	F	"

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0426	20,3130	72260 0	DEC	-.17670	B	''
0427	20,3131	76637 1	DEC	-.03709	A	''
0428	20,3132	02167 0	DEC	.06974	E	''
0429	20,3133	00645 0	DEC	.02569	D	''
0430	20,3134	06335 1	DEC	.20096	C	COEFFICIENT OF CG
0431	20,3135	04256 1	DEC	.13564	F	''
0432	20,3136	30163 0	DEC	.75704	B	''
0433	20,3137	64072 0	DEC	-.37142	A	''
0434	20,3140	53632 0	DEC	-.63117	E	''
0435	20,3141	15133 1	DEC	.41179	D	''

R0436 ASSIGNMENT OF TEMPDRARIES FOR 1/ACCS (EXCLUDING 1/ACCDNT)

A0437				MPAC, MPAC +1, MPAC +2 USED EXPLICITLY	
0439	REF 873	LAST 1488	0160	CDEFCTR	EQUALS MPAC +4
0440	REF 874	LAST 1489	0161	MASSCTR	EQUALS MPAC +5
0441	REF 875	LAST 1489	0160	SCRATCHX	EQUALS MPAC +4
0442	RFF 4	LAST 1486	0161	SCRATCHY	EQUALS SCRATCHX +1
0443	RFF 5	LAST 1489	0162	SCRATCHZ	EQUALS SCRATCHX +2
SCRATCH AREA FOR DVOVSUB ROUTINE.					
0444	REF 876	LAST 1489	0157	DDCKTEMP	EQUALS MPAC +3
RECDRD OF CSMDDCKED BIT OF DAPBDOLS					

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0445					20,3142		BANK	20				
0446					20,3142		SETLOC	DAPS3				
0447	REF	6	LAST	1480	20,2000		BANK					
0448					20,3142							
0449	REF	26	LAST	1480	E6,1537		EBANK=	AOSQ				
0450	REF	4	LAST	1480 TO 1490:	315 319*		COUNT*	\$\$/OAPAO				
04501	REF	7	LAST	1484	20,3142	55'631 0	-1	TS	INGTS	ZERO	INGTS IN ASCENT	
0451	REF	4	LAST	1402	20,3143	3 1346 1	1/ACCONT	CA	DB	INITIALIZE	DBVAL1,2,3	
0452					20,3144	0 0006 1		EXTEND				
0453	RFF	63	LAST	1476	20,3145	7 4737 1		MP	BIT13			
0454	REF	301	LAST	1477	20,3146	54 001 1		TS	L	0.25	OB	
0455	REF	532	LAST	1486	20,3147	6 0000 1		AD	A			
0456	REF	1			20,3150	54 115 0		TS	DBVAL3	0.50	OB	
0457	REF	1			20,3151	4 1346 0		CS	OBVAL1			
0458	REF	302	LAST	1490	20,3152	6 0001 0		AD	L			
0459	REF	1			20,3153	54 114 1		TS	OBVAL2	-.75	DB	
0460					20,3154	0 0004 0	GETAOSUV	INHINT				
0461	REF	11	LAST	1480	20,3155	31'541 0		CAE	AOSR	COMPUTE	AOSU AND AOSV BY ROTATING	
0463	REF	303	LAST	1490	20,3156	54 001 1		TS	L	AOSQ AND AOSR.		
0464	REF	27	LAST	1490	20,3157	31'537 1		CAE	AOSQ			
0465	REF	63	LAST	1484	20,3160	0 4674 0		TC	IBNKCALL			
0466	REF	4	LAST	1446	20,3161	37100 1		CADR	ROT450EG			
0467	REF	1			20,3162	53'544 1		DXCH	AOSU			
0468					20,3163	0 0003 1		RELINT				
0469	REF	66	LAST	1484	20,3164	3 0111 0		CA	DAPBOOLS			
0470	REF	7	LAST	1447	20,3165	7 4744 0		MASK	DRIFTBIT	ZERO DURING	ULLAGE AND POWERED FLIGHT.	
0471	REF	533	LAST	1490	20,3166	10 000 0		CCS	A	IF DRIFTING FLIGHT,		
0472	REF	179	LAST	1487	20,3167	3 4753 1		CA	ONE	SET DRIFTER TO 1		
0473	REF	1			20,3170	54 116 0		TS	ORIFTER	SAVE TO TEST FOR DRIFTING FLIGHT LATER		
0474	REF	6	LAST	1482	20,3171	6 1501 1		AD	ALLOWGTS	NON-ZERO IF DRIFT OR GTS NEAR		
0475	REF	534	LAST	1490	20,3172	10 000 0		CCS	A			
0476	REF	1			20,3173	3 3653 1		CA	FLATVAL	DRIFTING FLIGHT, STORE .B IN FLAT		
0477	REF	1			20,3174	54 151 0		TS	FLATEMP	IN POWERED FLIGHT, STORE ZERO IN FLAT		
0478					20,3175	0 0006 1		EXTEND				
0479	REF	1			20,3176	1 3202 0		BZF	OOPAXIS	IF POWERED AND NO GTS, START P AXIS,		
0480	REF	2	LAST	1490	20,3177	10 116 0		CCS	DRIFTER	OTHERWISE SET ZONE3LIM		
0481	REF	1			20,3200	3 3652 0		CA	ZONE3MAX	17.5 MS , SCALED AT 4 SECONDS.		
0482	REF	1			20,3201	54 152 0		TS	Z3TEM			
0483	REF	10	LAST	1488	20,3202	3 1530 0	DOPAXIS	CA	IJACC	IJACC AT PI/4 = 2JACC AT PI/2 =		
A0484										ANET AT PI/2 = ANET/ACOAST AT 2(6).		
0485	REF	41	LAST	1470	20,3203	6 4743 0		AD	BIT9	1 + ANET/ACOAST AT 2(6)		
0486	REF	1			20,3204	54 157 0		TS	FUNTEM			
0487	REF	11	LAST	1								

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0488 REE 1 20,3206 0 3570 0
 0489 20,3207 0 0004 0
 0490 REF 3 LAST 1488 20,3210 55'551 0
 0491 REE 4 LAST 1491 20,3211 55'552 0

TC INVERT
 INHINT
 TS 1/ANETP
 TS 1/ANETP +1

P AXIS DATA MUST BE CONSISTENT
 SCALED AT 2(7)/PI.

0492 REF 42 LAST 1490 20,3212 4 4743 1
 0493 20,3213 0 0006 1
 0494 REE 5 LAST 1491 20,3214 7 1551 0
 0495 20,3215 0 0006 1
 0496 REF 2 LAST 1490 20,3216 10 157 0
 0497 REF 1 20,3217 55'557 0
 0498 REF 2 LAST 1491 20,3220 55'560 1

CS BIT9
 EXTEND
 MP 1/ANETP
 EXTEND
 DV FUNTEM
 TS PACCFUN
 TS PACCFUN +1

-1 AT 2(6)
 -1/ANET AT 2(13)/PI
 -1/(ANET + ANET**2/ACOAST) AT 2(7)/PI

0499 REF 1 20,3221 3 4733 1
 0500 REF 1 20,3222 55'553 1
 0501 REF 2 LAST 1491 20,3223 55'554 0
 0502 20,3224 0 0003 1

CA 1/.03
 TS 1/ACOSTP
 TS 1/ACOSTP +1
 RELINT

NO AOS FOR P AXIS, ACOAST = AMIN

0503 20,3225 22 007 0
 0504 REF 3 LAST 1490 20,3226 10 116 0
 0505 REF 2 LAST 1490 20,3227 53'544 1

ZL
 CCS DRIFTER
 DXCH ADSU

ZERO ADSU, V IE IN DRIFT, JUST TO BE SURE

0506 REF 312 LAST 1484 20,3230 3 4755 1 UAXIS
 0507 REF 1 20,3231 54 154 0

CA ZERO
 TS JV

DO U AXIS COMPUTATIONS
 ZERO FOR U AXIS, ONE FOR V AXIS.

0508 REF 1 20,3232 54 163 1 BOTHAXES
 0509 REF 2 LAST 1491 20,3233 50 154 1
 0510 REF 3 LAST 1491 20,3234 11'543 0
 0511 REF 180 LAST 1490 20,3235 6 4753 1
 0512 20,3236 1 3241 1
 0513 REF 181 LAST 1491 20,3237 6 4753 1
 0514 REF 2 LAST 1491 20,3240 24 163 0
 0515 REF 1 20,3241 54 162 0
 0516 REF 3 LAST 1491 20,3242 4 0163 1
 0517 REF 1 20,3243 54 164 0

TS SIGNAOS
 INDEX UV
 CCS ADSU
 AD ONE
 TCF +3
 AD ONE
 INCR SIGNAOS
 TS ABSAOS
 CS SIGNAOS
 TS -SIGNAOS

CODING COMMON TO U,V AXES
 PICK UP ABS(ADSU OR ADSV)
 RESTORE TO PROPER VALUE
 AND LEAVE SIGNAOS AT ZERO
 NEGATIVE, RESTORE TO PROPER VALUE
 AND SET SIGNAOS TO ONE TO SHOW AOS NEG
 SAVE ABS(AOS)
 USED AS AN INDEX

0518 REF 2 LAST 1490 20,3244 3 1346 1
 0519 REF 1 20,3245 54 143 0
 0520 REE 1 20,3246 54 144 1

CA DBVAL1
 TS DBB1
 TS DBB2

SET DB1, DB2 TO DBVAL1 (= DB)

0521 REF 2 LAST 1491 20,3247 3 0162 1
 0522 REF 1 20,3250 6 3654 0
 0523 20,3251 0 0006 1
 0524 REF 1 20,3252 6 3322 1
 0525 REE 2 LAST 1490 20,3253 10 151 0 BIGAOS
 0526 REF 1 20,3254 1 3265 1

CA ABSAOS
 AD -.03R/S2
 EXTEND
 BZMF NOTMUCH
 CCS FLATEMP
 TCF SKIPDB1

TEST MAGNITUDE OF ABS(AOS)
 ABS(AOS) LESS THAN AMIN
 ABS(AOS) GREATER THAN AMIN
 1 DRIFT OR GTS, DO NOT COMPUTE DB

0527 REF 3 LAST 1491 20,3255 3 1346 1
 0528 REE 2 LAST 1491 20,3256 50 164 1

CA DBVAL1
 INDEX -SIGNAOS

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0529	REF	2	LAST	1491	20,3257	26 144 1	ADS	DBB2	DB2(1) = 2 DB	
0530	REF	4	LAST	1491	20,3260	50 163 0	INDEX	SIGNAOS		
0531	REF	1			20,3261	54 145 0	TS	DBB4	DB4(3) = 1 DB	
0532	REF	2	LAST	1490	20,3262	3 0114 0	CA	DBVAL2		
0533	REF	3	LAST	1491	20,3263	50 164 1	INDEX	-SIGNAOS		
0534	REF	1			20,3264	54 146 0	TS	DBB3	DB3(4) = -.75 DB	
0535	REF	3	LAST	1491	20,3265	3 0162 1	SKIPDB1	CA	ABSAOS	ABS(AOS) GREATER THAN AMIN, SO IT IS
0536	REF	2	LAST	1491	20,3266	0 3570 0		TC	INVERT	ALL RIGHT TO DIVIDE
0537	REF	4	LAST	1492	20,3267	50 164 1		INDEX	-SIGNAOS	
0538	REF	1			20,3270	54 130 1		TS	1/ACOSTT +1	1/ACOSTPOS(NEG) = 1/ABS(AOS)
0539	REF	2	LAST	1491	20,3271	3 4733 1		CA	1/.03	
0540	REF	5	LAST	1492	20,3272	50 163 0		INDEX	SIGNAOS	
0541	REF	2	LAST	1492	20,3273	54 127 1		TS	1/ACOSTT	1/ACOSTNEG(POS) = 1/AMIN
0542	REF	4	LAST	1492	20,3274	3 0162 1		CA	ABSAOS	
0543	REF	2	LAST	1482	20,3275	6 1533 0		AD	1JACCU	
0544	REF	3	LAST	1492	20,3276	6 1533 0		AD	1JACCU	2 JACC + ABS(AOS)
0545	REF	43	LAST	1491	20,3277	6 4743 0		AD	BIT9	MAXIMUM VALUE IN COMPUTATIONS
0546	REF	535	LAST	1490	20,3300	54 000 0		TS	A	TEST FOR OVERFLOW
0547	REF	1			20,3301	1 3346 1		TCF	SKIPDB2	NO OVERFLOW, DO NORMAL COMPUTATION
0548	REF	5	LAST	1492	20,3302	3 0162 1		CA	ABSAOS	RESCALE TO P1 TO PREVENT OVERFLOW
0549					20,3303	0 0006 1		EXTEND		
0550	REF	92	LAST	1459	20,3304	7 4736 0		MP	BIT14	
0551	REF	4	LAST	1492	20,3305	6 1533 0		AD	1JACCU	1 JACC AT P1/2 = 2JACC AT P1
0552	REF	1			20,3306	54 157 0		TS	ANET	ANETPOS(NEG) MAX SCALED AT P1 =
A0553										ANETPOS(NEG) MAX/ACOSTNEG(POS) AT 2(7)
0554	REF	43	LAST	1437	20,3307	6 4744 1		AD	BIT8	1 + ANETPOS/ACOSTNEG AT 2(7)
0555	REF	2	LAST	1492	20,3310	56 157 1		XCH	ANET	SAVE IN ANET, WHILE PICKING UP ANET
0556	REF	3	LAST	1492	20,3311	0 3570 0		TC	INVERT	
0557					20,3312	0 0006 1		EXTEND		
0558	REF	93	LAST	1492	20,3313	7 4736 0		MP	BIT14	SCALE 1/ANET AT 2(7)/P1
0559	REF	1			20,3314	54 160 1		TS	1/ANET	
0560	REF	1			20,3315	3 3321 1		CA	ACCHERE	SET UP RETURN FROM COMPUTATION ROUTINE
0561	REF	1			20,3316	54 161 0		TS	ARET	
0562	REF	44	LAST	1492	20,3317	4 4744 0		CS	BIT8	-1 AT 2(7)
0563	REF	1			20,3320	1 3623 1		TCF	DOACCFUN	FINISH ACCFUN COMPUTATION
0564	REF	1			20,3321	1 3353 0	ACCHERE	TCF	ACCTHERE	
0565	REF	304	LAST	1490	20,3322	54 001 1	NOTMUCH	TS	L	ABS(AOS) LESS THAN AMIN, SAVE IN L
0566	REF	3	LAST	1492	20,3323	3 4733 1		CA	1/.03	ACOSTPOS, NEG = AMIN
0567	REF	3	LAST	1492	20,3324	54 127 1		TS	1/ACOSTT	
0568	REF	4	LAST	1492	20,3325	54 130 1		TS	1/ACOSTT +1	
0569	REF	3	LAST	1491	20,3326	10 151 0		CCS	FLATEMP	
0570	REF	2	LAST	1492	20,3327	1 3346 1		TCF	SKIPDB2	DO NOT COMPUTE DB IF DRIFT OR GTS

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0571	REF	1		20,3330	3 4744 1		CA	.0125RS	AMIN/2
0572	RFF	305	LAST 1492	20,3331	6 0001 0		AO	L	L HAS ABS(AOS) - AMIN
0573				20,3332	0 0006 1		EXTEND		RESULT IS ABS(AOS) - AMIN/2
0574	REF	1		20,3333	6 3343 0		BZMF	NOAOS	ABS(AOS) LESS THAN AMIN/2
0575	RFF	2	LAST 1490	20,3334	3 0115 1	SOMEAOS	CA	DBVAL3	AMIN/2 LT ABS(AOS) LT AMIN
0576	REF	5	LAST 1492	20,3335	50 164 1		INDEX	-SIGNAOS	
0577	REF	2	LAST 1492	20,3336	54 146 0		TS	ORB3	DB3(4) = DB/2
0578	REF	536	LAST 1492	20,3337	6 0000 1		AD	A	
0579	RFF	6	LAST 1492	20,3340	50 163 0		INOEX	SIGNAOS	
0580	REF	2	LAST 1492	20,3341	54 145 0		TS	ORB4	OB4(3) = DB
0581	REF	3	LAST 1492	20,3342	1 3346 1		TCF	SKIP0B2	
0582	REF	4	LAST 1491	20,3343	3 1346 1	NOAOS	CA	OBVAL1	
0583	REF	3	LAST 1493	20,3344	54 146 0		TS	DBB3	DB3,4 = OB
0584	RFF	3	LAST 1493	20,3345	54 145 0		TS	DBB4	
0585	REF	6	LAST 1492	20,3346	3 0162 1	SKIPDB2	CA	ABSAOS	ANETPOS(NEG) MAX = 2 JACC + ABS(AOS)
0586	REF	5	LAST 1492	20,3347	6 1533 0		AD	1JACCU	
0587	RFF	6	LAST 1493	20,3350	6 1533 0		AD	1JACCU	
0588	REF	3	LAST 1492	20,3351	54 157 0		TS	ANET	CANNOT OVERFLOW HERE
0589	REF	1		20,3352	0 3614 1	CL1/NET+	TC	D01/NET+	COMPUTE 1/ANET, ACCFUN
0590	REF	6	LAST 1493	20,3353	50 164 1	ACCTHERE	INDEX	-SIGNAOS	
0591	RFF	1		20,3354	54 134 0		TS	ZSTEM +2	STORE ACCFUN IN TEMPORARY BUFFER
0592	REF	2	LAST 1492	20,3355	3 0160 0		CA	1/ANFT	
0593	REF	7	LAST 1493	20,3356	50 164 1		INDEX	-SIGNAOS	
0594	RFF	1		20,3357	54 126 0		TS	1/ATEM2 +2	STORE 1/ANET IN TEMPORARY BUFFER
0595	REF	7	LAST 1493	20,3360	3 0162 1		CA	ABSAOS	SEE IF OVERFLOW IN MIN CASE
0596	REF	7	LAST 1493	20,3361	6 1533 0		AO	1JACCU	
0597	REF	44	LAST 1492	20,3362	6 4743 0		AO	BIT9	MAXIMUM POSSIBLE VALUE
0598	REF	537	LAST 1493	20,3363	54 000 0		TS	A	OVERFLOW POSSIBLE BUT REMOTE
0599				20,3364	1 3366 0		TCF	+2	
0600	REF	43	LAST 1488	20,3365	3 4733 1		CA	POS MAX	IF OVERFLOW, TRUNCATE TO PI/2
0601	REF	2	LAST 1491	20,3366	6 3654 0		AD	-.03R/S2	RESTORE TO CORRECT VALUE
0602	REF	4	LAST 1493	20,3367	54 157 0		TS	ANET	
0603	REF	2	LAST 1493	20,3370	0 3614 1		TC	D01/NET+	COMPUTE 1/ANET, ACCFUN
0604	RFF	8	LAST 1493	20,3371	50 164 1		INOEX	-SIGNAOS	STORE MIN VALUES JUST AS MAX VALUES
0605	REF	2	LAST 1493	20,3372	54 132 0		TS	ZSTEM	
0606	REF	3	LAST 1493	20,3373	3 0160 0		CA	1/ANET	
0607	RFF	9	LAST 1493	20,3374	50 164 1		INOEX	-SIGNAOS	
0608	RFF	2	LAST 1493	20,3375	54 124 1		TS	1/ATEM2	
0609	RFF	8	LAST 1493	20,3376	4 0162 0		CS	ABSAOS	NOW 00 NEG(POS) CASES
0610	REF	8	LAST 1493	20,3377	6 1533 0		AD	1JACCU	
0611	REF	9	LAST 1493	20,3400	6 1533 0		AD	1JACCU	ANETNEG(POS) MAX
0612	REF	1		20,3401	0 3602 0		TC	1/ANFT-	COMPUTE 1/ANET, ACCFUN, AND ACCSW

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0613	REF	7	LAST	1493	20,3402	50 163 0	INDEX	SIGNAOS	STORE NEG(PDS) VALUES JUST AS PDS(NEG)
0614	REF	1			20,3403	54 133 1	TS	ZITEM +2	
0615	REF	306	LAST	1493	20,3404	54.001 1	TS	L	SAVE IN L FOR POSSIBLE FUTURE USE
0616	REF	4	LAST	1493	20,3405	3 0160 0	CA	1/ANET	
0617	REF	8	LAST	1494	20,3406	50 163 0	INDEX	SIGNAOS	
0618	REF	1			20,3407	54 125 0	TS	1/ATEM1 +2	
0619	REF	9	LAST	1493	20,3410	4 0162 0	CS	ABSAOS	
0620	REF	10	LAST	1493	20,3411	6 1533 0	AD	1JACCU	1/ANETNEG(PDS) MIN
0621	REF	5	LAST	1493	20,3412	54 157 0	TS	ANET	
0622	REF	3	LAST	1493	20,3413	6 3654 0	AD	-.03R/S2	TEST FDR AMIN
0623					20,3414	0 0006 1	EXTEND		IF ANET LESS THAN AMIN, STORE MAX JET
0624	REF	1			20,3415	6 3633 1	BZMF	FIXMIN	VALUES FOR MIN JETS AND SET ACCSW
0625	REF	1			20,3416	0 3610 0	TC	1/NETMIN	OTHERWISE DO MIN JET COMPUTATIONS
0626	REF	9	LAST	1494	20,3417	50 163 0	INDEX	SIGNAOS	STORE VALUES
0627	REF	2	LAST	1494	20,3420	54 131 0	TS	ZITEM	
0628	REF	5	LAST	1494	20,3421	3 0160 0	CA	1/ANET	
0629	REF	10	LAST	1494	20,3422	50 163 0	INDEX	SIGNADS	
0630	REF	2	LAST	1494	20,3423	54 123 0	TS	1/ATEM1	
0631	REF	3	LAST	1491	20,3424	50 154 1	INDEX	UV	
0632	REF	1			20,3425	3 3660 1	CA	+UMASK	
0633	REF	9	LAST	1452	20,3426	7 1262 1	MASK	CH5MASK	TEST FDR +U (+V) JET FAILURES
0634					20,3427	0 0006 1	EXTEND		
0635	REF	1			20,3430	1 3435 1	BZF	FAIL-	
0636	REF	3	LAST	1493	20,3431	3 0124 0	CA	1/ATEM2	REPLACE FUNCTION VALUES DEPENDING ON THE
0637	REF	4	LAST	1494	20,3432	54 126 0	TS	1/ATEM2 +2	FAILED JET PAIR WITH CORRESPONDING DNE-
0638	REF	3	LAST	1493	20,3433	3 0132 1	CA	Z5TEM	JET (DR AMIN) FUNCTION VALUES
0639	REF	4	LAST	1494	20,3434	54 134 0	TS	Z5TEM +2	
0640	REF	4	LAST	1494	20,3435	50 154 1	INDEX	UV	
0641	REF	1			20,3436	3 3656 1	CA	-UMASK	
0642	REF	10	LAST	1494	20,3437	7 1262 1	MASK	CH5MASK	TEST FDR -U (-V) JET FAILURES
0643					20,3440	0 0006 1	EXTEND		
0644	REF	1			20,3441	1 3446 0	BZF	DBFUN	
0645	REF	3	LAST	1494	20,3442	3 0123 1	CA	1/ATEM1	REPLACE FUNCTION VALUES DEPENDING ON THE
0646	REF	4	LAST	1494	20,3443	54 125 0	TS	1/ATEM1 +2	FAILED JET PAIR WITH CORRESPONDING DNE-
0647	REF	3	LAST	1494	20,3444	3 0131 1	CA	ZITEM	JET (DR AMIN) FUNCTION VALUES
0648	REF	4	LAST	1494	20,3445	54 133 1	TS	ZITEM +2	
0649	REF	4	LAST	1493	20,3446	4 0146 0	CS	DBB3	COMPUTE AXISDIST
0650	REF	2	LAST	1491	20,3447	6 0143 1	AD	DBB1	
0651	REF	4	LAST	1492	20,3450	6 0151 1	AD	FLATEMP	
0652	REF	1			20,3451	54 147 1	TS	AXDSTEM	
0653	REF	4	LAST	1493	20,3452	4 0145 0	CS	DBB4	
0654	REF	3	LAST	1492	20,3453	6 0144 0	AD	DBB2	
0655	REF	5	LAST	1494	20,3454	6 0151 1	AD	FLATEMP	
0656	REF	2	LAST	1494	20,3455	54 150 1	TS	AXDSTEM +1	

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0657				20,3456	0 0004 0		INHINT		
0658	REF	5	LAST 1494	20,3457	10 154 0		CCS	UV	TEST FOR U OR V AXIS
0659	REF	1		20,3460	1 3502 1		TCF	STORV	V AXIS STORE V VALUES
0660	REF	1		20,3461	3 0122 0		CA	ACCSW	U AXIS STORE U VALUES
0661	REF	3	LAST 1458	20,3462	55'547 1		TS	ACCSWU	
0662	REF	1		20,3463	3 4320 1		CA	NINE	TRANSFER 10 WORDS VIA GENTRAN
0663	REF	3	LAST 1373	20,3464	0 5545 0		TC	GENTRAN +1	
0664	REF	5	LAST 1494	20,3465	00123 1		ADRES	1/ATEM1	TEMPORARY BUFFER
0665	REF	12	LAST 1463	20,3466	01567 1		ADRES	1/ANET1	THE REAL PLACE
0666				20,3467	0 0003 1		RELINT		
0667	REF	3	LAST 1494	20,3470	52 144 1		DXCH	DBB1	SAVE U DBS FOR LATER STORING
0668	REF	1		20,3471	52 136 1		DXCH	UDB1	
0669	REF	5	LAST 1494	20,3472	52 146 0		DXCH	DBB4	
0670	REF	1		20,3473	52 140 0		DXCH	UDB4	
0671	REF	3	LAST 1494	20,3474	52 150 1		DXCH	AXDSTEM	
0672	REF	1		20,3475	52 142 1		DXCH	UAXDIST	
0673	REF	182	LAST 1491	20,3476	3 4753 1		CA	ONE	NOW DO V AXIS
0674	REF	6	LAST 1495	20,3477	54 154 0		TS	UV	
0675	REF	313	LAST 1491	20,3500	3 4755 1		CA	ZERO	
0676	REF	1		20,3501	1 3232 0		TCF	BOTHAXES	AND DO IT AGAIN
0677	REF	2	LAST 1495	20,3502	3 0122 0	STORV	CA	ACCSW	STORE V AXIS VALUES
0678	REF	1		20,3503	55'550 1		TS	ACCSWV	
0679	REF	2	LAST 1495	20,3504	3 4320 1		CA	NINE	
0680	REF	4	LAST 1495	20,3505	0 5545 0		TC	GENTRAN +1	
0681	REF	6	LAST 1495	20,3506	00123 1		ADRES	1/ATEM1	TEMPORARY BUFFER
0682	REF	13	LAST 1495	20,3507	01607 1		ADRES	1/ANET1 +160	THE REAL PLACE
A0683									NOW STORE DEADBANDS FOR ALL AXES
0684	REF	6	LAST 1494	20,3510	52 152 0		DXCH	FLATEMP	FLAT AND ZONE3LIM
0685	REF	3	LAST 1460	20,3511	53'556 1		DXCH	FLAT	
0686	REF	5	LAST 1493	20,3512	3 1346 1		CA	DBVAL1	COMPUTE P AXIS DEADBANDS
0687	REF	1		20,3513	55'561 0		TS	PDB1	
0688	REF	1		20,3514	55'562 0		TS	PDB2	
0689	REF	4	LAST 1495	20,3515	6 1555 0		AD	FLAT	
0690	REF	1		20,3516	55'564 0		TS	PDB3	
0691	REF	1		20,3517	55'563 1		TS	PDB4	
0692	REF	314	LAST 1495	20,3520	3 4755 1		CA	ZERO	
0693	REF	1		20,3521	55'565 1		TS	PAXDIST	
0694	REF	2	LAST 1495	20,3522	55'566 1		TS	PAXDIST +1	
0695	REF	5	LAST 1495	20,3523	11'555 1		CCS	FLAT	DRIFT OR GTS - COMPUTE DBS
0696	REF	1		20,3524	1 3542 0		TCF	DRFDB	

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0697	REF	2	LAST	1495	20,3525	52 136 1		DXCH	JDB1	STORE U DEADBANDS
0698	REF	5	LAST	1463	20,3526	53'602 0		DXCH	FIREDB	CANNOT USE GENTRAN BECAUSE OF RELINT
0699	REF	2	LAST	1495	20,3527	52 140 0		DXCH	JDB4	
0700	REF	2	LAST	1457	20,3530	53'604 0		DXCH	COASTDB	
0701	REF	2	LAST	1495	20,3531	52 142 1		DXCH	UAXDIST	
0702	REF	3	LAST	1460	20,3532	53'606 1		DXCH	AXISDIST	
0703	REF	4	LAST	1495	20,3533	52 144 1		DXCH	DBB1	STORE V AXIS DEADBANDS
0704	REF	6	LAST	1496	20,3534	53'622 1		DXCH	FIREDB +16D	CULD USE GENTRAN IF DESIRED
0705	REF	6	LAST	1495	20,3535	52 146 0		DXCH	DBB4	
0706	REF	3	LAST	1496	20,3536	53'624 1		DXCH	COASTDB +16D	
0707	REF	4	LAST	1495	20,3537	52 150 1		DXCH	AXDSTEM	
0708	REF	4	LAST	1496	20,3540	53'626 0		DXCH	AXISDIST +16D	
0709	REF	2	LAST	1484	20,3541	1 3562 1		TCF	1/ACCRET +1	ALL DDNE
0710	REF	6	LAST	1495	20,3542	3 1346 1	DRFDB	CA	DBVAL1	DRIFT DEADBANDS
0711	REF	7	LAST	1496	20,3543	55'601 0		TS	FIREDB	
0712	REF	8	LAST	1496	20,3544	55'602 0		TS	FIREDB +1	
0713	REF	9	LAST	1496	20,3545	55'621 1		TS	FIREDB +16D	
0714	REF	10	LAST	1496	20,3546	55'622 1		TS	FIREDB +17D	
0715	REF	6	LAST	1495	20,3547	6 1555 0		AD	FLAT	
0716	REF	4	LAST	1496	20,3550	55'603 1		TS	COASTDB	
0717	REF	5	LAST	1496	20,3551	55'604 0		TS	COASTDB +1	
0718	REF	6	LAST	1496	20,3552	55'623 0		TS	COASTDB +16D	
0719	REF	7	LAST	1496	20,3553	55'624 1		TS	COASTDB +17D	
0720	REF	315	LAST	1495	20,3554	3 4755 1		CA	ZERO	
0721	REF	5	LAST	1496	20,3555	55'605 1		TS	AXISDIST	
0722	REF	6	LAST	1496	20,3556	55'606 1		TS	AXISDIST +1	
0723	REF	7	LAST	1496	20,3557	55'625 0		TS	AXISDIST +16D	
0724	REF	8	LAST	1496	20,3560	55'626 0		TS	AXISDIST +17D	
0725					20,3561	0 0004 0	1/ACCRET	INHINT		
0726	REF	67	LAST	1490	20,3562	4 0111 1		CS	DAPBODLS	SET BIT TO INDICATE DATA GOOD.
0727	REF	3	LAST	1406	20,3563	7 4751 1		MASK	ACCSOKAY	
0728	REF	68	LAST	1496	20,3564	26 111 1		ADS	DAPBODLS	
0729					20,3565	0 0003 1		RELINT		
0730	REF	2	LAST	1480	20,3566	3 0117 0		CA	ACCRETRN	
0731	REF	23	LAST	1364	20,3567	0 4640 1		TC	BANKJUMP	RETURN TO CALLER
0732	REF	1			20,3570	54 165 1	INVERT	TS	HOLD	ROUTINE TO INVERT -INPUT AT PI/2
0733	REF	45	LAST	1493	20,3571	3 4743 0		CA	BIT9	1 AT 2(6)
0734					20,3572	22 007 0		ZL		ZERO L FDR ACCURACY AND TO PREVENT OVFL0
0735					20,3573	0 0006 1		EXTEND		
0736	REF	2	LAST	1496	20,3574	10 165 1		OV	HOLD	
0737	REF	440	LAST	1486	20,3575	0 0002 0		TC	Q	RESULT AT 2(7)/PI
0738	REF	316	LAST	1496	20,3576	3 4755 1	DOWNGTS	CAF	ZERO	ZERO SWITCHES WHEN USEQRJTS BIT IS UP
0739	REF	7	LAST	1490	20,3577	55'501 0		TS	ALLOWGTS	OR DAP IS OFF.
0740	REF	8	LAST	1490	20,3600	55'631 0		TS	INGTS	
0741	REF	2	LAST	1484	20,3601	1 2721 0		TCF	DOCKTEST	

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0742				20,3602	22 007 0	1/ANET-	ZL		
0743	RFF	3	LAST 1495	20,3603	22 122 0		LXCH	ACCSW	ZERO ACCSW
0744	REF	6	LAST 1494	20,3604	54 157 0		TS	ANET	SAVE ANET
0745	REF	4	LAST 1494	20,3605	6 3654 0		AD	-.03R/S2	TEST FOR MIN VALUE
0746				20,3606	0 0006 1		EXTEND		
0747	REF	1		20,3607	6 3630 1		BZMF	NETNEG	ANET LESS THAN AMIN, SO FAKE IT
0748	REF	7	LAST 1497	20,3610	3 0157 1	1/NETMIN	CA	ANET	
0749				20,3611	0 0006 1		EXTEND		
0750	REF	10	LAST 1493	20,3612	5 0164 1		INDEX	-SIGNAOS	
0751	REF	5	LAST 1492	20,3613	7 0130 1		MP	1/ACOSTT +1	ANETNEG(POS)/ACOSTPOS(NEG) AT 2(6)

A0752

THE FOLLOWING CODING IS VALID FOR BOTH POS OR NEG
VALUES OF AOS

A0753

0754	REF	46	LAST 1496	20,3614	6 4743 0	DOL/NET+	AD	BIT9	1 + ANET/ACOST AT 2(6)
0755	REF	8	LAST 1497	20,3615	56 157 1		XCH	ANET	SAVE AND PICK UP ANET
0756				20,3616	0 0006 1		EXTEND		
0757	REF	2	LAST 1492	20,3617	22 161 1		QXCH	ARFT	SAVE RETURN
0758	REF	4	LAST 1492	20,3620	0 3570 0		TC	INVERT	
0759	REF	6	LAST 1494	20,3621	54 160 1		TS	1/ANET	1/ANET AT 2(7)/PI
0760	REF	47	LAST 1497	20,3622	4 4743 1		CS	BIT9	-1 AT 2(6)
0761				20,3623	0 0006 1	DOACCFUN	EXTEND		
0762	REF	7	LAST 1497	20,3624	7 0160 1		MP	1/ANET	-1/ANET AT 2(13)/PI
0763				20,3625	0 0006 1		EXTEND		
0764	REF	9	LAST 1497	20,3626	10 157 0		DV	ANET	ACCFUN AT 2(7)/PI
0765	REF	3	LAST 1497	20,3627	0 0161 1		TC	ARFT	RETURN
0766	REF	5	LAST 1497	20,3630	4 3654 1	NETNEG	CS	-.03R/S2	ANET LESS THAN AMIN - SET EQUAL TO AMIN
0767	REF	10	LAST 1497	20,3631	54 157 0		TS	ANET	
0768	REF	2	LAST 1494	20,3632	1 3611 0		TCF	1/NETMIN +1	CONTINUE AS IF NOTHING HAPPENED

0769	REF	11	LAST 1494	20,3633	10 163 1	FIXMIN	CCS	SIGNAOS	
0770	REF	112	LAST 1482	20,3634	3 4752 0		CA	TWJ	IF AOS NEG, ACCSW = +1
0771	REF	15	LAST 1467	20,3635	6 7746 0		AD	NEGONE	IF AOS POS, ACCSW = -1
0772	REF	4	LAST 1497	20,3636	54 122 1		TS	ACCSW	
0773	REF	7	LAST 1495	20,3637	6 0154 1		AD	JV	IF ACCSW = +1, TEST FOR +U (+V) JET FAIL
0774	REF	538	LAST 1493	20,3640	50 000 1		INDEX	A	IF ACCSW = -1, TEST FOR -U (-V) JET FAIL
0775	REF	2	LAST 1494	20,3641	3 3657 0		CA	-UMASK +1	
0776	RFF	11	LAST 1494	20,3642	7 1262 1		MASK	CH5MASK	
0777				20,3643	0 0006 1		EXTEND		
0778				20,3644	1 3650 0		BZMF	+4	
0779	RFF	6	LAST 1497	20,3645	4 3654 1		CS	-.03R/S2	JET FAILURE - CANNOT USE 2-JET VALUES
0780	REF	11	LAST 1497	20,3646	54 157 0		TS	ANET	ANET = AMIN
0781	REF	1		20,3647	1 3416 0		TCF	STMIN- -1	CALCULATE FUNCTIONS USING AMIN
0782	REF	307	LAST 1494	20,3650	3 0001 0		CA	L	L HAS ACCFUN
0783	REF	2	LAST 1497	20,3651	1 3417 1		TCF	STMIN-	STORE MAX VALUES FOR MIN JETS

A0784

ERASABLE ASSIGNMENTS FOR 1/ACCONT

L ADSTASK AND AOSJDB

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0785	REF	5	LAST	149	E6,1551	1/ANETP	EQUALS	BLOCKTOP	+2	
0786	REE	6	LAST	1498	E6,1553	1/ACOSTP	EQUALS	BLOCKTOP	+4	
0787	REF	7	LAST	1498	E6,1557	PACCFUN	EQUALS	BLOCKTOP	+8D	
0788	REE	8	LAST	1498	E6,1561	PDB1	EQUALS	BLOCKTOP	+10D	
0789	REF	9	LAST	1498	E6,1562	PDB2	EQUALS	BLDCKTOP	+11D	
0790	REF	10	LAST	1498	E6,1563	PDB4	EQUALS	BLDCKTOP	+12D	
0791	REE	11	LAST	1498	E6,1564	PDB3	EQUALS	BLDCKTOP	+13D	
0792	REE	12	LAST	1498	E6,1565	PAXDIST	EQUALS	BLDCKTOP	+14D	
0793	REE	71	LAST	1259	0122	ACCSW	EQUALS	VBUF		EXECUTIVE TEMPORARIES
A0794										CANNOT DO CCS NEWJDB DURING 1/ACCS
0795	REF	5	LAST	1497	0123	1/ATEM1	EQUALS	ACCSW	+1	TEMP BUEEER FOR U AND V AXES
0796	REF	7	LAST	1495	0124	1/ATEM2	EQUALS	1/ATEM1	+1	
0797	REF	8	LAST	1498	0127	1/ACDSTT	EQUALS	1/ATEM1	+4	
0798	REF	9	LAST	1498	0131	Z1TEM	EQUALS	1/ATEM1	+6	
0799	REF	10	LAST	1498	0132	Z5TEM	EQUALS	1/ATEM1	+7	
0800	REF	11	LAST	1498	0135	UDB1	EQUALS	1/ATEM1	+10D	U AXIS DEADBAND BUFFER
0801	REF	12	LAST	1498	0136	UDB2	EQUALS	1/ATEM1	+11D	
0802	REF	13	LAST	1498	0137	UDB4	EQUALS	1/ATEM1	+12D	
0803	REF	14	LAST	1498	0140	UDB3	EQUALS	1/ATEM1	+13D	
0804	REF	15	LAST	1498	0141	UAXDIST	EQUALS	1/ATEM1	+14D	
0805	REF	16	LAST	1498	0143	DBB1	EQUALS	1/ATEM1	+16D	TEMP DEADBAND BUFFER, ALSO V AXIS
0806	REF	17	LAST	1498	0144	DBB2	EQUALS	1/ATEM1	+17D	
0807	REF	18	LAST	1498	0145	DBB4	EQUALS	1/ATEM1	+18D	
0808	REF	19	LAST	1498	0146	DBB3	EQUALS	1/ATEM1	+19D	
0809	REF	20	LAST	1498	0147	AXDSTEM	EQUALS	1/ATEM1	+20D	
0810	REF	21	LAST	1498	0151	FLATEMP	EQUALS	1/ATEM1	+22D	
0811	REF	22	LAST	1498	0152	Z3TEM	EQUALS	1/ATEM1	+23D	MUST FOLLOW FLATEMP
0812	REF	5	LAST	1490	0146	DBVAL1	EQUALS	DB		
0813	REF	5	LAST	615	0114	DBVAL2	EQUALS	INTB15+		
0814	REF	6	LAST	1498	0115	DBVAL3	EQUALS	INTB15+	+1	
0815	REF	7	LAST	1498	0116	DRIFTER	EQUALS	INTB15+	+2	
0816	REF	877	LAST	1489	0154	UV	EQUALS	MPAC		
0817	REF	878	LAST	1498	0157	ANET	EQUALS	MPAC	+3	
0818	REF	879	LAST	1498	0157	FUNTEM	EQUALS	MPAC	+3	
0819	REF	880	LAST	1498	0160	1/ANET	EQUALS	MPAC	+4	
0820	REF	881	LAST	1498	0161	ARET	EQUALS	MPAC	+5	
0821	REF	882	LAST	1498	0162	ABSADS	EQUALS	MPAC	+6	
0822	REF	883	LAST	1498	0163	SIGNADS	EQUALS	MPAC	+7	
0823	REF	884	LAST	1498	0164	-SIGNADS	EQUALS	MPAC	+8D	
0824	REF	885	LAST	1498	0165	HDLD	EQUALS	MPAC	+9D	
0825	REF	59	LAST	1396	0117	ACCRETRN	EQUALS	FIXLOC	-1	

L AOSTASK AND AOSJOB

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0826		20,3652	00110 1	ZONE3MAX	DEC	.004375
0827		20,3653	00443 1	FLATVAL	DEC	.01778
0828		20,3654	77377 1	-.03R/S2	OCT	77377

17.5 MS (35 MS FOR 1 JET) AT 4 SECONDS
 .8 AT PI/4 RAD
 -PI/2(7) AT PI/2

0829	REF 45	LAST 1492	4744	.0125RS	EQUALS BIT8
0830	REF 44	LAST 1493	4733	1/.03	EQUALS POSMAX

PI/2(+8) AT PI/2
 2(7)/PI AT 2(7)/PI

0831	REF 2	LAST 1408	20,3655	02210 0	PAXISADR GENADR PAXIS
------	-------	-----------	---------	---------	-----------------------

A0832

A0833

0834		20,3656	00110 1	-UMASK	OCT	00110
0835		20,3657	00022 1		OCT	00022
0836		20,3660	00204 1	+UMASK	OCT	00204
0837		20,3661	00041 1		OCT	00041

THE FOLLOWING 4 CONSTANTS ARE JET
 FAILURE MASKS AND ARE INDEXED

-U
 -V
 +U
 +V

L SPS BACK-UP RCS CONTROL

USER'S PAGE NO. 1 E0 S4

P0001 PROGRAM NAME: SPSRCS

R0002 ALTHOR: EDGAR M. OSHIKA (AC ELECTRONICS)

R00021 MODIFIED: TO RETURN TO ALL AXES VIA Q BY P.S.WEISSMAN, OCT 7, 1968

R0003 FUNCTIONAL DESCRIPTION:

R0004 THIS PROGRAM CONTROLS THE FIRING OF ALL RCS JETS IN THE DOCKED CONFIGURATION ACCORDING TO THE FOLLOWING PHASE
R0006 PLANE LOGIC.

R0007 1. OUTER RATE LIMIT (SPSRCS)

R0008 IF MAGNITUDE OF EDOT IS GREATER THAN 1.73 DEG/SEC SET JET FIRING TIME, TJ, TO REDUCE RATE AND THEN RETURN TO
R0010 CALLING PROGRAM (REQUESTING 4 JETS FOR P-AXIS).
R0011 OTHERWISE, CONTINUE.

R0012 2. RATE DEAD BAND TEST (JTONTST)

R0013 IF JETS ARE FIRING NEGATIVE AND RATE IS GREATER THAN -0.101 DEG/SEC, LEAVE JETS ON AND RETURN,
R0015 IF JETS ARE FIRING POSITIVE AND RATE IS LESS THAN +0.101 DEG/SEC, LEAVE JETS ON AND RETURN, OTHERWISE CONTINUE.

R0017 3. COASTING TEST (SPSSTART)

R0018 IF STATE (E,EDOT) IS BELOW LINE $E + 4 \times \text{EDOT} > -1.4 \text{ DEG}$ AND EDOT IS LESS THAN 1.30 DEG/SEC SET JET TIME POSI-
R0020 TIVE AND RETURN,
R0021 IF STATE IS ABOVE LINE $E + 4 \times \text{EDOT} > +1.4 \text{ DEG}$ AND EDOT IS GREATER THAN -1.30 DEG/SEC, SET JET TIME NEGATIVE
R0023 AND RETURN,
R0024 OTHERWISE, SET JET TIME ZERO AND RETURN.R0025 THE MINIMUM PULSE WIDTH OF THIS CONTROLLER IS DETERMINED BY THE REPETITION RATE AT WHICH THIS ROUTINE IS CALLED
R0027 AND IS NOMINALLY 100 MS FOR ALL AXES IN DRIFTING FLIGHT. DURING POWERED FLIGHT THE MINIMUM IS 100 MS FOR THE
R0029 P AXIS AND 200 MS FOR THE CONTROL OF THE U AND V AXES.

R0030 CALLING SEQUENCE:

R0031	TC	SPSRCS	FROM Q,R AXES RCS AUTOPILOT
R0032		INHINT	FROM P-AXIS RCS AUTOPILOT
R0033	TC	IBNKCALL	
R0034		CADR	SPSRCS

R0035 EXIT:

R0037 TC Q

R0038 ALARM/ABORT MODE: NONE

R0039 SUBROUTINES CALLED: NONE

R0040 INPUT: E,EDOT

L SPS BACK-UP RCS CONTROL

USER'S PAGE NO. 2 F0 S4

R0041 TJP, TJV, TJU

TJ MUST NOT BE NEGATIVE ZERO

R0042 OUTPUT: TJP, TJV, TJU
R0043 NUMBERT = 6,

WHEN RATE LIMITING P AXIS.

0044
0045 REF 5 LAST 1454 17,3700
0046 17,2000
17,3700BANK 17
SETLOC DAPS2
BANK

0047 REF 1

COUNT* \$\$/DAPBU

0048 REF 12 LAST 1452 E6,1525

0049 REF 18 LAST 1463 17,3700 3 1425 0

0050 17,3701 0 0006 1

0051 REF 1 17,3702 7 4766 0

0052 17,3703 0 0006 1

0053 REF 1 17,3704 1 3717 1

EBANK= TJU
CA EDOT

EXTEND

MP RATEFLIM1

OUTER RATE LIMIT = 1.73 DEG/SEC

EXTEND

BZF JTONTTEST

0054 REF 308 LAST 1497 17,3705 54 001 1

0055 REF 39 LAST 1481 17,3706 3 6241 0

0056 REF 21 LAST 1463 17,3707 55 741 0

0057 REF 309 LAST 1501 17,3710 10 001 1

0058 REF 1 17,3711 1 3753 1

0059 REF 23 LAST 1460 17,3712 0 5677 1

0060 REF 2 LAST 1459 17,3664

0061 REF 28 LAST 1390 17,3713 3 4736 1

RATELIM2 =

POSTHRST

TS L

CA SIX

TS NUMBERT

CCS L

TCF NEGTHRST

TC CASHOLE

.1AT4

CA HALF

**TEMP ** FILL WITH A CONSTANT
= OCT 00632, 1.125 DEG/SEC

0062 REF 31 LAST 1458 17,3714 51 476 0

0063 REF 13 LAST 1501 17,3715 55 525 0

0067 REF 441 LAST 1496 17,3716 0 0002 0

NDX AXISCTR

TS TJU

TC Q

0068 REF 32 LAST 1501 17,3717 51 476 0

0069 REF 14 LAST 1501 17,3720 11 525 0

0070 17,3721 1 3725 0

0071 REF 1 17,3722 1 3737 0

0072 REF 19 LAST 1501 17,3723 3 1425 0

0073 17,3724 1 3726 0

JTONTTEST

NDX AXISCTR

CCS TJU

TCF +4

TCF SPSSTART

CA EDOT

TCF +2

0074 REF 20 LAST 1501 17,3725 4 1425 1

00744 REF 539 LAST 1497 17,3726 22 000 1

00746 REF 69 LAST 1496 17,3727 4 0111 1

00748 REF 8 LAST 1490 17,3730 7 4744 0

0075 REF 540 LAST 1501 17,3731 10 000 0

00752 REF 1 17,3732 3 4767 0

00754 REF 310 LAST 1501 17,3733 6 0001 0

0076 17,3734 0 0006 1

0077 17,3735 6 3737 1

0078 REF 1 17,3736 1 3716 0

+4

CS EDOT

LXCH A

CS DAPPROOLS

MASK DRIFTBIT

CCS A

CA RATEDB1

AD L

EXTEND

BZMF +2

TCF POSTHRST +3

IF DRIFTBIT = 1, USE ZERO TARGET RATE

IF DRIFTBIT = 0, USE 0.10 RATE TARGET

L SPS BACK-UP RCS CONTROL

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0079	REF	21	LAST	1501	17,3737	3 1425 0	SPSSTART	CA	EDOT	
0080	REF	17	LAST	1463	17,3740	6 1750 1		AD	E	
0081					17,3741	0 0006 1		EXTEND		
0082	REF	2	LAST	228	17,3742	7 1411 0		MP	DKDB	PAD LOADED DEADBAND. FRESHSTART: 1.4 DEG
0083					17,3743	0 0006 1		EXTEND		
0084	REF	1			17,3744	1 3761 0		BZF	TJZERO	
0085					17,3745	0 0006 1		EXTEND		
0086					17,3746	6 3755 0		BZMF	+7	
0087	REF	22	LAST	1502	17,3747	3 1425 0		CA	EDOT	
0088	REF	1			17,3750	6 3664 0		AD	RATELIM2	
0089					17,3751	0 0006 1		EXTEND		
0090	REF	2	LAST	1502	17,3752	6 3761 1		BZMF	TJZERO	
0091	REF	29	LAST	1501	17,3753	4 4736 0	NEGTHRST	CS	HALF	
0092	REF	2	LAST	1501	17,3754	1 3714 1		TCF	POSTHRST +1	
0093	REF	2	LAST	1502	17,3755	4 3664 1	+7	CS	RATELIM2	
0094	REF	23	LAST	1502	17,3756	6 1425 0		AD	EDOT	
0095					17,3757	0 0006 1		EXTEND		
0096	REF	3	LAST	1502	17,3760	6 3713 1		BZMF	POSTHRST	
0097	REF	317	LAST	1496	17,3761	3 4755 1	TJZERO	CA	ZERO	
0098	REF	4	LAST	1502	17,3762	1 3714 1		TCF	POSTHRST +1	
0099	REF	5	LAST	1422	4766		RATELIM1 =	CALLCODE	= 00032, CORRESPONDING TO 1.73 DEG/SEC	
0100	REF	1			4767		RATEDB1 =	TBUILDFX	= 00045, CORRESPONDS TO 0.101 DEG/SEC	

*** END OF LMDAP .012 ***

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	F	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
.00375A8	17,3673	1463	1 1459	-.03R/S2	20,3654	1499	6 1491 1497	-UMASK	20,3656	1499	2 1494 1497
.0125RS	4744	= 1499	1 1493	-.05AT2	17,3671	1463	1 1458	-UP	00,2620	1058	1 1057
.0375AT4	17,3666	1463	1 1461	-.15AT2	17,3672	1463	1 1458	-XMIN	16,3041	1426	1 1426
.1AT2	17,3665	1463	1 1461	-AYD	E3,1713	127	1 1142	-XTRANS	17,2120	1437	1 1437
.1AT4	17,3664	1463	2 1459 1501	-AZ	21,2055	820		-0.3D/S	01,2340	311	1 309
.166...	23,3441	1252	1 1248	-AZ8IT	4746	= 821	1 820	-0.6D/S	01,2337	310	1 309
.30	11,3675	1242	1 1213	-BIT10	06,3004	196	1 192	-1/12	13,3737	1243	1 1232
.5SEC	4774	1091	3 526 1329	-BIT12	7740	= 539	1 539	-1/2+2	00,2444	1054	1 1075
.5SEC817	33,2176	609	1 609	-BIT14	7735	1093	2 1418	-1/8	7740	1093	3 539 1462
.66667	21,3446	1470	2 1469	-CCSPR	01,3127	1108	1 1110	-1CHK	43,3301	1281	5 1282 1287
.707	17,3127	1451	2 1451	-COMMAX	07,3720	1325	2 1307 1308	-100MS	16,3600	1435	2 1465
=====	=====	=====	=====	-COMMAX-	07,3721	1325	2 1307 1308	-100MST6	16,3714	1466	3 1465
(APD)	30,2311	843	2 840 843	-COSB	E5,1644	= 138	1 138	-136MST6	16,3555	1434	2 1431 1434
(AT)A	22,2004	54	1 842	-DELGMB	E6,1673	= 151	18 913 917	-15DEGS	06,2513	185	1 184
(T8UP)A	32,2006	54	1 842	-EL	21,2067	821		-150MS	17,3042	1449	1 1447
(TGD)A	32,3603	838	1 839	-ELBIT	4753	= 821	1 821	-160MST6	16,3512	1433	1 1433
(1/DV)A	32,2000	53	1 842	-ELR	05,3347	238	1 233	-2DEG	17,3662	1463	2 1456
=====	=====	=====	=====	-ENDERS	7742	1093	1 1000	-2JETLIM	E6,1473	145	4 145 1481
+AZ	21,2062	820		-ENDVAC	6250	1004	2 1000 1018	-2SEC	10,3457	1376	1 1363
+AZ8IT	4747	= 821	1 820	-FOURDEG	16,3513	1433	1 1433	-45DEGSR	7737	= 543	1 542
+DECSGN	40,2303	414	1 413	-FOURDT	27,2570	779	1 778	-50DEGSR	25,2231	543	1 543
+DOWN	00,2610	1058	1 1057	-GYROMIN	07,3473	1317	2 1317 1320	-50SC	04,2773	1181	1 1169
+EL	21,2074	821		-LINT	31,3737	826	1 825	-70DEGS	06,2512	185	1 184
+EL8IT	4752	= 821	1 821	-LONKONFG	23,2040	286		-90DEGSR	25,2232	543	1 543
+LIMIT	42,3333	435	1 435	-MAXADRS	4350	= 1280	1 1285	=====	=====	=====	=====
+MGA	E4,1656	= 133	5 329 701	-MUDT	33,2031	59	1 881	/AF/CNST	31,2444	801	1 797
+ON	40,2413	415	3 415 454	-MUDTMUN	33,2035	60	1 884	/AFC/	E7,1573	= 164	3 797 819
+QMIN	17,2223	1439	1 1438	-MUDT1	33,2033	59		/BUFE+	00,2721	1062	2 1061
+RMIN	17,2233	1439	1 1439	-OCT10	6221	1003	1 1003	/BUF-	00,2715	1061	2 1061
+TJMINt6	17,3041	1449	4 1439 1448	-OCT630	16,2304	1417	1 1417	/LAND/	E4,1736	= 136	10 135 884
+UMASK	20,3660	1499	1 1494	-ON	40,2433	416	2 415 454	/MPAC+	00,2767	1063	2 1063
+XMIN	16,3043	1426	1 1426	-PHASE1	0752	116	7 229 1295	/MPAC-	00,2763	1063	2 1063
+XORULGE	17,2117	1437	2 1436 1437	-PHASE2	0754	117	8 229 873	/NORM	00,2732	1062	1 1062
+1FPS	31,3756	827	1 319	-PHASE3	0756	117	6 229 866	/NORM2	00,2725	1062	1 1062
+150MST6	16,3575	1435	1 1431	-PHASE4	0760	117	9 229 1377	/R/MAG	E4,1674	= 135	5 135 852
+3FPS	31,3757	827	1 318	-PHASE5	0762	117	2 229 860	=====	=====	=====	=====
=====	=====	=====	=====	-PHASE6	0764	117	6 229 1388	?	6001	= 756	
*ENTER	36,3054	754	1 753	-QMIN	17,2227	1439	1 1438	?GUIDSU8	31,2514	803	1 790
N8SM	23,3577	1258	6 561 965	-RATED8	E6,1474	= 145	7 145 1441	=====	=====	=====	=====
*PROCEED	36,3051	753	1 753	-RMIN	17,2235	1439	1 1439	A	0000	= 108	540 173 1501
SMN8	23,3575	1258	8 499 964	-RRLIMIT	25,2315	546	2 547	A-PCHK	13,3157	1211	4 1208 1221
=====	=====	=====	=====	-SIGNADS	0164	= 1498	10 1491 1497	AAPEG	E5,1446	= 137	1 137
-.0112A8	17,3663	1463	1 1458	-TJMAX	17,3675	1463	2 1459 1460	AAPEG*	E5,1456	= 137	1 137
-.025AT2	17,3667	1463	1 1461	-TJMIN	17,3677	1464	1 1461	A8CLOAD	41,2616	438	1 422
-.025AT4	17,3670	1463	1 1459	-TPER	E4,1542	= 131	6 321 729	A8DELV	1246	= 121	7 121 1488

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN-DEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
ABDVCONV	E7,1511	= 162	5 162 861	ACDT+C12	16,3721	= 1470	2 1422 1474	AFCCALC2	31,3204		813
ABLOAO	41,2703	= 439	1 422	ACENTRAL	E6,1744	= 147	4 1468 1469	AFCCALC3	31,3223		813
ABORT	5644	= 1378		ACG	E4,1670	= 135	3 135 813	AFCCLENO	31,3231		813
ABORTALM	21,2310	= 837	2 837	ACMODBIT	4737	= 84		AFQUMP	31,2254		797
ABORTON	21,3253	= 906	1 906	ACMOOFLG	0040	= 84	3 508 510	AFTERTJ	17,2661	1447	3 1439 1446
ABORTS	32,2000	= 33	3 53 837	ACOS=0	00,3637	1079	4 1079 1081	AFTRLTR	30,3166	912	1 911
ABORTYZ	16,2750	= 1424	1 1434	ACOSA8RT	00,3723	1081		AFTRGU10	31,2470	803	1 813
ABORT2	5654	1377	1 1377	ACOSOVF	00,3721	1081	1 1079	AGAINMM	04,2072	243	1 243
ABOUTONE	15,2046	= 266	2 265 957	ACOSSHR	00,3714	1081	1 1079	AGS8UFF	E4,1604	= 133	14 133 289
ABREG	E5,1416	= 137	2 137 826	ACOSST	00,3625	1079	1 1079	AGSBUFFE	E4,1621	= 133	
ABRFG*	E5,1426	= 137	2 137 826	ACOSST2	00,3642	1079	2 1079	AGSDISPK	32,2032	222	
ABRTABLE	36,2110	741	1 838	ACOSZFRO	00,3731	1081	1 1079	AGSEND	32,2132	223	2 223
ABRTDISP	30,2747	851		ACOS3	00,3652	1080	1 1081	AGSINIT	32,2015	221	1 289
ABRTIGN	36,2503	747	1 741	ACTCENT	E3,1755	127	2 329 682	AGSK	E4,1420	129	6 211 223
ABRTJAOR	21,2200	830	1 830	ACTIVE	23,2363	706	4 637 706	AGSLIST	05,2407	= 208	
ABRTJASK	21,2201	830	1 830	ADGGRAV	15,3006	964	1 964	AGSRND1	32,2213	224	2 224
ABS	00,3226	1071	4 823 1070	ADDRESS	6102	999		AGSRNO2	32,2221	224	2 224
ABSAOS	0162	= 1498	9 1491 1494	AORRWO	0116	112	82 920 1259	AGSUPDAT	0001	= 250	
ABSEDTOP	E6,1735	= 146	2 1430	AOG	E5,1416	= 826	2 806 813	AGSVCALC	32,2046	222	1 222
ABSTJ	E6,1735	= 146	9 1431 1449	ADG2TTF	E5,1426	= 826	1 811	AGSWORD	1324	122	5 223 836
ABTVINJ1	E5,1503	= 138	2 138 842	AOIAX	E3,1463	126	1 342	AHEA05	6432	1011	1 1011
ABTVINJ2	E5,1505	= 138	2 138 842	ADIAIY	E3,1464	126	1 342	AIG	E7,1455	154	11 214 893
ABVAL	00,3201	1070		AOIAZ	E3,1465	126	1 343	AIGBANK	26,3275	596	2 590 595
ABVALA8S	00,3176	1070	1 1008	ADRPCHN2	5366	1293	1 1293	AIMER	30,2675	851	1 850
ABVEL	E7,1467	= 162	7 162 889	ADRRUPT	17,3175	1452	1 1452	AINGOTN	37,2217	389	1 389
ACAON83	36,3746	770	1 765	ADRS+1	43,3633	1286		AINLA	E5,1434	= 143	33 143
ACAON85	36,2054	= 770	1 761	AORSCAN	27,2237	758	1 758	AK	E6,1757	152	21 152 1414
ACCDQITQ	E6,1507	147	8 147 1484	ADRSCHK	43,3602	1285	2 1285	AK1	E6,1760	= 152	1 1413
ACCOOTR	E6,1511	= 147	4 1470 1488	AORSOIF1	E6,1744	= 148	12 1455 1463	AK2	E6,1761	= 152	1 1413
ACCEPTUP	04,3230	1332	2 1333	AORSOIF2	E6,1742	= 148	11 1455 1462	ALARM	5567	1375	50 179 1452
ACCEPTW0	41,2027	419	2 419	ADRS1	43,3252	1280	1 305	ALARM/T8	35,2367	641	1 631
ACCFCTZ1	E6,1575	= 149	1 1460	AOR40400	5734	1378	1 1377	ALARMIT	27,2562	779	1 778
ACCFCTZ5	E6,1576	= 149	1 1458	AOR77770	5733	1378	1 1378	ALARMMA	30,3727	923	1 913
ACCHERE	20,3321	1492	1 1492	ADSRAX	E3,1466	126	1 342	ALARM1	5724	1378	1 1081
ACCOKFLG	0317	= 104		ADSRAY	E3,1467	126	1 342	ALARM2	5571	1375	2 1280 1377
ACCOMP	11,2431	1226	1 1234	ADSRAZ	E3,1470	126	1 342	ALCGKK	37,2627	398	
ACCRETRN	0117	= 1498	2 1480 1496	AOSUM	43,3571	1285	2 1285	ALOK	F5,1532	= 143	3 398 399
ACCSOKAY	4751	= 104	3 234 1496	AOTIME	35,3200	679	1 679	ALFDK	E4,1422	= 133	1 398
ACCSW	0122	= 1498	5 1495 1498	ADUP8FM1	04,3603	1387	2 1383 1384	ALFLT	37,2577	398	1 397
ACCSWU	E6,1547	= 149	3 149 1495	ADUPBUFE	04,3436	1384	1 1382	ALFLT3	37,2644	398	1 398
ACCSWV	E6,1550	= 149	1 1495	ADUPTTEMP	04,3435	1384	1 1383	ALGORTHM	21,3323	1468	
ACCTHERE	20,3353	1493	1 1492	AOVAN	01,3211	1111	2 1105 1281	ALIGNCOA	37,2311	391	3 391
ACCD	E5,1512	= 143	2 399 400	ADVANCE	34,3016	652	2 632 637	ALILP	37,2667	399	1 399
ACC4-2FL	0307	= 103	2 832 839	AFCCALC	31,3171	813	1 811	ALINEX	26,2045	352	
ACC4OR2X	4741	= 103	2 308 1437	AFCCALC1	31,3174	813	1 819	ALINEZ	26,2071	353	1 352

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
ALINTIME	43,2411	290	1 277	ALTERYZ	16,2761	1425	1 1424	APSESBIT	4747	=	96
ALK	E5,1446	= 143	6 143 399	ALTIM	E5,1530	= 143	2 397	APSESW	0202	=	96
ALKCG	37,2632	398		ALTIMS	E5,1531	= 143	2 397 398	APSFLAG	0230	=	98
ALKCG2	37,2635	398	1 398	ALTM	0060	= 109	1 898	APSLBIT	4737	=	98
ALKLP	37,2676	399	1 399	ALTOUT	21,2424	898	1 897	APSIDES	12,3675	1195	1 704
ALLCOAST	20,2204	1403	4 244 768	ALTRATE	E7,1707	= 166	5 166 898	APSTGO	27,2725	782	1 781
ALLDC/DC	41,3011	440	2 438 439	ALTROUT	21,2353	897		APSVEX	33,2000	54	3 765 861
ALLJETS	17,3162	1452	2 1451 1452	ALTSAVE	E7,1710	= 166	14 166 899	ARATE	22,2771	377	3 377
ALLOOP	37,2536	397	2 396 397	ALTSCALE	0272	= 102		ARCCOS	00,3612	1079	1 1008
ALLOWGTS	E6,1501	= 149	7 1407 1496	ALTSCBIT	4743	= 102		ARCOMP	21,2362	897	
ALLREAO	25,3074	564	1 565	ALTSYST	16,3410	1432	2 1432	ARCONV	21,2000	57	1 897
ALLSET	35,3443	686	1 686	ALXXXZ	37,3076	402	1 396	ARCONV1	33,2027	57	1 878
ALLSTALL	13,3414	1214	2 1216	ALXIS	E5,1444	= 143	4 396 402	ARCSIN	00,3610	1079	1 1008
ALLIS	26,3645	603	1 602	AM	E6,1733	150	3 365 377	ARCTAN	13,2510	1132	5 491 1129
ALL30EC	42,3567	449	1 447	AMEMORY	E4,1400	= 129		ARCTANXX	13,2536	1132	2 1132
ALL4BITS	21,2077	821	2 820	AMG	E7,1456	154	3 581 603	ARCTRGSP	30,3573	921	3 919
ALM/ENO	43,2120	279	24 277 296	AMOVEO	11,3533	1239	1 1238	ARCTRIG	23,3222	1246	9 314 1249
ALMCAOR	1363	= 124	14 124 1378	ANET	0157	= 1498	11 1492 1497	ARET	0161	= 1498	3 1492 1497
ALMCYCLE	4145	459	14 420 460	ANGLTIME	22,3001	377	1 377	ARG+	7264	1031	1 1031
ALMNCAOR	5726	1378		ANGTERM	E4,1704	= 135	3 135 814	ARGHI	00,3417	1075	2 1076
ALMXIT	35,2040	631	2 651	ANGX	E5,1500	= 143	2 400 401	ARGLO	00,3470	1076	1 1076
ALMXITA	35,2036	631	1 648	ANGY	E5,1476	= 143	1 401	ARGZERO	7304	1031	1 1031
ALDAO	41,2732	439	1 422	ANGZ	E5,1472	= 143	1 401	ARGZERO2	7301	1031	1 1031
ALDAOEO	13,3150	1211	2 1210 1211	ANTENBIT	4740	= 101		ARG90	5067	1097	1 1097
ALPHA	0010	= 1197	4 1169 1171	ANTENFLG	0267	= 101		AROUTISF	40,2704	432	1 430
ALPHAM	E4,1467	= 130	13 130 1231	AOG	E7,1457	154	7 214 893	ARTHINSF	40,3076	445	1 444
ALPHAQ	E6,1422	= 144	6 210 1480	AOR8SFLG	0315	= 104		ARTINISF	40,3111	446	1 444
ALPHAR	E6,1423	= 144	5 1404 1480	AORBSYST	4747	= 104	2 1431 1432	ARTOA	21,2001	57	1 898
ALPHAS8	E4,1604	= 134	4 134 329	AOR8TFLG	0310	= 103	1 750	ARTOA2	21,2002	57	1 898
ALPHATRY	21,3465	1473		AOR8TRAN	4742	= 103	2 1437 1439	ARTOUTSF	40,2677	432	2 430 431
ALPHAV	E4,1431	= 130	34 130 1241	AOSQ	E6,1537	148	27 148 1490	ARUPT	0010	= 108	13 168 1452
ALRM503	24,3014	521	1 521	AOSQTERM	E6,1545	148	7 148 1422	ASCALE	13,3733	1242	1 1228
ALRM514	24,2340	511	1 509	AOSR	E6,1541	= 148	11 1404 1490	ASCENT	30,2313	846	4 835 845
ALRM525	24,2707	519	1 517	AOSRTERM	E6,1546	= 148	6 1404 1422	ASCFLT	34,2000	=	33
ALRM526	24,2336	511	1 508	AOSU	E6,1543	= 148	3 1490 1491	ASCRSTRT	30,3011	852	3 847 851
ALRM527	24,3015	521	1 521	AOSV	E6,1544	= 148		ASCSPOT	33,2443	868	
ALSIGNAG	7543	1038	5 886 1064	AOTAZ	E7,1404	153	4 169 953	ASCTERM	30,2730	851	2 851 853
ALSK	37,3103	402	1 399	AOTCOOE	0735	= 116	12 211 959	ASCTERM1	30,2743	851	1 852
ALT	1124	= 120	6 120 1131	AOTEL	E7,1407	153	1 261	ASCTERM2	30,2763	852	1 847
ALTBITS	E7,1737	= 166	5 166 898	AOTMARK	07,2000	259	3 938 958	ASCTERM3	30,2766	852	4 851 852
ALTCALC	22,2131	366	1 365	AOTMARK1	07,2000	= 28	2 259 266	ASCTERM4	30,2767	852	1 844
ALTHK	33,2716	879	2 879 890	AOTMARK2	05,2000	= 28	1 264	ASECXT	E5,1573	=	143
ALTCONV	33,2025	57	1 877	AOTSTALL	07,3665	1323	3 948 1324	ASENT	30,2000	=	33
ALTCTIT	33,2731	= 879	1 879	APO	E7,1642	= 167	5 167 840	ASENT1	27,2000	=	32
ALTOSPLY	20,2226	1409	1 1408	APOPERI	23,2000	= 31	1 704	ASINEX	00,3707	1080	1 1079

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ASKIFNRM	10,2403	1352	1 1352	AUTR1FLG	0321	=	104	BACKHAND	17,2467	1442	1 1443
ASTAR	15,3144	967	1 967	AUTR2FLG	0320	=	104	BACKP	16,2305	1417	1 1466
ASTNBIT	4740	=	93 1 746	AUXFLAG	0147	=	93	BAODES	25,2623	557	1 557
ASTNCLOK	32,3177	792		AUXFLBIT	4752	=	93 3 862 863	BAOFEND	07,3635	1322	2 574 1321
ASTNDEX	32,3247	793	1 792	AVECTR	0024	=	1143 7 1138 1140	BAOOPT	15,3633	977	
ASTNFLAG	0154	=	93 4 745 766	AVEGEXIT	1252	=	121 7 121 765	BAORAD	25,3206	566	6 566 569
ASTNRET	32,3203	792	1 753	AVEGFBIT	4747	=	94 4 201 859	BAOROOT	31,3647	824	
ASTNRETN	36,3040	753	1 752	AVEGFLAG	0163	=	94 5 243 834	BADR2	12,3665	1195	2 1194
ASTOK	26,3374	597	1 518	AVEGOUT	37,3503	860	1 859	BADX	12,2311	1173	3 1170 1171
ASTROMSK	10,3372	1366	1 1362	AVEIT	07,2276	268	1 265	BALLOUT	5634	1376	1 1416
ASTROTMSK	04,2627	710	1 711	AVEMOBIT	4753	=	98	BALLOUTI	5710	1377	7 259 1371
AT	E4,1656	=	135 7 135 850	AVEMIDSW	0225	=	98 3 334 1218	BALLANGS	26,2244	490	4 353 530
AT/RCS	30,2000	54	1 847	AVERAGEG	33,2272	862		BALLEXIT	1342	123	2 490 491
ATAN=90	13,2543	1132	1 1132	AVERTRN	32,3707	865	1 865	BANKCALL	4616	993	310 222 1480
ATOECAY	36,2012	53	1 842	AVESTAR	07,2241	267	2 267 268	BANKJUMP	4640	993	23 286 1496
ATIGINC	E7,1400	153	4 400 736	AVETOMID	13,3513	1217	1 865	BANKMASK	4350	=	1094 3 1005 1018
ATMAG	34,3637	844	2 756 838	AVFLAG	0050	=	85 8 639 783	BANKRUPT	0016	=	108 13 170 1416
ATMAGAD	32,3610	838	1 834	AVFLAGA	35,2313	639	6 631 736	BANKSET	0165	=	115 14 995 1366
ATMAGADR	36,3140	756	1 747	AVFLAGP	35,2320	639	6 631 736	BASEOTF	E4,1537	=	131 2 714 715
ATOPCSM	13,2661	1205	5 36 1239	AVFLBIT	4747	=	85	BASEOTV	E4,1517	=	131 2 714 715
ATOPLEM	13,2734	1206	4 36 1239	AVGEND	32,3661	864	1 860	BASETEMP	1061	=	247 2 247
ATOPOTH	13,2661	=	36 1 719	AVGEXIT	1252	=	121 7 746 866	BASETHP	E4,1567	=	131 2 714
ATOPTHIS	13,2734	=	36	AVOUTCAD	37,3521	860	1 860	BASETHV	E4,1504	=	131 2 714
ATP	E4,1764	=	136 4 136 853	AX*SR*T	23,3601	1258	2 612 1257	BASETIME	E4,1513	=	131 3 714 715
ATR	E4,1762	=	136 3 136 850	AXC	01,2346	1082	1 1007	BAWLANGS	26,2000	=	31 2 352 490
ATTACHED	43,3150	312	1 277	AXOSTEM	0147	=	1498 4 1494 1496	BB	0006	=	1294 5 1293 1300
ATTACHIT	43,3155	312	1 312	AXISCTR	E6,1476	146	32 147 1501	BBANK	0006	=	108 44 168 1375
ATTCADR	1307	122	6 122 1325	AXISDIFF	17,3657	1463	2 1443 1455	BCDU	E6,1674	150	13 150 1325
ATTCHK	15,3535	975	1 963	AXISOIST	E6,1605	=	149 8 1457 1496	BD0V	7602	1039	2 1006 1039
ATTCK2	42,2035	297	2 296 297	AXISGEN	23,3345	1250	4 939 968	BD0T	24,2010	69	1 1138
ATTFLAG	0150	=	93 1 974	AXISGEN1	23,3353	1250	1 1250	BDSU	7061	1024	1 1006
ATTFLBIT	4753	=	93 3 972 975	AXISGEN2	23,3402	1250	1 1251	BDT	E7,1670	158	7 158 784
ATTPRIO	1311	=	122 2 382 1325	AXISGEN3	23,3425	1251	1 1251	BDTOK	27,2515	778	1 778
ATISCALE	42,2053	297	1 297	AXO	E3,1715	127	1 1142	BEE17	04,2750	1181	1 1192
ATTSTEER	17,2616	=	1446 1 1438	AXT	01,2341	1082	1 1007	BEE19	04,2762	=	1181 1 1189
ATY	E4,1760	=	136 5 136 853	AZ	1347	123	4 123 954	BEE22	04,2766	=	1181 1 1171
AUG2	07,3552	1319	1 1318	AZEACH	21,2100	821	2 820	BEGDES	25,2573	556	2 541 552
AUG3	07,3523	1318	1 1319	AZEL	14,3665	954	1 954	BEGDES29	24,3253	610	2 609 610
AURLKON1	23,2034	286	1 286	AZIMUTH	E5,1400	=	142 5 142 400	BELOW1	10,2125	1295	1 1296
AURLKON2	23,2000	286	1 284	AZINCR	E7,1554	=	164 4 164 808	BELOW2	10,2142	1295	2 1295
AUTOMANV	26,2144	487		AZINCR1	F7,1643	=	165 6 165 820	BELOW3	10,2156	1295	1 1295
AUTOMBIT	4752	=	102 1 127	AZO	E3,1711	127	1 1141	BELOW4	10,2161	1295	2 1295
AUTOMODE	0301	=	102	AZCNTRAL	E6,1737	=	147 14 1468 1470	BESTI	E5,1755	=	139 13 139 960
AUTRATE1	4753	=	104	=====				BESTJ	E5,1756	=	139 5 139 937
AUTRATE2	4752	=	104	B*RN8*B*	36,2133	741	1 763	BETAM	E4,1471	=	130 6 130 1241

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BETASB	E4,1606	= 134	3 134 329	BIT14COM	10,2154	1295	1 1295	BRATE	E6,1723	= 150	3 377 380
BETAV	E4,1437	= 130	11 130 122B	BIT15	4735	1090	58 81 1476	BRNCHCON	40,2600	418	1 418
BGIM	16,3720	1470	1 1470	BIT15+6	7733	1093	1 1354	BRNCHCTR	12,2276	1173	1 1173
BGIM23	16,2200	1408	1 1408	BIT15/14	41,3237	450	2 450 452	BRSPOT1	31,2614	805	
BHIZ	01,2447	1085		BIT2	4752	1090	58 82 1483	BRSPOT2	31,2723	803	
BIASCALE	22,3167	380	1 380	BIT3	4751	1090	48 82 1468	BRSPOT3	31,3077	811	
BIASHI	00,2566	1056	1 1075	BIT3H	27,3223	853	1 844	BRSPOT4	31,3236	813	
BIASLO	00,2270	1049	1 1076	BIT4	4750	1090	58 82 1456	BRUPT	0017	= 108	4 830 1452
BIASTEMP	E6,1707	= 150		BIT4H	30,3037	856		BSUBD	24,2016	69	1 1138
BIBIBIAS	37,3402	858	1 257	BIT5	4747	1090	50 82 1455	BUF	0130	112	152 113 1393
BIGAOS	20,3253	1491		BIT6	4746	1090	64 82 1460	BUF+	00,2422	1053	3 1052 1055
BIGTIME	12,3446	1192	1 1191	BIT7	4745	1090	48 82 1436	BUF-	00,2416	1052	3 1052 1055
BINCON	4363	474	3 454 1094	BIT7+9PV	23,2267	531	1 531	BUFNEM	00,2531	1055	1 1052
BINROUND	40,3106	445	3 444 446	BIT8	4744	1090	45 82 1499	BUFNORM	00,2500	1055	1 1055
BIN3	6244	= 574	2 567	BIT8,9	17,3043	1449		BUFPDS	00,2516	1055	2 1052 1055
BITSET	5020	= 906	1 906	BIT9	4743	1090	47 82 1497	BUFZERO	00,2363	1052	1 1055
BITSOFF	41,2674	439	1 439	BLANKCHK	10,3005	1360		BUF2	0133	113	30 259 1376
BITSOFF1	41,2701	439	1 439	BLANKCON	40,2614	418	2 418 431	BURNBABY	36,2124	741	3 761 841
BITS15+7	10,3375	1366	1 1353	BLANKDEX	4752	= 753	1 743	BUSYMASK	10,3402	1366	
BITS2-10	5011	1092	1 36	BLANKOSP	41,3516	466	2 466	BUTTONS	05,2731	230	
BITS3&4	5742	= 1325	2 1304 1305	BLANKET	5464	1348	14 286 1367	BVECTOR	F7,1522	= 160	24 160 1145
BITS4+10	10,3400	1366	1 1365	BLANKRET	0114	= 112		BVECTR	0032	= 1143	5 1139
BITS4&5	4763	1091	3 180 296	BLANKSUB	4255	469	2 452 1360	BVSU	7035	1023	1 1006
BITS4&6	4771	= 1325	5 226 1304	BLNKBBNK	4302	469	1 469	BYLMATT	15,3527	975	2 972
BITS4-5	07,3717	= 1325	1 1310	BLNKSUB1	40,3503	469	2 469	BZE/GOTO	01,2464	1086	1 1007
BITS4-7	33,3204	884	1 876	BLNKWAIT	36,3345	763	1 764	B12-1	4356	= 474	
BITS5+11	10,3377	1366	3 1358 1365	BLOAD	41,2743	440	1 422	B12T14	7721	= 1094	1 1009
BITS5,8	25,3401	569	2 569	BLOCKTOP	E6,1547	149	12 149 149B	B14+82	25,2635	557	1 557
BITS6&15	06,3003	196	1 195	BNKCHK	43,3724	1287		B2/A2	13,2504	1131	1 1133
BITS7+4	10,3376	1366	2 1352	BNKOPTN	43,3323	1281		B2FB	15,3255	969	1 969
BITS7&8	06,2777	196	2 179 191	BOOLSMK	20,2114	308	3 307 308	B2XSC	13,2502	1131	1 1131
BITS8/7	21,3262	906	1 906	BOOLSTRAT	05,3056	233	1 227	B3TOR4	01,2573	1089	2 1088 1089
BITS8,9	16,3602	1435	1 1428	BOOP	37,2755	400	1 400	B5OFF	5563	1374	11 314 725
BITS9+7	43,3052	302	1 302	BORTENT	5574	1375	2 1377	B5TOR8	01,2462	1085	
BITS9,11	5014	= 1427	1 1427	BOTHABRT	5713	1377	1 1378	=====			
BIT1	4753	1090	74 82 1485	BOTHAXES	20,3232	1491	1 1495	C*MM*N1	23,3557	1257	2 1257 1258
BIT10	4742	1090	64 83 1488	BOTHJOBS	10,2540	1355	1 1355	C*MM*N2	23,3561	1257	1 1257
BIT10+15	6021	526	1 526	BOTHLITS	25,3640	622	1 623	C*MM*N3	23,3572	1257	2 1257 1258
BIT11	4741	1090	41 58 1475	BOTHPAO	22,3377	723	1 723	CA+ECE	07,3113	1308	1 185
BIT11+1	25,2372	548	1 548	BOTHSGN	40,2377	415	1 415	CAORFLSH	0372	116	6 210 1364
BIT12	4740	1090	57 81 1473	BOTHSHIP	22,3336	722	1 723	CAORMARK	0373	116	
BIT13	4737	1090	63 55 1490	BOV(B)	01,2454	1085	1 1007	CAORMASK	10,3403	1366	1 1357
BIT13-14	4355	= 1094	6 296 1405	BPL	01,2500	1086	1 1086	CAORSAVE	E7,1566	= 836	3 836
BIT14	4736	1090	93 81 1492	BPL/BMN	01,2471	1086	1 1007	CADRSTOR	1042	118	13 237 1362
BIT14+7	26,2230	488		BRANCH	6722	1020	11 879 1086	CADRTAB	01,2001	= 254	1 1300

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
CAGESUB	06,2735	195	1 179	CANV37	04,2133	243	1 243	CDUY	0033	= 108	14 269 1445
CAGESUB1	06,2743	195	1 189	CATLOG	14,2346	67	12 935 959	CDUYCMD	0051	= 108	2 189 1413
CAGESUB2	06,2746	195	1 181	CCALL	6625	1018	1 1006	CDUYD	E6,1634	= 149	7 382 1445
CAGETEST	07,3614	1321	7 1305 1318	CCSHOLE	5677	1377	23 389 1501	CDUZ	0034	= 108	17 184 1445
CAGETSTJ	07,3626	1321	5 1304 1313	CCSL	7662	1041	1 1094	CDUZCMD	0052	= 108	2 190 1413
CAGETSTQ	07,3621	1321	3 1311 1312	CD*TR*G	23,3447	1254	1 491	CDUZD	E6,1635	= 149	7 382 1445
CALCDIR	E5,1460	= 142		CD*TR*GS	23,3461	1255	3 1254 1257	CDUZOLIM	30,3744	924	1 913
CALCGA	23,3255	1248	4 387 970	CDFLF/2	0016	= 1262		CEARTH	0016	= 933	3 932 936
CALCGA1	23,3315	1248	1 1249	CDSEBIT	4735	= 101		CENTANG	E7,1616	156	7 213 737
CALCGRAV	33,2762	881	2 868 882	CDSEFLAG	0264	= 101	1 286	CG	E5,1507	= 138	15 138 816
CALCGRV1	33,3017	881	1 881	CDHMR	34,3133	657	2 637 647	CGCALC	31,3240	813	3 803
CALCGTA	23,3151	1244	4 941 968	CDRVE	06,2012	171		CGOTO	6702	1019	1 1006
CALCMAN2	0053	= 86	2 377 378	CDU*NBSM	23,3565	1257	3 713 977	CHAN	E5,1443	= 142	
CALCMAN3	0052	= 86	1 377	CDU*SMNB	23,3552	1257	2 529 788	CHANDSP	41,2504	429	1 428
CALCN83	36,3462	765	1 770	CDUANG	E5,1543	= 142		CHANGEVB	07,2611	275	1 275
CALCN85	36,3376	764	1 740	CDUBANK	23,2273	531	1 529	CHANG1	5122	1098	4 391 1286
CALCPERR	16,3425	1432	2 1408 1433	CDUDANG	E5,1440	= 142		CHANG2	5126	1098	1 998
CALCPHI	22,2701	375	1 375	CDUFLAG	E5,1461	= 142		CHANJOB	01,2703	1103	4 1098 1110
CALCRGVG	31,3025	810	2 802 803	CDUINC	10,3600	1393	3 1393	CHANLOAD	41,3161	443	1 443
CALCRVG	33,3030	881	1 862	CDUIND	E3,1474	= 126	21 181 1318	CHAN12	0012	= 109	74 180 1483
CALCSMSC	14,3267	945	7 934 976	CDULIMIT	E5,1443	= 142		CHAN13	0013	= 109	24 227 1450
CALCTFE	27,3442	1271	1 729	CDULOGIC	10,3465	1390	13 264 1255	CHAN14	0014	= 109	23 189 1414
CALCTHET	27,2277	772		CDUNDX	E5,1536	= 142		CHAN30	0030	= 109	10 176 1405
CALCTPER	27,3437	1271	1 729	CDUREADF	E5,1441	= 142		CHAN31	0031	= 109	20 296 1438
CALCXY	26,3565	602	1 600	CDUREADI	E5,1442	= 142		CHAN32	0032	= 109	3 173 863
CALC2BIT	4752	= 86		CDUS	0036	= 108	4 211 538	CHAN33	0033	= 109	23 182 895
CALC3BIT	4751	= 86		CDUSCMD	0054	= 108		CHAN5	0005	= 109	6 227 1443
CALL	6637	1018	1 1086	CDUSPQT	0766	117	33 117 1256	CHAN6	0006	= 109	3 227 1408
CALL/ITA	01,2504	1086	1 1007	CDUSPOTX	0772	= 117	3 873 910	CHAR	0117	= 112	5 411 413
CALLACCS	20,2133	1402	1 1402	CDUSPOTY	0766	= 117	3 873 910	CHARALRM	40,3432	459	16 411 459
CALLCODE	4766	1091	5 294 1502	CDUSPOTZ	0770	= 117	3 873 910	CHARIN	40,2077	411	1 1332
CALLDGCH	26,3605	602	4 526 603	CDUT	0035	= 108	12 202 617	CHARIN2	40,2112	411	2 411
CALLGMBL	4747	= 1407	3 1422 1477	CDUTCMD	0053	= 108	2 547 906	CHECKALT	30,2774	852	1 851
CALLQERR	17,2043	1436	1 1435	CDUTEMPX	1155	120	3 871 893	CHECKB	7747	1296	1 1293
CALLRECT	11,3235	1234	4 1233	CDUTEMPY	1156	120	3 871 893	CHECKCTR	12,2657	1179	2 1173 1191
CALLRPT	13,2454	1130	1 1130	CDUTEMPZ	1157	120	2 871 873	CHECKG	37,2332	391	2 388 389
CALLRTRP	13,2364	1128	1 1128	CDUTIMEF	E5,1436	= 142		CHECKG1	37,2335	391	1 392
CALLT-35	36,2207	742	1 742	CDUTIMEI	E5,1434	= 142		CHECKIN	17,2217	1439	1 1438
CALOOP	14,3204	944	1 944	CDUTODCM	22,2410	370	3 364 494	CHECKMAX	22,2117	365	1 365
CALOOP1	14,3226	944	2 944	CDUTRIG	23,3443	1254	12 499 976	CHECKMM	5321	1288	10 287 836
CALSAM	15,2604	960		CDUTRIGS	23,3453	1254	3 1254 1257	CHECKNJ	43,3340	1281	3 1281 1286
CALSAM1	15,2603	960	1 959	CDUWXR	30,3412	917	1 917	CHECKP	16,3033	1426	1 1425
CALS3A	14,3172	944	1 928	CDUX	0032	= 108	29 203 1432	CHECKP22	43,2702	295	1 295
CAM	E6,1731	= 150	4 150 366	CDUXCMD	0050	= 108	5 189 1414	CHECKRR	43,2672	295	1 295
CANTROD	04,2064	242	1 242	CDUXD	E6,1633	149	25 149 1444	CHECKTAB	04,2071	242	1 242

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CHECKUP	16,2041	1406	1 1406	CLEANEND	10,3106	1361	1 1359	COB	0040	=	1143 4 1138 1139
CHECKYAW	27,3162	852	2 352	CL EAR	40,2467	417	1 412	CODE	0124	=	112 15 412 466
CHEKAXIS	27,2115	495	1 495	CLEARMRK	5474	1348	1 1348	CODE123	07,2123	261	1 261
CHEKBITS	16,2000	1405	2 1406 1416	CLEAR1	40,2522	417	1 417	CODE4	07,2133	262	1 261
CHEKMCRE	16,2016	1405	1 1415	CLOAD	41,2760	440	1 422	CODE40R5	07,2103	261	1 261
CHEKSTIK	17,2260	1440	1 1438	CLOG2/32	32,3657	857	1 857	CODE5	07,2137	262	1 261
CHEXFERR	32,2534	582	1 581	CLOCKJOB	36,2742	752	1 751	CODE500	32,3250	793	1 793
CHKBIT10	17,2156	1438		CLOKTASK	36,2722	751	4 258 751	COEFCTR	0160	=	1489 7 1487 1488
CHKBMAG	30,2547	849	1 849	CLOSEADR	21,3756	1478	1 1478	COEFF	20,3126	=	1488 4 1487 1488
CHKCORS	07,3046	1307	1 1308	CLOSEOUT	17,3173	1452	4 1448 1478	COE	E6,1666	=	150 45 365 496
CHKDATA1	20,2014	307	1 307	CLPASHI	40,2505	417	1 417	COFMAXGO	22,2176		366
CHKFAILL	5603	1375	1 1378	CLPASS	1015	118	13 237 467	COFSKEW	E6,1723	=	150 9 150 368
CHKFAILL2	5607	1375	1 1375	CLRADM0D	6011	526	7 244 554	COGA	E5,1765	=	140 16 140 1194
CHKINGTS	17,2547	1443	1 1443	CLRM00N	13,2711	1206	2 1207 1235	COGAFBIT	4750	=	96
CHKLASTY	21,3027	903	1 903	CLROVFLW	13,2512	1132	1 1132	COGAFLAG	0203	=	96 3 1182 1183
CHKLINUS	26,2157	487	2 487	CLRXFLAG	30,2725	851		COGAMAX	0016	=	1198 4 1189 1192
CHKLIST	05,3454	987		CLRS	40,2525	417	1 417	COGAMIN	0010	=	1198 3 1190 1192
CHKMINTJ	17,3560	1461	2 1459 1462	CLUPOATE	35,3620	690	1 689	COGADVFL	12,2775		1182 2 1182 1194
CHKNOVAC	01,3634	1299	1 1302	CLUPLOCK	04,3302	1333	1 1333	COGL0LIM	04,3003		1181 1 1193
CHKPOOH	43,2123	279	6 295 305	CL1/NET+	20,3352	1493		COGUPLIM	04,3001		1181 2 1190
CHKPRIO	10,2305	1350	1 1349	CMNTOVFL	12,2324	1173	1 1173	COLINEAR	04,3101		1184 1 1184
CHKRTIMR	16,2657	1423	4 1423	CMOON	0022	=	933 2 932 933	COLREG	1117	=	120 7 120 1239
CHKSAB	14,3124	943		CMOONBIT	4740	=	95 1 228	COMADRS	43,3541		1284 2 1286
CHKSB	14,3126	943	1 943	CMOONFLG	0173	=	95 9 36 1206	COMFAIL	36,2574		749 2 257 864
CHKSD	14,3145	943	1 943	COMPONENT	30,2620	850	1 848	COMFAIL1	36,2613		749 1 752
CHKSDA	14,3166	943	1 943	CMPX1	E5,1445	=	143 2 399	COMFAIL2	36,2626		750 1 752
CHKSDATA	14,3121	943	2 942 949	CNGL	22,2400	370		COMFAIL3	36,2615		749 3 739 741
CHKSRCH	26,3407	598	1 602	CNTCHK	07,2235	267		COMFAIL4	36,2617		749 2 739 740
CHKSUPR	43,3654	1286	1 1286	CNTDNOEX	4747	=	752 4 742 755	COMFLAG	5511		1369 2 750 1369
CHKTEMX	37,3625	872	1 872	CNTRCHK	43,3474	1283		COMMAND	E3,1471	=	126 6 1303 1308
CHKVISEZ	16,2717	1424	1 1423	CNTRCON	4771	=	1280 1 1283	COMMEQS	20,2570		1482 1 1482
CHNL12	0066	=	1470 3 1470	CNTRLOOP	43,3475	1283	1 1284	COMMFx	43,3533		1284 2 1286
CHRPRI0	4355	474	7 173 1385	COAALIGN	37,2301	391	1 389	COMMUNIT	30,2230		842 2 833 842
CH31TEMP	E6,1441	145	2 1427 1440	COARFINE	14,3220	944		COMMNOUT	12,2760		1182 1 1195
CH5MASK	1262	121	11 205 1497	COARS	07,2763	1306	1 1306	COMMONLM	12,3435		1191 1 1192
CH6MASK	1263	121	6 206 1434	COARSE	14,3506	950	3 944 970	COMMSFT	32,3505		836 1 836
CIRCL	34,2372	646	3 645	COARSERP	07,3063	1308	2 1307	COMNEG	07,3072		1308 1 1307
CKIMUSE	5244	1116		COARSTOL	07,3071	1308	1 1308	COMP	7667		1041 4 1008 1071
CKMDMORE	43,3746	=	1381 1 1381	COARSTYP	15,2174	929	1 928	COMPCCHK	06,3553		346 1 345
CKMID2	13,3657	1220	1 1238	COARS1	07,2770	1306	1 1306	COMPDISP	37,3150		712 1 712
CKMODCAD	43,2405	289	3 280 288	COARS2	07,3013	1307	2 1307 1308	COMPICK	41,2513		429 1 429
CKRNOBIT	43,2676	295		COASTOB	E6,1603	=	149 7 1457 1496	COMPMAT	13,2237		719
CKSTAIL	32,2115	223	1 223	COASTSET	36,3606	768	1 767	COMPMATX	27,2050		494 1 496
CK4V32	04,3427	1384	3 1383	COASTTJ	17,3357	1457	4 1457 1463	COMPMFSN	27,2127		495 1 495
CLEANOSP	10,2334	1351	2 743 753	COATRIM	15,3273	970	1 968	COMPNUMB	1170	=	120 10 120 1387

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COMPOS	07,3025	1307	1 1307	COSGDUZ	0746	= 116	10 491 1261	CSSUN	14,2446	933	1 933
COMPTBIT	4744	= 90		COSF	0030	= 1199	4 1194 1195	CSS33	14,2625	936	2 935
COMPTST	41,2424	427	6 427 440	COSI	24,2000	68	2 1139	CSS40	14,2623	936	1 935
COMPTGO	35,2376	660	1 689	COSINE	00,3517	1077	2 1008 1255	CSS5	14,2444	933	2 932 933
COMPTST1	41,2426	427	1 428	COSMG	0061	= 1408	3 203 204	CSTH	E5,1731	= 140	10 140 1195
COMPUTER	0122	= 90		COSPH1/2	0022	= 1243	6 1230 1232	CSTH-RHO	E5,1735	= 140	4 140 1190
COMPL2	22,2211	367	1 367	COSPH1E	11,3145	1232	1 1230	CSTOAY	05,2023	68	1 980
COMSTART	31,2624	806	1 806	COSTALIN	0000	= 250	3 250	CSUN	0020	= 933	1 933
COMTERM	11,2756	1230	1 1233	COSTH	0020	= 139	18 314 1248	CS359+	35,2361	641	
COMZERO	07,3102	1308	2 1307 1308	COSI/2DG	25,3067	563	1 561	CTHETA	0322	= 115	3 382 1410
CONC+S1	43,3247	1280	1 1284	COS600EG	23,2421	= 603	2 600	CTLIST	0334	= 989	6 987
CONC+S2	43,3250	1280	1 1284	COTROLER	E6,1627	149	6 1407 1467	CULTBIT	4745	= 87	
CONICS	12,2000	= 28	3 1168 1185	COUNT	0143	= 113	12 412 458	CULTIO	14,2620	936	4 936
CONICS1	04,2000	= 27	4 60 1183	COUNT*EM	21,2052	820	1 820	CULTFLAG	0065	= 87	4 935 936
CONST	30,2600	849	1 848	COUNTPL	E5,1542	= 142		CULTRIX	E5,1706	= 139	1 936
CONTRL2	01,3662	1300	2 1302	COVCNV	42,3673	500	1 500	CURSOR	1045	= 958	4 276 957
CONTOESG	26,3531	600	1 602	COZY4	E7,1664	157	4 695 698	CURTAINS	5703	1377	11 939 966
CONTOES2	26,3540	600		CPHI	0321	= 115	11 353 1411	CUTOFF	27,3261	854	4 754 854
CONTINU	43,3624	1286	5 1285 1286	CPHIBIT	4735	= 81		CUTOFF1	27,3271	854	1 854
CONTMANU	22,3170	380	1 379	CPHIFLAG	0000	= 81	1 1249	CVFCTR	0010	= 1143	1 1139
CONTSERV	33,2573	876	7 874 889	CPSI	0323	= 115	5 364 1410	CYCLEBIT	4742	= 85	
CONUMNDR	41,3071	442	1 441	CREMANU	43,3025	301	1 277	CYCLESW	0043	= 85	4 768 784
CONV3	42,3621	499		CRITCON	40,2315	414	1 413	CYCLSHFT	43,3503	1284	
CONV4	42,3632	499	1 499	CSI/A	34,2113	642	1 632	CYL	0022	= 108	24 413 1284
CONV5	42,3634	499	1 499	CSI/B	34,2125	643	1 651	CYR	0020	= 108	46 247 1299
CON1	5405	1293	1 1294	CSI/B1	34,2165	643	3 648 651	C1/2	7716	1092	1 1097
CON2	10,2170	1296	1 1293	CSI/B2	34,2176	643	1 650	C1MP	E6,1721	= 150	
CON2ADR	5422	1293	1 1293	CSI/B22	34,2216	644	1 644	C1PP	E6,1717	= 150	
COPIES	10,2610	1356	1 1349	CSI/B23	34,2224	644	1 644	C2MP	E6,1715	= 150	
COPIES2	10,2611	1356	1 1354	CSI/B230	34,2237	644	1 644	C2PP	F6,1713	= 150	
COPINDEX	0164	= 1366	23 1350 1364	CSI/B3	34,2230	645	1 645	C2SQM	E6,1711	= 150	
COPMPAC	0157	= 1366	3 1362 1365	CSI/CDH	35,2000	= 33	3 631 670	C2SQP	E6,1707	= 150	
COPYCYC	33,2456	868	3 862 868	CSI/CDH1	34,2000	= 33	1 642	C3/2	7736	1093	1 1097
COPYCYCL	33,2300	862	1 878	CSI/SOL	34,2737	651	1 650	C33JMP	06,2763	196	1 183
COPYCYC1	33,2601	877	1 375	CSIALRM	E7,1611	156	5 156 651	C33TEST	06,2374	182	6 179 181
COPYCYC2	33,2661	878		CSISTEP	34,2732	650	1 650	C5/2	5005	1091	1 1097
COPYNDR	10,2607	1356	1 1353	CSMCONIC	13,3066	1209	3 352 599	=====	=====	=====	=====
COPYPAC	10,2275	1350	1 1359	CSMDKFLG	0305	= 103		OACLIMIT	20,2432	1414	3 1414
COPYTOGO	10,2273	1350	1 1359	CSMDOCKO	4737	= 103	10 308 1480	OACLOOP	20,2374	1414	1 1414
COREINC	01,3030	1106	2 1102 1106	CSMINT	24,3170	576	1 576	DAO	6774	1021	1 1006
CORFOUNO	01,2633	1102		CSMMASS	1332	123	7 308 1487	DALTRATE	E7,1714	= 166	3 166 897
CORSCHK2	07,3060	1308	2 1307 1308	CSMPREC	13,3043	1209	5 36 742	OAMPING	17,2302	1440	1 1440
COSCDU	0744	= 116	5 116 1256	CSMSTORE	23,2367	706	1 706	OANZIG	6060	998	66 945 1397
COSCOUX	0750	= 116	7 491 946	CSMVEC	43,3062	303	1 278	OAPARUP	E6,1751	= 152	5 152 1452
COSCOUY	0744	= 116	7 491 1261	CSS	0016	= 936	1 936	OAPATTER	43,2163	281	1 277

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DAPBITS	21,2273	832	1 831	DBSELF	0316	= 104		DEC42	32,3524	836	1 836
DAPBDLS	0111	= 103	69 227 1501	DBVAL1	1346	= 1498	6 1490 1496	DEC45	4772	1091	2 1011 1084
DAPBQRT	E6,1753	= 152	2 1423 1452	DBVAL2	0114	= 1498	2 1490 1492	DEC50	26,3656	603	
DAPDATA1	20,2004	307	1 307	DBVAL3	0115	= 1498	2 1490 1493	DEC51	04,3174	1326	
DAPDATA2	01,2230	309	3 309 310	DCDU	E6,1633	= 151	3 1261	DEC58	37,2474	394	1 388
DAPDATA3	01,2275	310		DCMCL	30,3203	912	1 918	DEC585	37,3055	401	1 389
DAPDATA1	1343	123	10 307 329	DCMTCODU	22,2654	375	2 378 495	DEC70	04,2375	248	1 242
DAPDAT2	01,2245	309	1 309	DCOGA	0014	= 1198	4 1191 1192	DEG.5	15,2535	958	1 956
DAPDISP	43,3143	307	1 277	DCOMP	7704	1041	2 1041	DEGCDM	40,2663	432	1 431
DAPIDLER	16,2024	1406	2 237 1407	DCMPTST	41,2437	428	2 427	DEGCON1	40,3074	445	1 444
DAPLRUP	E6,1752	= 152		DCSTCYC	41,2452	428	2 442 443	DEGINSF	40,3010	444	2 444
DAPS1	16,2000	= 30	4 1405 1470	DDUMCALC	32,3075	791	1 815	DEGINSF2	40,3021	444	
DAPS2	17,2000	= 30	5 1399 1501	DDUMCRIT	32,3255	793	1 791	DEGOUTSF	40,2615	431	2 430 431
DAPS3	20,2000	= 30	6 57 1490	DDUMGOOD	32,3156	792	1 791	DEGREF1	14,3251	945	1 944
DAPS4	21,2000	= 30	2 1467 1471	DDV	7576	1039	1 1006	DEGTAB	40,2673	432	2 431 432
DAPTEMP1	E6,1735	= 151	29 145 1465	DDV/BDDV	00,2353	1052	2 824 1039	DEG30	15,2533	958	2 266 956
DAPTEMP2	E6,1736	= 151	12 146 1466	DDVCALL	00,3004	1063	1 1063	DEG359	14,3252	945	1 944
DAPTEMP3	E6,1737	= 151	8 146 1466	DEAD	27,2253	758	2 758	DEG60	15,2537	958	2 955 957
DAPTEMP4	E6,1740	= 151	4 146 1441	DEBIT	5522	1369	3 750 1369	DEL	E6,1745	= 147	3 1469 1477
DAPTEMP5	E6,1741	= 151	5 146 1420	DEC-12	11,2304	1096		DELAYEX	5235	1115	1 1114
DAPTEMP6	E6,1742	= 151	11 146 1465	DEC-6	11,2303	1096		DELAYJOR	00,3735	1371	14 223 764
DAPTREG1	E6,1743	= 151	2 147 148	DECBRNCH	1000	117	18 412 460	DELAYLOC	1326	123	6 236 1371
DAPTREG2	E6,1744	= 151	1 148	DECCNTR	33,2371	864	1 863	DELAYNUM	4752	= 36	1 1371
DAPTREG3	E6,1745	= 151	1 148	DECDSP	41,2523	429	1 421	DELCDUX	E6,1636	149	6 149 1416
DAPTREG4	E6,1746	= 152	1 146	DECDSP3	41,2575	430	2 430	DELCDUY	E6,1637	= 149	3 151 1416
DAPTREG5	E6,1747	= 152	1 145	DECEND	40,2265	413	2 413	DELCDUZ	E6,1640	= 149	3 151 1416
DAPTREG6	E6,1750	= 152	1 149	DECON	40,2322	414	1 413	DELCOMP	22,2527	372	3 377 495
DAPIAS	06,3132	= 203	3 174 204	DECOUNT	0117	= 112	27 423 446	DELDCDU	E6,1636	= 151	2 378 382
DAPZRUP	E6,1755	= 152	4 1407 1452	DECQTIMR	16,2667	1423	1 1423	DELOCDU1	E6,1637	= 151	1 382
DASAMPL	25,3344	569	1 570	DECRET	0115	= 112	2 442 443	DELOCDU2	E6,1640	= 151	1 382
DATAFAIL	25,3461	571	1 567	DEGROUND	40,3261	455	1 454	DELDEP	E5,1757	= 140	5 140 1179
DATAGDOD	E7,1731	= 159	5 159 602	DECRTIMR	16,2671	1423	1 1423	DELDV	E7,1607	156	15 156 650
DATAOUT	21,2417	898	2 898 899	DECTEM	0122	= 112	3 429	DELEL	E7,1573	= 156	4 676 679
DATAPL	E5,1472	= 142	13 388 392	DECTEST	41,2443	428	2 427 428	DELELO	0032	= 670	3 676 679
DATGDCCHK	26,3616	602	1 602	DECTOBIN	40,2232	413	1 413	DELERLIM	30,3742	= 924	1 917
DAXMAX	30,3740	924	2 915 924	DECTWO	35,3700	693	1 682	DELGMBLP	30,3251	913	1 913
DAY/2MAX	30,3742	924	2 915 924	DECLT	27,2222	604	1 604	DELINDEP	0014	= 1199	2 1178 1179
DAZMAX	30,3740	= 924	1 915	DEC17	4361	= 394	3 386 860	DELLOOP	00,3740	1371	1 1371
DB	1346	123	5 227 1498	DEC22	43,2707	295	1 295	DELLT4	E7,1447	154	8 209 783
DBB1	0143	= 1498	4 1491 1496	DEC227	15,2625	960	2 955 959	DELM	E5,1550	= 143	5 399
DBB2	0144	= 1498	3 1491 1494	DEC23	42,2033	290	1 290	DELMAX1	34,2105	642	2 650
DBB3	0146	= 1498	4 1492 1494	DEC27	4764	= 1091		DELMPL	37,2646	398	1 399
DBB4	0145	= 1498	6 1492 1496	DEC29	4765	= 1091		DELOK	12,2645	1179	1 1178
DBFUN	20,3446	1494	1 1494	DEC299	32,3572	838	1 833	DELPEROR	1277	122	5 380 1432
DBSELECT	4750	= 104	1 1402	DEC40	32,3523	836	1 836	DELQERDR	1300	122	3 382 1445

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES									
DELQFIX	E5,1500	=	137	2	138	885	DERCOF-3	0147	=	114	DISDVLVC	35,2334	640	2	633	655				
DELRROR	1301		122	3	382	1445	OERCOF-4	0146	=	114	DISGRVER	15,3040	964	1	963					
DELRSPL	22,3541	=	36				OERCOF-5	0145	=	114	DISINOAT	21,2510	899	2	897	898				
DELT	E5,1644	=	140	3	140	1172	DERCOF-6	0144	=	114	DISPCHNG	36,2364	745	3	739	741				
DELTACSM	E3,1572		127	1	596		DERCOF-7	0143	=	114	DISPCOMN	31,3442	817	2	818					
DELTAH	E7,1662	=	165	6	165	886	OERCOF-8	0142	=	114	DISPOEX	1163	120	23	660	830				
DELTALEM	E3,1644		127	1	596		DERCOFN	0152	=	114	DISPEXIT	31,3426	817	3	817	819				
OELTAQ	E7,1544	=	160	8	160	1146	OERPTR	0141	=	114	DISPGYRO	15,3316	970	1	968					
OELTAR	E4,1706	=	133	5	133	734	OERTABLL	31,3666	825	1	823	DISPLACE	41,3066	441	2	441				
DELTATOK	E4,3543		1386	1	1386		DESASCNT	0004	=	251	3	250	DISPLAYE	35,3630	691	2	670	671		
OELTAX	E5,1664	=	141	12	141	1151	DESCBITS	20,2115	821	1	270	DISPLAYS	10,2000	=	28	3	1348	1376		
OELTEE	E7,1607	=	156				OESCOUNT	1114	119	4	520	557	OISPNOT	36,3022	753	1	752			
DELTEEO	E7,1603	=	156	4	679		DESGLDS	26,3600	602	1	600		DISPN5X	37,3132	712	2	712			
DELTIME	12,2434		1176	3	1171	1191	OESIG3IT	4742	=	102	1	877	DISPRSET	21,3237	906	2	897	899		
DELTTAP	31,3743		827	1	806		OESIGFLG	0271	=	102			OISTEM	0122	=	112	3	427		
DELTTIME	E4,1710	=	133	3	133	734	DESLLOOP	25,2600	557	5	557	603	DIVIDER	16,2273	1417	2	1417			
OELV	0324		115	9	115	964	OESRET	1113	119	10	119	554	OKALT	16,3420	1432	1	1433			
OELVCSI	F7,1571		156	16	156	650	DESRETRN	25,2446	552	1	551		OKOB	E6,1411	144	2	228	1502		
DELVCFL	E7,1477	=	162	3	765	766	DESRTN	25,2452	552	2	552		OKKASN	E6,1405	144	1	228			
OELVEET1	E4,1672		132	5	209	644	OETENTCK	16,3050	1427	2	1425		OKMEGAN	E6,1404	144	2	228	1420		
OELVEET2	E4,1700		132	6	209	659	OEXDEX	0142	=	114	7	1254	1259	OKTRAP	E6,1403	144	2	228	1420	
DELVEET3	E6,1765		152	19	209	784	DEX1	0143	=	114	1	1258		OLAYJOB	00,2000	=	27	1	1371	
DELVIMU	E7,1620		157	7	331	770	OEX1	0143	=	114	5	114	1259	OLAO	6051	997	1	1006		
OELVLVC	E7,1431		154	20	154	717	OEX2	0144	=	114				OLAO*	7732	1093	1	1001		
DELVMID	E7,1573	=	156				DERNT	40,3364	458					LOADCQO	7731	1093	1	1013		
OELVOV	E4,1626		132	5	331	718	OGBF	20,3025	1487	2	1483		OLY2	5212	1114	2	1114	1371		
DELVREF	E7,1524	=	162	6	162	881	OGBITS	25,3147	565	2	565	569	OMENEBIT	4743	=	90				
DELVS	E7,1731	=	166	6	166	901	DGCHCK	25,3442	571	2	567	569	OMENFLG	0121	=	90	7	586	1152	
DELVSAB	E7,1661	=	157	5	157	835	OGCHCK2	25,3345	569	2	570		OMODE	7331	1033	1	1072			
OELVSN	E7,1653	=	157	16	157	835	OGDOO?	32,2735	615				OMP	7102	1026	15	413	800		
DELVSLV	E7,1431	=	154	2	213	627	DGDDCHK	25,3000	562	1	562		OMPNSUB	7315	1032	1	823			
DELVTEST	27,2274		772				OIOFLAG	0020	=	83			OMPNTMP	0135	=	113	2	1032		
OELVTPF	E4,1753		135	4	213	735	OIOFLBIT	4736	=	83	4	232	906	OMPR	7573	1039	1	1006		
DELVTPI	E7,1573		156	7	156	735	DIFEQ+0	11,3372	1237	1	1233		OMPSUB	7106	1026	22	1028	1259		
DELVX	0324	=	115	11	339	872	DIFEQ+1	11,3376	1237	1	1233		OMPSUB2	7125	1026	1	1031			
DELVY	0326	=	115	9	342	872	DIFEQ+2	11,3407	1237	1	1233		DMP1	7571	1039	1	1006			
DELVZ	0330	=	115	8	342	872	DIFEQCNT	E3,1500	126	25	126	1239	ONAOOCR	05,3453	987	1	989			
OELX	F5,1642	=	140	6	140	1173	DIFEQCOM	11,3552	1239	2	1237		ONOUMP	05,3644	991	1	991			
OEP	0036	=	1199	1	1178		OIFEQTAB	11,3153	1233	1	1232		ONDUMPI	05,3631	991	2	303	991		
DEPRCRIT	31,3761		827	2	809		DIFEQO	11,3246	1234	1	1238		DNDUMP1	05,3657	991	1	991			
OEPREV	E5,1761	=	140	3	140	1178	DIFFALT	E7,1575	156	5	209	658	ONDUMP2	05,3661	991	1	991			
OERCLOOP	31,3575		923	1	823		OIMOBIT	4753	=	88			ONECADR	0336	=	989	15	986	989	
OERCOF+1	0153	=	114				DIMOFLEG	0073	=	88	21	251	1239	ONEOUMP	43,3053	303	2	277	303	
OERCOF-1	0151	=	114				DINDX	0063	=	152	6	1414		DNINDEX	1335	=	123	4	123	570
DERCOF-2	0150	=	114				OIRAORES	6105	999	2	1013		DNLADMM1	04,2475	250	1	246			

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SYMBDL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBDL	DEF	H	REFERENCES	SYMBDL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
DNLADPOO	4755	= 250	1 244	DONEYET	21,3547	1474	2 1474	DPINCOM	40,3131	446	1 446
DNLRALT	1341	= 123		DDPAXIS	20,3202	1490	1 1490	DPINDRM	40,3137	446	1 446
DNLRLVELX	1336	= 123	4 123 211	DDPIF	31,2342	799	2 798	DPINSF	40,3114	446	4 444 446
DNLRLVELY	1337	= 123	1 123	DOPROC	40,3577	472	2 471 483	DPINSE2	40,3141	446	1 444
DNLRLVELZ	1340	= 123	2 123 209	DDROTAT	17,2675	1447	2 1447	DPINSF4	40,3146	446	1 444
DNLSTADR	0332	= 115		DDRREPOS	25,2127	540	1 202	DPIPAY	E5,1522	= 143	2 398
DNLSICOD	0332	= 115	11 115 1388	DDRRQUT	25,3017	562	2 562	DPIPAZ	E5,1526	= 143	1 398
DNPHAS1	05,3437	986	2 237 991	DDRSAMP	25,2023	502	1 502	DPL1	30,3673	922	1 922
DNPHAS2	05,3445	986	1 988	DDRSAMP2	25,2027	502		DPL3	30,3674	922	1 922
DNQ	0337	= 115	2 115 989	DDRSTART	05,2730	230	1 230	DPL5	30,3675	922	1 922
DNRRANGE	1333	= 123	6 123 617	DDSHIFT	21,3645	1476		DPL7	30,3676	922	1 922
DNRRDOT	1334	= 123	1 123	DDSKIP	17,2742	1448	1 1447	DPL9	30,3677	922	1 922
DNTABLE	05,2441	219	1 987	DDSSHFT	00,2322	1050	1 1050	DPMQOE	10,3670	1396	1 710
DNTMBUFF	0340	= 115	22 169 991	DDSTORE	6361	1009	1 998	DPDSMAX	4732	1090	3 454 1396
DNTMEXIT	05,3623	989	6 987 992	DDSUBST	05,3607	989	1 988	DPDUT	40,2723	433	3 432
DNTMFAS1	06,2671	193	1 196	DDSWITCH	11,3301	1234	2 1233 1234	DPDSMAX	23,2431	1095	8 315 713
DNTMGDT0	0335	= 115	8 115 991	DDT	7330	1033	1 1006	DPSBURN	E6,1746	= 146	
DNTM1	0034	= 109	1 989	DDTERM	40,3575	472	1 471	DPSFLITE	20,2522	1481	1 1480
DNTM2	0035	= 109	1 989	DDTICK	22,3441	724	1 724	DPSTHRSH	32,2010	55	1 789
DDACCFUN	20,3623	1497	1 1492	DDTINC	0136	113	7 113 1034	DPSVEX	33,2001	54	2 761 833
DDALARM	5155	= 1378		DDTIXR	01,2421	1083		DPTST	41,2261	423	4 423 443
DDALIGN	15,3176	968		DDTIPER	22,3622	729	1 729	DPTST1	41,2301	424	4 424
DDCKED	20,3030	1487	1 1481	DDTRET	0137	113	8 113 1073	DPZERD	11,2274	= 1242	3 935 1234
DDCKTEMP	0157	= 1489	4 1480 1484	DDTSUB	7155	1028	3 1034	DPO	0036	= 937	
DDCKTEST	20,2721	1484	2 1484 1496	DDTSWFMX	30,3737	924	1 918	DPI	0040	= 937	
DDCSM	23,3136	1152	1 1151	DDT6RUP	17,2036	1400	1 169	DP1/12	15,2533	= 266	1 265
DDCSM1	23,3141	1152	1 1151	DDUBLK	40,2575	418	2 417 418	DP1/2	11,2272	= 1131	5 1131 1143
DDDAT	07,2071	261	1 261	DDVLOAD	6462	1013	1 1010	DP1/20	33,3060	882	1 881
DDDELVZ	37,3554	871	1 872	DDVLADAD*	6465	1013	1 1010	DP1/4	11,3701	1242	3 1195 1242
DDDES	25,2636	559	1 557	DDW..	11,3611	1241	2 1234 1239	DP1/4TH	23,2413	1095	6 36 1146
DDDESEND	25,3064	563	1 563	DDW..1	11,3637	1241	2 1241	DP1/8	07,2622	275	1 268
DDDLAD	6457	1013	1 1010	DDWMENT2	10,3434	1368	3 1357 1363	DP1MIN	26,2077	354	1 352
DDDLADAD*	6143	1001	2 1010 1013	DOWNFLAG	5516	1369	96 223 1360	DP1DUTSF	40,2710	432	1 430
DDDNADR	05,3446	986		DDWNGTS	20,3576	1496	2 1484	DP2(-3)	27,3734	1277	1 1274
DDDNCHAN	05,3514	987		DDWNTLM	05,2000	= 28	2 208 986	DP2(-4)	27,3736	1277	1 1268
DDDNPR	05,3533	988	1 987	DDWNTORL	E6,1513	148	7 148 1465	DP2/3	11,3717	1242	3 1223 1242
DDDOWNTM	05,3430	986	2 168 169	DDI/NET*	20,3614	1497	2 1493	DP2DUTSF	40,2715	432	2 430
DDFSTART	05,2474	226	1 233	DP(-22)	27,3732	1277	1 1272	DP3DUTSF	40,2717	432	1 430
DDFSTR1	05,2501	226	3 230 232	DP-.01	35,3701	693	3 689	DP9/10	04,2771	1181	4 1172 1179
DDINT	13,2036	251	2 251	DPAGREE	7254	1031		DQUARTER	11,3701	= 1242	2 1228
DDINT2	13,2060	251	1 251	DPB-14	26,2366	496	2 494 496	DRDOT	F4,1742	= 136	4 136 849
DDIT	31,2352	799	1 800	DPBIT14	01,3474	1126	1 1126	ORFDB	20,3542	1496	1 1495
DDLEM	26,2432	586	1 586	DPDAT1	20,2037	307	1 307	ORFTRIT	4735	= 84	3 180 1309
DDNBRD	25,2661	559	1 559	OPDAT3	01,2312	310	1 310	DRFTSUB2	06,3474	345	1 349
DDNEADR	37,3640	872	1 872	DPHALF	23,2421	= 1095	12 366 778	DRIFT/ON	17,3351	1457	1 1457

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
DRIFTBIT	4744	=	104	8	747	1501	12 237 1364	DTDECAY	36,2004	53	1 833
DRIFTDFL	D312	=	104	1	750			DTHEATSM	1264	121	5 1261
DRIFTER	D116	=	1498	3	1490	1491	1414 2 1409	DUMMYAD	D4,2145	244	1 247
DRIFTFLG	0036	=	84	3	864	950	308 1 307	DUMMYJOB	D1,3203	1111	2 228 1110
DRIFTI	E5,1504	=	143	1	388		1410 1 1410	DUMPCNIC	27,3400	1266	
DRIFTD	E5,1502	=	143	1	390		735 1 735	DUMPCNT	0333	115	2 226 991
DRIFTSUB	06,3454	=	345	3	341		735 1 735	DUMPLDC	D336	= 115	5 991
DRIFTT	E5,1442	=	143	1	389		470 1 481	DUMPRPRA	27,3436	1268	
DRIVEDN	21,3545	=	1474	1	1474		471 2 470 1288	DUMPTFF1	27,3521	1272	
DSALMOUI	0011	=	109	36	186	1389	= 1288 1 1288	DUMPTFF2	27,3616	1273	
DSEXIT	D114	=	112	3	457	458	D140 = 113 2 471	DUNFLIM	3D,3735	924	1 918
DSKYFBIT	4735	=	89	1	1332		457 1 456	DV/SC	7635	1040	2 1040
DSKYFLAG	0113	=	89				458 1 456	DVBYCDSM	3D,3551	920	4 919
DSLV	4D,3376	=	458	2	458		456 3 421 453	DVCNTR	E7,1513	= 162	47 162 894
DSMAG	D142	=	113	2	458		236 1 236	DVCNTRI	E7,1566	= 865	2 864
DSMSK	4D,3400	=	458	2	458		972 3 972	DVCNITSET	33,2326	863	
DSPA	41,2365	=	427	1	421		172 2 171	DVECTR	D010	= 1143	1 1139
DSPAB	41,2360	=	427	1	421		172 2 172 175	DVLDS	E4,1706	= 133	5 133 684
DSPABC	41,2353	=	427	1	421		454 1 454	DVMAX1	34,2063	642	1 644
DSPABORT	4227	=	468	3	468		314 1 314	DVMAX2	34,2065	642	1 644
DSPALARM	4D,3420	=	459	6	421	444	172 2 172	DVMON	33,2317	863	
DSPB	41,2373	=	427	1	421		430 1 430	DVMONCDN	36,2526	748	
DSPC	41,2400	=	427	1	421		454 4 454 455	DVNDRM	DD,2505	1055	3 1054
DSPCADR	16,2206	=	1408	1	1408		118 48 171 1376	DVNORMCT	0137	= 113	6 1052 1063
DSPCNT	0776	=	117	7	172	237	1051 = 118 8 118 711	DVOVF	DD,2405	1052	11 1054 1065
DSPCOM1	41,2371	=	427	3	427	429	118 34 118 971	DVOVSUB	2D,2724	1485	4 1482 1488
DSPCOM2	41,2405	=	427	2	427		118 13 118 958	DVPREV	E7,1573	= 156	4 648 649
DSPCOM3	41,2413	=	427	1	427		276 3 271 276	DVSIGN	D136	= 113	10 1052 1069
DSPCDUNT	0777	=	117	66	173	1332	= 113 3 454	DVTHRUSH	1251	= 121	7 121 863
DSPDCEND	41,2566	=	430	4	430	436	457 1 459	DVTOTAL	E7,1505	= 162	6 162 862
DSPDCGET	41,2527	=	429	1	429		756 1 746	DVXSC	7427	1036	2 1035
DSPDCPUT	41,2537	=	429	1	430		455 1 437	DWNRPB	4062	169	1 168
DSPDCWD1	4D,3233	=	454	4	455		1070 1 1008	DXCDMP	12,2154	1171	1 1171
DSPDC2NR	4D,3266	=	455	3	435	456	1073 5 1070 1078	DXCRIT	0124	= 114	2 823 824
DSPDECNR	4D,3262	=	455				113 4 457 458	DXCRIT+1	0125	= 114	
DSPDECVN	4D,3306	=	456	4	433	471	111 5 172	DXERROR	E6,1444	145	9 145 1430
DSPDECWD	4D,3226	=	454	4	430	434	122 10 170 236	DYDOT	E4,1744	= 136	4 136 850
DSPDELAY	37,3117	=	712	1	712		1023 1 1006	DYERROR	E6,1446	= 145	7 145 1441
DSPDPDEC	4D,2771	=	437	1	421		166 7 166 901	DYNMOISP	36,3361	764	2 763 764
DSPFLG	1070	=	1366	3	1359	1360	924 1 917	DZDOT	E4,1746	= 136	3 136 851
DSPFMEM	41,3353	=	453	1	422		379 1 378	DZERROR	E6,1450	= 145	7 145 1441
DSPIN	4D,3322	=	457	5	412	458	= 130 11 130 1239	D1/1024	04,2765	1181	1 1190
DSPIN1	4D,3347	=	458	2	457	458	1213 1 1214	D1/128	04,2753	1181	3 1174 1185
DSPLAY	06,2047	=	172	1	172		1214 2 1213 1214	D1/16	04,2761	1181	2 1187 1194
DSPLIST	1043	=	118	6	237	478	1214 1 1214	D1/256	04,2767	1181	3 1174 1181

HEALTH KEY: NDRMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEDUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
D1/32	04,2763	1181	5 1181 1194	EDRIVEY	E6,1763	= 152	1 1413	ENDDPDEC	40,3007	437	1 444
D1/4	04,2757	1181	4 36 1194	EDRIVEZ	E6,1764	= 152	1 1413	ENDDPUSH	6547	1015	1 1015
D1/64	04,2755	1181	5 1169 1195	EE	13,2506	1131	1 1131	ENDECVN	40,3322	= 456	1 457
D1/8	04,2751	1181	1 1195	EGRESS	E5,1772	= 141	6 141 1217	ENDEXT	5472	= 1366	44 222 1389
D21	F6,1703	= 150		EIGHT	4750	= 1094		ENDEXTVR	5472	= 279	5 283 288
D29.9SEC	36,3142	756	2 742	EIGHTEEN	33,2472	869	1 868	ENDFIND	5160	= 1100	4 1102 1106
D60R9BIT	4752	= 87		EJSCAN	01,3115	1108	2 1105 1108	ENDHMS	42,3602	= 449	
D60R9FLG	0072	= 87	10 251 1239	FJ1	01,3166	1110	7 1108 1109	ENDIDLE	4207	468	1 1362
=====	=====	=====	=====	EJ2	01,3176	1110	1 1110	ENDIMU	07,3604	1321	3 1305 1310
E	E6,1750	= 149	17 1429 1502	EL	1350	= 123	1 331	ENDINST	4217	468	6 415 1361
E/BKCALL	04,2533	383		ELCALC	35,2746	676	1 679	ENDINT	13,2632	1205	1 251
E/CALL	04,2552	384		EL EACH	21,2101	821	2 821	ENDIT	10,3226	1363	1 1360
E/JOBWAK	04,2566	385		ELEPS	35,3676	693	1 676	ENDJASK	17,3176	1452	1 1452
E/PROG	04,2000	= 27	2 383 385	ELEV	E4,1662	132	10 209 679	ENDJBCAD	37,3523	860	1 858
E/SWITCH	04,2550	383		ELEVEN	4760	1090	3 480 1466	ENDJDB1	01,3100	1108	1 1100
EASPH	11,3261	1234	1 1233	ELEX	35,3223	679	1 676	ENDLLJOB	31,3444	817	2 817 818
EARTCNTR	14,2363	932		EL INCR	E7,1552	= 164	4 164 808	ENDLRH	34,3745	893	
EARTHGON	22,3527	725	1 725	EL INCR1	E7,1642	= 165	7 165 821	ENDLRV	33,3643	893	1 893
EARTHL	26,3711	1142	2 1135 1137	ELPOPFIN	43,3445	1283	2 1283	ENDMANUV	26,2152	487	
EARTHMU	27,2012	59	1 784	ELRCODE	04,3320	1334	1 1333	ENDMANU1	26,2153	487	2 486 488
EARTHMX	26,3657	1141	2 1135 1137	ELRCODE1	40,2156	412	1 411	ENDMARK	5472	1348	2 268 1366
EARTHMX*	0051	= 1143	4 1138 1141	ELVIRA	E7,1645	= 165	7 165 820	ENDMARKS	07,2317	268	
EARTHMPAD	22,3367	723	1 722	ENABLET6	E7,2023	1399	1 1399	ENDMAXDV	00,2624	1058	2 1058 1060
EARTHTR	37,2420	393	1 393	END-ALIG	E7,1626	= 163	3 163 167	ENDMODE	07,3661	1322	2 1322
EARTHTR*	37,2447	393	4 388 401	END-E3	E3,1776	= 128		ENDMONDO	41,3346	452	1 452
EBANK	0003	= 108	74 227 1480	END-E4	E4,1763	= 135		ENDNMTST	40,2247	413	2 413
EBANKSAV	1070	119	3 1350 1366	END-E5	E5,1774	= 143		ENDNUM	40,2257	413	1 413
EBANKTEM	1072	119	6 226 1366	END-E6	E6,1776	= 152		ENDNVBSY	04,2612	477	
EBANK3	5007	= 1094	3 238 890	END-E7	E7,1777	= 167		ENDNVBS1	41,3612	467	1 480
EBANK4	4741	= 1094	5 291 892	END-E7.0	E7,1744	= 167		ENDPFJOB	5155	1100	160 243 1480
EBANK5	5014	1092	8 401 1427	END-E7.1	E7,1745	= 167		ENDPUT	10,3165	1362	2 1364
EBANK6	5015	= 1094	7 227 1480	END-E7.2	E7,1774	= 167		ENDPASTE	4143	452	
EBANK7	5016	1092	12 287 953	END-E7.3	E7,1626	= 167		ENDPINBF	4512	= 478	
EBUF2	1167	= 120	10 383 384	END-E7.4	E7,1744	= 167		ENDPINS1	40,3672	= 484	
ECC	E5,1751	= 140	3 140 1195	END-F7.5	E7,1655	= 167		ENDPINS2	41,3731	= 482	
ECDUW	E6,1644	= 151	3 151 924	END-IN/M	E7,1670	= 157		ENDPRCHG	01,2762	1104	2 1103 1110
ECDUWL	30,3732	924	1 909	END-UE	1351	= 123		ENDP76	13,2333	719	2 717
ECDUWUSR	E6,1644	= 151	3 151 917	ENDALL	40,2263	413	2 413 414	ENDRADAR	25,3546	574	2 548 557
EDDP	0023	= 108	13 452 1284	ENDALM	4153	459	1 465	ENDRDLO	40,2770	434	1 437
EDOT	E6,1425	= 149	23 144 1502	ENDBALL	26,2324	491		ENDRELD5	40,3593	= 463	1 469
EDOTP	E6,1425	= 144	4 1429 1433	ENDBLFF	4303	= 469	1 473	ENDRET	10,3210	1363	5 1358 1365
EDOTQ	E6,1434	144	5 144 1468	ENDBSUB1	40,3532	= 470	1 471	ENDRMODF	4616	= 536	
EDOTR	E6,1435	= 144	3 145 1467	ENDCHKG	37,2366	392		ENDROLL	22,3226	382	
EDOTSQ	E6,1735	= 148	3 1456 1457	ENDDAPT4	5270	= 204		ENDRQDAT	41,2316	424	
EDRIVEX	E6,1762	152	5 152 1414	ENDDOT	7204	1028	1 1073	ENDROWT	41,3515	461	1 465

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SYMBOl TABLE LISTING, INCLUDING DEEINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOl	DEF	F	REFERENCES	SYMBOl	DEF	H	REFERENCES	SYMBOl	DEE	H	REFERENCES
ENDRRD29	24,3372	617	4 616 617	ENTERJMP	40,2157	412	1 412	ERESTORE	1360	= 124	11 124 1283
ENDRSTR	05,2641	228	2 232	ENTERQR	17,2353	1441		EREXIT1	32,2540	582	1 580
ENDRTOUT	41,2616	= 430	1 438	ENTERUV	17,2406	1441	3 1441	ERMINUS	40,3645	483	
ENDRUTIN	41,3230	= 444	1 450	ENTEXIT	0136	= 419	10 420 460	ERPLUS	40,3650	484	1 483
ENDR03	01,2241	309	1 309	ENTMID1	13,3622	1219	1 1219	ERROR	40,3601	483	1 411
ENDSAM	14,2431	933	1 932	ENTMID2	13,3616	1219	1 1219	ERRORS	43,3265	1280	1 1280
ENDSCALE	40,3043	445	3 444 445	ENTPASHI	41,2012	419		ERRTEST	17,3264	1456	
ENDSCAL1	40,3056	445	2 445 446	ENTPASO	41,2035	420	3 419 467	ERTHR	37,2431	393	1 393
ENDSPF	41,3362	453	1 456	ENTRET	0136	= 113	6 415 466	ERTHRVSE	37,2401	393	2 396 401
ENDSPMIN	42,3445	437	1 447	ENISET	41,3570	466	2 466	ERVECTOR	E5,1404	= 142	5 142 393
ENDSPMM	04,2603	470	1 477	ENTTIM2	04,2742	711	1 711	ESCAPE	0136	= 113	4 1079 1080
ENDSPOCT	40,3415	458		EURPERM	E7,1666	= 165	1 165	ESCAPE2	0137	= 113	2 1079 1080
ENDSTATE	11,3503	1238	1 1237	EPHEM	15,2000	= 30	1 980	ESTICADR	37,2116	387	2 387
ENDSTEER	36,3636	768	1 768	EPHEM1	05,2000	= 28	2 67 982	ESTIMS	37,2500	396	2 387 390
ENDSUMS	43,3137	306	1 1286	EPSFOUR	35,3703	693	1 682	ETPIBIT	4745	= 85	
ENDS40.9	27,3074	785	1 784	EPSILN1	34,2075	642	1 650	ETPIFLAG	0046	= 85	6 85 679
ENDT(X)	27,3725	1276	1 1276	EPSILONL	E5,1763	= 140	3 140 1191	EXBRK	31,3325	815	2 803
ENDTASK	5236	1116	4 235 1123	EPSILONL	E4,1602	= 131	2 1171 1172	EXDSPRET	10,2473	1354	5 222 296
ENDTEST1	37,2270	390	3 386 401	EPSSMALL	27,2772	783	1 783	EXECBANK	5163	1100	8 1098 1100
ENDTFF	27,3613	1273	3 1273 1275	EPSI	27,2430	773	2 773 783	EXECTEM1	0061	= 111	6 1098 1106
ENDTNON	06,2266	179	1 179	FPS2	27,2432	774	2 773 783	EXECTEM2	0062	= 111	4 1101 1106
ENDTNON2	06,2306	190	1 179	ERAD	04,2000	60	1 1134	EXGSUB	31,3304	815	1 803
ENDTPUSH	6551	1015	2 1015 1072	ERADF8IT	4737	= 83		EXIT	6742	1020	1 998
ENDTSLC	00,2212	1047	1 1047	ERADFLAG	0021	= 83	4 666 1134	EXITEM	0114	= 112	7 441 442
ENDV DAT	33,3475	= 889	3 888 891	ERADM	E7,1670	= 159	5 159 1134	EXITVR	30,3002	852	1 853
ENDVLOAD	6510	1014	2 1016	ERASCHK	43,3345	1282	1 1281	FXNORM	31,3333	815	2 803
ENDVPUSH	6537	1015		ERASCON1	43,3240	1280	1 1282	EXOVFLOW	31,3414	816	1 819
ENDVXV	6777	1021	4 1021 1038	ERASCON2	43,3241	1280	1 1282	EXSPOT1	31,3272	814	1 814
ENDW	F5,1642	= 137	3 138 141	ERASCON3	43,3242	1280	1 1282	EXTLOGIC	31,3264	814	
END2DEC	40,3305	455		ERASCON4	43,3243	1280	1 1282	EXTV8ACT	1044	118	17 237 1374
END29DOD	32,2764	615	1 615	ERASCON5	43,3251	1280	1 1283	EXTV8CHK	07,2006	259	1 259
ENEMA	05,2766	231	2 832 1377	ERASCON6	5007	= 1280	3 1282 1283	EXTV81	23,2000	= 31	1 286
ENGINOFF	36,3545	767	1 767	ERASER	10,3344	1365	1 1359	EXTVER8S	43,2000	= 35	7 277 1381
ENGINOF1	36,3555	767	1 244	ERASID	5011	= 36	1 991	EXVERT	31,3411	816	1 803
ENGINOF2	36,3551	767	2 834 854	ERASLOOP	43,3375	1282	4 1282 1283	E0	E7,1674	= 160	
ENGINOF3	36,3564	767	1 741	ERASTAL1	13,3473	1216	1 1216	E01	E4,1634	= 132	1 132
ENGINOF4	36,3561	767	1 750	ERASTAL2	13,3476	1216	1 1216	E02	E4,1642	= 132	
ENGOFF	27,3212	853	1 848	ERASWAK1	13,3501	1216		E1	E7,1676	= 160	
ENGOF FDT	E7,1644	= 167	5 167 853	ERASWAK2	13,3503	1216		E1345678	43,3356	1282	1 1283
ENGOF F1	27,3245	854	2 853	ERASZED	0007	= 208	2 208	F2	E7,1700	= 160	1 160
ENGOF TSK	36,3542	767	3 256 769	ERCNT	0117	= 112	7 480 484	E2DPS	F7,1617	= 164	3 789 826
ENGON8IT	4745	= 90	6 189 914	ERCOM	40,3653	484	1 484	E3	F7,1702	= 160	
ENGONFLG	0123	= 90		ERCOMP	E5,1563	= 143	8 389 393	E7OVERLA	F7,1467	= 155	3 155 162
ENTER	41,2002	419	2 412 459	ERCON	40,3666	484	1 483	=====			
ENTERDAT	C7,2070	261		ERCOUNT	1365	= 124	3 124 1280	F	F7,1733	158	7 158 781

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
F(MASS)	20,2540	1481	3 1481	FFTAG11	4000	=	27	FIXROOT	00,3453	1075	3 1074
FACEREG	0154	=	1367	FFTAG12	4000	=	27	FIXY	27,2464	776	1 776
FAIL-	20,3435	1494	1 1494	FFTAG13	4000	=	27	FLAGGON	22,3310	722	1 722
FAILLOOP	17,3142	1452	2 1452	FFTAG2	4000	=	27	FLAGOFF	35,3532	688	1 687
FAILREG	0375	116	15 226 1376	FFTAG3	4000	=	27	FLAGON	35,3465	687	2 687
FAIL3	5613	1375	1 1375	FFTAG4	4000	=	27	FLAGODOW	E6,1647	=	151 6 151 918
EAKFPRET	5164	1100	2 1098 1108	FFTAG5	6000	=	27	FLAGORGY	32,3012	789	
FALTOF	4370	474		FFTAG6	6000	=	27	FLAGWR00	0074	=	81 36 180 1409
FALTON	4364	474	10 246 1389	FFTAG7	4000	=	27	FLAGWR01	0075	=	83 29 232 1309
EAPS	36,2006	53	2 765 782	FFTAG8	4000	=	27	FLAGWR02	0076	=	84 29 180 1309
FASTCHNG	31,3721	825	10 799 819	FFTAG9	4000	=	27	FLAGWR03	0077	=	86 20 221 1326
FAZA	23,2673	1148	1 1150	FHNM	25,3577	578	1 577	FLAGWR04	0100	=	88 30 237 1365
FAZ4B	23,3050	1151	1 1152	FIFSDP	34,2101	642	1 650	FLAGWR05	0101	=	89 28 172 1447
FAZA81	23,3076	1151	1 1151	FIFTYFPS	34,2663	650	1 649	FLAGWR06	0102	=	91 16 201 975
FAZA82	23,3102	1151	1 1151	FIGTIME	35,3010	677		FLAGWR07	0103	=	93 31 201 1384
FAZAB3	23,3111	1151	1 1151	FILDELV	E5,1460	=	143	FLAGWR08	0104	=	94 13 273 969
FAZA84	23,3121	1151	1 1152	FILLEO	01,3366	1121	1 1120	FLAGWR09	0105	=	96 7 746 852
FAZA85	23,3130	1152	2 1152 1218	FINALBIT	4746	=	85	FLAP	0216	=	97 3 833 842
FAZA1	23,2677	1149		FINALDV	00,2625	1059	3 1052 1058	FLAPBIT	4744	=	97
FAZ8	23,2772	1150	1 1149	FINALFLG	0047	=	85	FLASHH?	21,2121	829	
FAZ81	23,2775	1150		FINOCOW	30,3064	909	5 779 909	FLASHOFF	4433	475	6 289 1359
FAZB2	23,3023	1150	1 1150	FINDGMB	27,2136	495	2 494 495	FLASHON	4427	475	4 420 1362
FAZ85	23,3030	1150	1 1150	FINDKEY	07,2365	269	1 269	FLASHSUB	10,3133	1362	3 1360 1361
FAZC	23,3036	1150	2 1150	FINDTIME	01,3576	1298	2 1298	FLASHV?	21,2127	829	1 829
FBANK	0004	=	108	FINDVAC	5105	1098	43 226 1385	FLAT	F6,1555	=	149 6 1457 1496
FBANKMSK	4350	=	1005	FINOVAC2	01,2576	1101	2 1098 1100	FLATEMP	0151	=	1498 6 1490 1495
FB1ASSUB	06,3644	349	3 347 348	FINE	01,2335	310	1 309	FLATOUT	31,2415	800	1 749
FB83	11,2411	1225	1 1239	FINEK2	43,2357	288		FLATOUT1	31,2337	798	2 798
FC	E7,1613	=	164	FINFONLY	14,3230	944	1 944	FLATOUT2	31,2341	798	1 798
FCADRRM1	04,2400	248	1 247	FINETIME	4102	394	3 392 1330	FLATVAL	20,3653	1499	1 1490
FCOW	30,2000	=	33	FINIMUDD	37,2320	391	1 387	FLGWR010	0106	=	98 20 98 1480
FC000	E7,1560	=	164	FIRE08	E6,1601	=	149	FLGWR011	0107	=	99 38 244 893
FCOLO	F7,1616	=	164	FIREFCT	E6,1737	=	148	FLGWR012	0110	=	101 1 101
FCOMPSET	31,2320	798	1 798	FIREP	16,3020	1425		FLGWR013	0111	=	103 1 103
FOATX	E4,1750	134	2 320 491	FIREQR	17,2176	1438		FLIP	4606	536	2 829
FOAIY	E4,1751	134		FIRSTBIT	4741	=	92	FLGGSUB	32,2000	=	33 1 857
FOAIZ	E4,1752	134		FIRSTFLG	0136	=	92	FLPASSO	E7,1621	=	165 4 165 813
FOOT	24,2006	68	1 1138	FIRSTIME	12,2621	1178	1 1178	FLPAUTNO	E6,1650	=	151 4 151 914
FOPS	36,2000	53	1 761	FIRSTIME	27,3012	784	1 785	FLPC	0212	=	96 2 848
FEEDBACK	17,3003	1449	1 1448	FIVE	4756	1090	26 238 1424	FLPCBIT	4740	=	96
FETCHZNB	30,3174	912	1 912	FIXCLPAS	40,2402	415		FLPI	0213	=	97 4 839 851
FETCHZWO	05,3575	989	2 986 987	FIXOELAY	5221	1114	16 511 1307	FLPIBIT	4741	=	97 1 852
FEXTRA	4737	=	800	FIXLOC	0120	112	59 261 1498	FLRCS	0214	=	97 4 832 854
FFTAG1	4000	=	27	FLXMIN	20,3633	1497	1 1494	FLPCSBIT	4742	=	97 2 851
FFTAG10	4000	=	27	FIXRANGE	40,2652	431	1 431	FLTRSUR	30,3454	918	2 911

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SYMBOL	DEF	F	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
FLUNDBIT	4742	=	95 3 746 851	F2DPS*21	21,2000	=	30 1 819	GETAZEL	14,3655	954	2 953 954
FLUNOISP	0175	=	95 4 749 832	F2DPS*31	31,2000	=	33 4 54 822	GETCADR	01,3513	1127	1 1127
FLVR	0210	=	96 4 834 852	F2DPS*32	32,2000	=	33 3 55 789	GETCOMP	41,2515	429	5 427 429
FLVRBIT	4736	=	96	=====	=====	=====	=====	GETOAT	07,2060	261	4 259 267
FLZONBIT	4746	=	97 1 852	G(CSM)	E4,1722	=	136 4 136 883	GETDT	36,3710	769	2 766 769
FLZONEO	0220	=	97 3 835 847	G+N,AUTO	26,2233	488	2 487 755	GETECC	12,3707	1195	1 1195
FMAXODD	31,2002	55	1 798	GACC	E5,1706	=	139 4 963 964	GETERAD	13,2466	1131	1 1134
FMAXPOS	31,2003	55	1 798	GAINFLTR	30,3733	924	1 918	GETGORL	27,3020	784	1 784
FORCEONE	20,2034	307	1 307	GAMCOMP	11,2563	1227	3 1226 1227	GETINREL	40,2324	414	4 412 417
FORCEV25	42,3577	449	2 449	GAMMA	E7,1475	=	160 5 160 1148	GETLMATT	15,3523	975	1 972
FORMULA1	17,3440	1459	1 1458	GAMPREV	E7,1605	156	7 157 650	GETMAXOT	13,3343	1214	1 1213
FORMULA2	17,3450	1459	1 1458	GAMRP	0010	=	1133 3 1129 1133	GETMKS	07,2202	267	3 263 276
FORMULA3	17,3553	1461	1 1460	GCOMP	E3,1471	126	24 126 950	GETNEWM	5427	1294	1 1293
FORTYONE	13,3457	1215	1 1208	GCOMP SUB	06,3425	344	6 342 343	GETPART2	01,3536	1297	1 1302
FORVEL	E7,1677	=	166 2 166 903	GCOMP SW	E3,1477	126	10 339 396	GETPRIO	5423	1293	2 1293 1296
FORYMETR	E7,1675	=	166 2 166 899	GCOMPZER	06,3701	349	1 963	GETRPSV	11,2535	1227	1 1227
FOUR	4751	=	1094 47 226 1467	GCOMP1	06,3540	346	1 346	GETRVN	37,3346	715	1 714
FOURSECS	27,2572	779	1 779	GCTR	E5,1736	=	138 10 138 964	GETRVN2	37,3360	715	
FOURTEEN	4317	=	1068 4 573 1476	GDESELCT	07,3601	1320	1 1315	GETULC	26,3276	596	3 587 596
FP	E7,1562	=	164 5 797 799	GDT/2	1236	121	12 121 901	GETX	12,3000	1185	3 1182 1195
FRANDRES	05,2000	=	28 2 58 226	GDT1/2	E7,1560	=	162 5 162 884	GET22/32	21,2736	902	
FRCS2	36,2016	53	2 763 780	GDUMPL	31,3421	817		GET45	35,3570	689	3 689
FRCS4	36,2014	53	1 762	GEADDR	6135	1000	1 1000	GFACTM	20,3027	1487	1 1482
FREEFBIT	4751	=	82 1 963	GEFF	E4,1720	=	136 4 136 850	GIMBLBTS	20,3021	1487	2 1483
FREEFLAG	0014	=	82 12 939 981	GENDDV	00,2570	1057	2 1056 1060	GIMLOCK1	23,3335	1249	1 1248
FREERET	0144	=	113	GENMARK	10,2674	1358		GL+NOATT	40,3670	484	1 483
FRSTPAS	34,2644	649	1 649	GENMASK	0162	=	1367 4 1350 1363	GLAMPTST	06,2507	185	1 185
FRSTZERO	20,2674	1484	1 1483	GENPL	E5,1434	=	142 27 142 143	GLINVERT	06,2500	185	1 185
FSUBO	24,2014	69	1 1138	GENRET	1143	120	4 523 531	GLM	35,2000	=	34 1 662
FTHROT	31,2000	=	33 3 55 797	GENSCL	00,2346	1051	2 1051	GLOCKCHK	06,2441	184	2 184
FUELNEED	E7,1664	=	165	GENSCR	00,2277	1050	4 1049 1071	GLOCKMON	06,2434	184	1 182
FULLAPS	05,2000	58	1 227	GENSHFT2	00,2224	1048	1 1048	GLOCKOK	5270	=	196 4 185
FULLDSP	41,3654	480	1 480	GENSHIFT	00,2214	1048	1 1039	GLOKFAIL	0056	=	86 2 387 1249
FULLDSP1	41,3655	480	1 480	GENTRAN	5544	1373	4 312 1495	GLOKFBIT	4736	=	86
FULLTIME	17,3422	1458	6 1459 1463	GEOCOMPS	E5,1562	=	143 3 397 398	GMBDRBIT	4742	=	92 1 786
FUNCTION	E6,1747	=	147 23 1468 1477	GEOIMUTT	37,2004	386	2 1183 1189	GMBDRVSW	0137	=	92 2 785 786
FUNCT2	21,3405	1469	2 1469	GEOM	04,3051	1184	7 140 1190	GMBLBITA	21,3760	1478	1 1477
FUNCT3	21,3413	1469		GEOMSGN	E5,1672	=	140 2 400 401	GMBL8ITB	21,3762	1478	
FUNNYOSP	E7,1664	=	165 5 165 330	GEORGEJ	37,3107	402		GMERGE	07,3453	1317	1 1320
FUNTEM	0157	=	1498 2 1490 1491	GEORGEK	37,3111	402		GMODE	E4,1501	=	130 1 130
FV	E4,1461	=	130 13 130 1241	GEOSTR4	37,3025	401		GN/CCODE	5001	1091	
FVACCADR	01,3770	1302	1 1299	GET-LVC	10,2021	701	4 663 773	GNUFAZE5	37,3515	860	3 858 867
FWIGHT	E7,1606	=	164 4 164 800	GET+MGA	10,2005	701	2 689 701	GNUR	E7,1654	=	165 4 886 890
FXAORS	43,3565	1285	2 1286	GFTABVAL	33,2211	861	1 861	GNURVST	33,3517	889	2 886 889
FXFX	43,3551	1285	1 1286	GETANSUV	20,3154	1490		GNUTFAZ5	37,3511	860	2 858 860

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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BD BADLY DEFINED	CD DEFINITION ASSOCIATED WITH CONFLICT	XX MISCELLANEOUS TROUBLE	

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF OFF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	OFF	H	REFERENCES	SYMBOL	OFF	H	REFERENCES	SYMBOL	OFF	H	REFERENCES
GNUV	E7,1654	= 165	1 889	GOMOVE	23,2073	497	1 497	GRAVEL	15,2646	962	1 962
GOABORT	32,3257	832	1 256	GONXT8NK	43,3670	1286	3 1286	GREEO	15,2772	964	1 964
GOAGIN	10,2723	= 1366		GOODARG	21,3603	1475	1 1475	GRP2OFF	21,2334	873	3 873
GOALMCYC	41,2350	425	1 444	GOODEND	07,3640	1322	4 260 1322	GRP2PC	04,3165	1222	26 505 1238
GOANIOLE	10,3014	1360	1 1360	GOOMANU	22,3234	382	1 376	GRP2SVQ	E5,1711	= 141	3 141 1222
GOBAC	13,3471	1215	2 1215	GOONEG	20,2746	1486	1 1485	GRP4OFF	32,3404	834	
GOBACK	35,3733	755	2 755	GOODRAD	25,3253	567	1 569	GSAV	E4,1634	132	9 132 977
GOBAQUE	11,2707	1229	2 1232 1238	GOPERFRS	10,2560	1356		GSCALE	31,3750	827	1 813
GOB8	4054	169	1 168	GOPFRS	10,2500	1354		GSELECT	07,3406	1316	3 1315
GOBLTIME	E7,1507	= 162	3 162 784	GOPREF1	10,2476	1354	10 509 1329	GSHIFT	7620	1039	1 1006
GOCH56	17,2034	1399	2 1399	GOPFRFIR	10,2556	1356		GTMP	0026	= 982	5 980 982
GOCLOSE	21,3753	1478		GOPERF2	10,2503	1354		GTS	21,3263	1467	1 1444
GOCTOFF	36,3072	754	2 739 741	GPEREF2R	10,2563	1356	1 486	GTSCAOR	17,2561	1444	1 1443
GODSP	10,2321	1351		GOPERF4	10,2506	1354	2 505 665	GTSFIN	42,2147	320	1 443
GOOSPALM	41,2351	425	20 419 466	GOPERF4R	10,2566	1356	1 927	GTSFINLC	41,3157	443	1 443
GOOSPR	10,2327	1351	3 487 941	GOPIN	43,2121	279	24 280 313	GTSFOUT	42,2141	319	1 430
GOOSPRFT	10,2324	1351	4 763 948	GOPLAY	10,2743	= 1366	1 1354	GTSFOUTL	41,2564	430	1 430
GODSPRS	10,2512	1355	8 1349 1356	GOPDOO00	5665	1377	1 257	GTSGO+ON	21,3277	1467	
GODSPRS1	10,2514	1355	1 1351	GOPDOFIX	04,2024	239	2 239 257	GTSQAXIS	21,3314	1468	1 1467
GODSPRI	10,2330	1351		GOPOST	36,3057	754	2 739 740	GTSTEMPS	E6,1735	= 147	13 147
GODSPR2	10,2331	1351	2 1349 1352	GOPROG	05,2667	230	2 168 169	GUESS	37,2020	386	
GODSP2	10,2322	1351		GOPROG2	05,2771	231	2 245 303	GUESSBIT	4752	= 84	
GOESTIMS	37,2113	387	1 387	GOPROG2A	05,2772	231	1 231	GUESSW	0034	= 84	3 695 1190
GOEXTV8	43,2000	277	1 421	GOPROG3	05,2776	231	2 231	GUESS1	37,2255	390	
GOFLASH	10,2351	1352	41 240 972	GOQ	41,3025	441	1 441	GUIODURN	32,3253	793	1 790
GOFLASHR	10,2510	1355	9 691 971	GOQTRIMG	21,3306	1467	1 1478	GUIOINIT	30,2264	842	2 790 839
GOFLASH2	10,2353	1352	14 1349 1354	GOREAOAX	37,3422	858	1 860	GUIDSUB	31,2520	803	1 815
GOGOMARK	10,2263	1350		GOSERV	33,2277	862		GUILDEN	31,2527	804	
GOGOPROG	04,2221	245	1 246	GOSHOSUM	43,3106	= 305	1 278	GUILORET	31,2600	805	3 803 805
GOINT	35,3416	686	2 679	GOSLEEPS	10,2627	1357	3 1354 1365	GVDETER	15,2627	961	2 963 975
GOLOADLV	43,2371	289	6 277 278	GOTANGLS	32,2625	612	1 612	GWAKE	07,3347	1314	1 1314
GOLOC	0705	= 1302	30 1297 1302	GOTO	6645	1018	13 1019 1086	GWAKE2	07,3307	1313	1 1314
GOMANUR	07,3723	1325	1 487	GOTOERS	6661	1018	1 1018	GYCOARS	14,3025	941	1 929
GOMARK	10,2206	1348	1 1366	GOTQGE	6674	1019	1 1018	GYRCOR	15,3113	966	1 966
GOMARKF	10,2212	1349	12 222 1366	GOTOGTS	17,2544	1443	1 1436	GYROAGRE	07,3321	1313	1 1313
GOMARKFR	10,2231	1349	5 286 1366	GOTOP00H	6001	239	68 232 1331	GYR08USY	07,3342	1314	1 1313
GOMARKR	10,2226	1349	1 1366	GOTOV56	6022	604	11 488 525	GYROCMD	0047	= 108	6 190 1319
GOMARK2	10,2215	1349		GOUT	E5,1714	= 139	3 962 964	GYROEXIT	07,3512	1318	1 1318
GOMARK2R	10,2234	1349		GOWNUPOT	40,3317	456	1 425	GYROFRAC	07,3602	1320	2 1317 1320
GOMARK3	10,2220	1349	1 223	GODSP	10,2206	= 1366		GYROTRIM	15,3041	965	1 970
GOMARK3R	10,2237	1349	1 310	GOXOSPF	10,2212	= 1366	12 283 1383	GYTO8ETO	E5,1462	= 142	
GOMARK4	10,2223	1349	2 267 292	GODXSPFR	10,2231	= 1366	4 307 619	G21	E6,1705	= 150	
GOMARS	10,2207	1349		GODXSPR	10,2226	= 1366		=====			
GOMIDAV	36,2176	742	1 742	GPMATRIX	06,3132	203	1 203	H	F4,1477	= 130	8 130 1239
GOMOO	04,2215	245	1 246	GRA8GRAV	15,2777	964	1 964	H*GHCR*#	0131	= 137	3 798

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SYM80L TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
HAFFA1	E7,1601	= 156	3 644 646	HIUNITX	23,2421	= 36	1 500	IGC	E5,1741	= 138	3 138 1249
HALF	4736	= 1094	29 347 1502	HIUNITY	23,2417	= 36	2 500	IGNALG	32,3024		789
HALFARG	E6,1743	= 147	2 1476 1478	HIUNITZ	23,2415	= 36	4 500 529	IGNALGRT	32,3175		792
HALFDP	11,2272	= 1096	3 935 1228	HI10	04,3315	1334	1 1333	IGNALLOOP	32,3063		790
HALFREV	10,2000	701	2 701	HI5	4350	474	10 172 1286	IGNFLAG	0153	= 93	3 745 766
HALFSEC	24,3025	522	1 521	HI6ZEROS	23,2423	= 36	18 314 1277	IGNFLBIT	4737	= 93	2 745 754
HANDADR	17,2530	1443	1 1442	HLIGHT	25,3630	622	2 622	IGNITE	36,3112	754	1 754
HANG20	06,2071	172	1 171	HLITE	4747	= 623	2 622 829	IGNITF1	36,3126	755	1 754
HAPO	E4,1722	= 133	5 133 663	HMEAS	E7,1652	= 165	7 165 893	IGNITION	36,2411	746	2 256 755
HAPOX	E4,1517	= 130	4 130 728	HMSIN	42,3446	447	1 444	IGNYET?	36,2404	746	1 745
HAVEBASE	37,3264	714	1 716	HMSOUT	42,3224	434	1 430	IGRET	E7,1673	= 160	2 594
HAVEGUES	11,2002	695	2 783 785	HOLD	0165	= 1498	2 1496	IGSAMEX	27,2103	495	1 495
HAVENORM	04,3103	1184	1 1184	HOLDQ	E6,1743	= 148	2 1455 1459	IMEDIATE	01,3615	1299	4 1298 1301
H8AD	34,3746	894	1 893	HOLDW	E5,1734	= 141	7 141 1150	IMMEDRET	10,3242	1364	
H8EAMANT	33,2002	56	1 896	HPER	E4,1724	= 133	3 329 663	IMODES30	1302	122	67 176 1376
H8EAMN8	E4,1712	= 135	2 885 896	HPERMIN	E4,1604	= 131	6 131 729	IMODES33	1303	122	51 173 1405
H8CALC	E7,1532	= 162	10 162 886	HPERX	E4,1521	= 130	2 329 729	IMPLBURN	36,3522	766	1 748
H8DDTISP	E7,1471	= 162	5 162 884	HRCON	42,3532	448	2 447	IMPULBIT	4743	= 85	2 748 768
HEADTJET	16,3470	1433	1 1433	HRCON1	42,3273	435	1 434	IMPULSW	0044	= 85	5 766 781
HFAIL	33,3543	890	2 885	HSCAL	33,2010	56	1 885	IMUATICK	43,2717	296	1 277
HFLSHBIT	4753	= 101	2 622 623	HSTILBAD	34,3756	894	2 893 894	IMUBACK	37,2005	386	
HFLSHFLG	0263	= 101	2 885 890	=====	=====	=====	=====	IMUBAD	07,3612	1321	5 180 1321
HH	F6,1745	= 148	15 1458 1461	I8NKCALL	4674	995	63 180 1490	IMUCADR	1304	= 122	4 223 1321
HIASCENT	E6,1400	144	4 227 1481	ICDUFALL	06,2703	= 195	1 196	IMUCAGE	06,2565	189	1 196
HIDESCNT	20,2002	58	1 1481	ICORK2	43,2214	283		IMUCHK	15,3635	978	2 948 971
HIDPHALF	23,2421	= 36	6 496 1246	IDADDTA8	42,2644	328	2 319	IMUCOARK	43,2205	283	1 282
HIDP1/4	23,2413	= 36	1 1277	IDADDTM	0142	= 113		IMUCOARS	07,2753	1306	5 283 963
HIENERGY	12,3431	1191	1 1191	IDADITEM	0150	113	4 319 442	IMUCOARV	43,2226	283	2 283 284
HIGATASK	33,2502	874	1 876	IDAD2ITEM	0151	113	2 319	IMUCOMP	06,2000	= 28	1 339
HIGATCHK	33,2550	875	1 875	IDAD3TEM	0152	114		IMUFALL	06,2703	= 195	1 196
HIGATJOB	33,3653	895	1 874	IDLEADR	05,3334	237	1 234	IMUFINE	07,3163	1310	6 288 1325
HIGHCRIT	E5,1477	= 137	1 137	IDLEF8IT	4745	= 94	4 767 866	IMUFINED	07,3205	1310	2 1310 1315
HIGHSTF	31,3734	826	1 813	IDLEFLAG	0161	= 94	7 748 854	IMUFINEK	43,2340	288	1 277
HIGH4	7741	1093	3 1001 1018	IDLEMASK	10,2663	1357	1 1362	IMUFINFX	43,2370	288	1 288
HIGH9	7743	1093	8 261 1001	IDLERADR	16,2152	1407	1 1408	IMUFINZ0	07,3163	= 1325	
HIMINCON	42,3372	436	1 436	IDLERET1	10,3154	1362		IMUGOOD	07,3611	1321	
HINJECT	32,3601	838	1 842	IDLESLEP	10,3407	1367	1 1357	IMUMON	06,2172	176	2 174
HIPRIO	10,2375	1352	1 1352	IERASTST	6124	1000	1 1000	IMUOP	06,2622	191	1 196
HIRTHROT	4737	= 55	1 767	IFAILINH	05,3336	237	1 231	IMUOP2	06,2643	191	1 191
HISCALAR	0003	= 109	2 394 1021	IFAILJMP	06,2755	196	1 177	IMPULSE	07,3276	1313	7 288 1394
HISCALIM	25,3441	570	1 570	IFAILOK	07,3207	1311	1 1310	IMUSE	0007	= 82	7 246 1329
HISECDN	42,3173	436	1 435	IFLAGC	13,3074	1209	1 1210	IMUSERIT	4744	= 82	3 180 223
HITEMIN	0121	= 112	3 447 448	IFLAGP	13,3051	1209	1 1209	IMUSFELG	4744	= 1325	1 191
HITEMOUT	1007	= 117	4 434 437	IFLEGAL	10,2434	1353	1 1353	IMUSLLLG	37,2315	391	3 387 401
HITEST	33,2531	875	2 879	IG	E6,1723	= 150		IMUSTALL	07,3671	1324	15 223 966

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF RFFS, PAGE OF FIRST REF, PAGE OF LAST RFF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
IMUSUPER	37,2000	= 35	1 305	INGTS	E6,1631	= 149	8 1407 1496	INTLOOP	35,2546	671	1 671
IMUVAR	26,3400	597	2 592	INDEX	E6,1740	= 147	6 1475 1476	INTLZE	21,2551	899	1 899
IMUZFRO	07,2667	1304	3 223 391	INITA8IT	4752	= 96	2 968 969	INTMCTBS	41,2116	421	2 420
IMUZEROA	07,2677	1304	1 1304	INITALGN	0205	= 96	3 968 975	INTOTHIS	13,2300	713	
IMUZERDK	43,2133	280	1 280	INITBY	15,3203	968	1 968	INTPRET	6036	997	234 222 1385
IMUZERD2	07,2732	1305	1 1304	INITCDUW	30,3055	909	2 742 832	INTPRETX	31,3667	825	4 806 812
IMUZERD3	07,2741	1305		INITDSP	10,2712	1358	1 1297	INTPRET1	23,2000	= 31	1 1095
IMUZERR	37,2325	391	1 386	INITINIT	27,3102	785	1 783	INTPRET2	11,2000	= 28	1 1096
IMU2	37,2000	= 35	2 59 386	INITREAD	25,3114	565	6 564	INTRPVP	34,3603	738	2 734
IMU4	37,2000	= 35	1 396	INITST	34,2061	642	2 643 649	INTRSM	6047	997	1 1105
IM30INIF	05,3350	238	1 227	INITV	12,3515	1193	3 1191 1192	INTSTALL	13,3412	1214	37 244 1385
IM30INIR	05,3351	238	1 231	INITVEL	11,2000	695	3 662 773	INTVAL	37,3065	402	2 396 398
IM33INIT	5026	= 238	2 228 237	INITVELX	11,2261	699	1 699	INTVEC	F5,1462	= 143	
INBOUND	27,3522	1272	1 1271	INITVEL1	11,2022	695	1 695	INTVEL	11,2000	= 28	1 695
INCORPEX	F7,1672	= 159	5 159 1131	INITVEL2	11,2056	696	1 698	INTWAKE	13,3427	1215	4 312 1212
INCORP1	23,2433	1144	1 597	INITVEL3	11,2101	696	2 696	INTWAKFC	04,3137	1222	1 1222
INCORP2	23,2645	1148	1 597	INITVEL4	11,2133	697	1 697	INTWAKEM	04,3134	1222	1 1221
INCOR1	23,2467	1145	1 1145	INITVEL5	11,2167	698	1 698	INTWAKEU	04,3106	1221	1 1387
INCOR1A	23,2476	1145	1 1145	INITVEL6	11,2231	698	1 698	INTWAKEX	04,3151	1222	1 1222
INCOR18	23,2525	1145	1 1145	INITVEL7	11,2234	698	1 697	INTWAKEO	13,3425	1215	2 507 1222
INCOR1C	23,2533	1145	2 1145	INITWMX6	26,3174	594	1 594	INTWAKEI	13,3447	1215	3 719 1215
INCOR2	23,2574	1146	2 1146 1153	INJARG	32,3337	833	1 836	INTWAKLM	04,3147	1222	1 1222
INCOR2A8	23,2624	1147	1 1147	INLINK	0045	= 108	2 237 1333	INTWAKUP	04,3153	1222	1 1221
INCOR3	23,2630	1147	1 1147	INLUNCHK	11,3202	1233	1 1234	INTWAKUQ	1167	= 1221	3 1221 1222
INCR	01,2403	1083	1 1007	INREL	0137	= 113	23 413 418	INTWAKLO	1167	= 120	1 1221
INCRCDUS	10,3564	1393		INRELTAS	40,2330	414	2 414 417	INTY	E5,1470	= 143	6 398 399
INCRCDU	22,3035	378	2 379 380	INT/W	13,3562	1218	2 1217	INTYP8IT	4750	= 87	
INDEP	E5,1765	= 140	4 1178 1179	INTBANK	13,3042	1208	1 1208	INTYPFLG	0070	= 87	18 505 1220
INDERASF	6205	1001	1 1001	INTBITAB	13,3510	1216	2 1215	INTZ	E5,1474	= 143	
INDEXF	6145	1001	1 999	INTBIT15	0115	112	7 112 1001	INVERT	20,3570	1496	4 1491 1497
INDEXES	17,3037	1449	3 1447 1448	INTB15+	0114	112	7 112 1498	INVLG	36,2650	750	1 750
INDEXFI	23,3667	1259	1 1258	INTEGPV	13,3134	1211	12 251 1220	INVRSEON	12,3140	1187	1 1187
INDEXFLOC	0130	= 113	12 1001 1084	INTEGRVS	13,3107	1210	6 686 792	IRETURN	E4,1502	= 130	8 130 1212
INDEX2	6163	1001	1 1001	INTEGRV1	13,3136	1211	2 1209	IRFURNI	E7,1743	158	6 167 1221
INDJUMP	6273	1006	6 1000 1003	INTFGRV2	13,3141	1211	1 1239	IRIGCOMP	06,3330	341	
INDWORK	6203	1001	1 1001	INTFXIT	13,3225	1212	3 1213 1214	IRIGX	06,3356	342	2 341 347
INDXYZ	16,3555	= 1434	1 1424	INTFLAG	0227	= 98		IRIGY	06,3373	342	2 341 347
INERCDNA	20,2767	1486	1 1482	INTFLBIT	4736	= 98	2 231 1215	IRIG7	06,3410	342	2 341 348
INERCDNB	20,3005	1487	1 1482	INTEGRATE	11,3237	1234	2 1234	IRIG1	06,3353	341	3 339 350
INERCDNC	20,3006	1487	1 1481	INTEGRAL	26,3205	594	7 586 594	ISCADR+0	4220	468	2 468 477
INFINAPD	12,3736	1196	2 1196	INTIME	E7,1605	= 157	6 672 734	ISITAUTO	26,2240	489	1 378
INFINBIT	4745	= 95		INITINIT	13,2000	= 29	4 61 1217	ISITN00	10,3030	1360	1 1360
INFINFLG	0200	= 95	4 1182 1191	INTINT	35,3422	686	6 632 684	ISITPRIO	10,3113	1361	2 1362
INFINITY	12,3216	1188	5 1185 1188	INTINT2C	34,3062	654	2 646 647	ISLIST+0	4224	468	2 468 477
INFLIGHT	23,2000	= 31	2 338 1244	INTINT3P	34,3071	654	2 637	ISSERVON	04,2106	243	1 242

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN-DEFINED = DEFINED BY EQUALS J-DEFINED BY JOKER OR ERASE ANYWHERE MD-MULTIPLY DEFINED
 BD-BADLY DEFINED CD-DEFINITION ASSOCIATED WITH CONFLICT XX-MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
ISSUP	06,2321	180		JAPFG*	E5,1460	= 137	1 137	KEL	E4,1634	= 132	12 373 495
ISSKOFF	06,2716	194		JBRFG*	E5,1430	= 137	2 137 826	KEPCONVG	12,2342	= 1173	3 1172 1173
ISSWON	06,2726	195	1 194	JOG2TTF	E5,1430	= 826	1 811	KEPC1	0042	= 1197	3 1169 1186
ISSZERO	06,2361	181	1 189	JETRATE	E6,1743	= 147	5 147 1420	KEPC2	0044	= 1197	3 1169 1186
ISWCALL	4700	995		JETRATEQ	E6,1744	= 147	3 1418 1466	KEPLERN	12,2000	= 1169	2 1224
ISWRETRN	4707	995	3 622 767	JETRATER	E6,1745	= 147	3 1418 1466	KEPLOOP	12,2175	= 1171	1 1173
ITCIR	E7,1614	= 157	4 695 698	JETSALL	16,3537	= 1434	1 1434	KEPPREP	11,2311	= 1223	3 1212 1229
ITEMP1	0061	111	80 111 1421	JETSOFF	16,3421	= 1432	7 1426 1434	KEPRTN	E4,1512	= 130	3 1173 1224
ITEMP2	0062	111	34 111 1474	JFTSON	17,3337	= 1457		KEPZERO	11,2274	= 1181	4 1169 1195
ITEMP3	0063	111	34 111 1472	JLING	E4,1676	= 135	3 135 811	KEYCOM	04,3224	= 1332	
ITEMP4	0064	111	17 111 1320	JBOVER	26,3405	= 604	7 603 604	KEYRPTB8	4060	= 169	2 168 169
ITEMP5	0065	111	50 111 1294	JORSLEEP	5133	= 1100	8 387 1371	KEYRUPT	04,2000	= 27	1 1332
ITEMP6	0066	111	9 195 1472	JOBSLP1	01,2773	= 1105	1 1100	KEYRUPT1	04,3215	= 1332	2 168 169
ITERATOR	12,2551	1178	1 1191	JOBSLP2	01,3004	= 1105	1 1107	KEYTEMP1	0073	= 111	6 169 1333
ITERCTR	0026	= 1199	5 697 1179	JOBWAKE	5137	= 1100	13 385 1372	KEYTEMP2	0734	= 116	2 1333
ITISMASK	10,3141	1362	1 1361	JOBWAKE2	01,3020	= 1106	1 1100	KIGNV/R4	E5,1474	= 137	2 137 791
ITRO	6367	1009		JOBWAKE3	01,3032	= 1106	2 1106	KIGNX/B4	E5,1470	= 137	3 137 791
ITR1	6356	1009		JOBWAKE4	01,3024	= 1106	1 1106	KIGNV/B8	E5,1472	= 137	2 137 791
ITR10	6141	1000		JOBXCHS	10,2647	= 1357	2 1352 1353	KILLOCK	35,3605	= 689	2 689 690
ITR11	6201	1001		JSWCHBIT	4736	= 81		KILLB8	6035	= 757	1 757
ITR12	6133	1000		JSWITCH	0001	= 81	5 1234 1239	KILLCLOCK	36,2736	= 751	1 751
ITR13	6212	1002	1 1001	JTIST	17,3046	= 1450	2 1432 1449	KILLDEAD	27,2265	= 758	1 758
ITR14	6236	1003		JTONTST	17,3717	= 1501	1 1501	KILLMON	41,3314	= 451	2 451
ITR15	6122	1000		JUMPDSP	16,2203	= 1408	1 1405	KILLTASK	6027	= 757	9 526 753
ITR7	6260	1004		JUNCIN1	34,3373	= 733	1 733	KILLTSK2	27,2223	= 757	2 757
ITSAJOB	01,3632	1299	1 1298	JUNCT2	34,3426	= 734	1 734	KILL2	04,2251	= 245	3 246
ITSAJOB2	01,3743	1302	1 1300	JUSTOA	15,2042	= 265	1 266	KILMONON	4204	= 467	4 459 481
ITSATBL	01,3646	1299	1 1297	JUSTOUT	16,3136	= 1428	1 1429	KLEENEX	10,2211	= 1349	
ITSAVAR	01,3546	1297	1 1297	JUSTTRIM	15,3074	= 965	1 969	KONMAT	05,2001	= 67	5 980 982
ITSAWAIT	01,3565	1298	1 1298	JUSTZY	15,2011	= 265	1 266	KPIP	33,2020	= 57	1 861
ITSEVEN	01,3747	1302	1 1299	J2REQSQ	13,2022	= 61	1 1231	KPIP1	33,2021	= 57	3 862 887
ITSINDIR	5436	1298	1 1298	J4REQ/J3	13,2012	= 61	2 1231	KPIP1(5)	21,2004	= 57	3 900 901
ITSLGCL1	5445	1300	2 1300 1301					KPIP2	33,2023	= 57	1 883
ITSLGCL2	01,3704	1301	1 1301	K(AT)	32,3605	= 838	1 833	KQ	E6,1503	= 147	5 147 1483
ITSLIKE8	01,3617	1299	1 1297	K(1/OV)	32,2002	= 54	1 833	KQ2	E6,1504	= 147	1 1483
ITSLNGCL	01,3731	1301	1 1297	KALCMAN3	22,2004	= 364	1 1325	KROAP	E6,1505	= 147	1 1483
ITSNOVAC	01,3642	1299	1 1299	KALCMON1	22,2000	= 31	4 364 378	KR2	E6,1506	= 147	1 1483
ITSWBIT	4735	= 93		KALCMON2	22,2000	= 31	1 369	KSPNDX	E6,1677	= 150	6 150 380
ITSWICH	0151	= 93	5 637 676	KALERCON	07,3745	= 1325	1 1325	KT	E7,1573	= 156	5 675 737
ITSWTLST	01,3736	1301	1 1300	KAOS	16,2612	= 1422		KT1	30,3045	= 856	1 847
ITURNON	06,2533	187	1 196	KCENTRAL	E6,1741	= 147	3 147 1468	KV1	E6,1701	= 150	4 150
ITURNON2	06,2556	188	2 187 191	KDPNDX	E6,1700	= 150	3 150 380	KV2	E6,1707	= 150	4 150
=====	=====	=====	=====	KEEP-2	E7,1556	= 164	1 164	KV3	E6,1715	= 150	4 150
JAMPROC	4243	469		KEEPPRIO	10,2417	= 1353	2 1359 1363	K1	E6,1701	= 150	
JAMTERM	4231	468	1 1361	KEEPVR	27,3205	= 853	1 853	K1ORK2	34,2542	= 648	1 648

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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BO BADLY DEFINED CO DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
K1VAL	27,2600	53	1 780	LASTYCMD	0112	= 112	8 112 546	LGCUPDTE	26,3344	597	4 588 593
K2	E6,1707	= 150		LAT	1120	= 120	8 120 1130	LGRET	E7,1673	= 160	4 160 597
K2.	34,2561	648	1 648	LAT-LONG	13,2351	1128	3 666 930	LGWAKF	07,3357	1314	2 1314 1315
K2CNTRAL	E6,1742	= 147	1 1468	LATAZCHK	37,2021	386		LGYRD	1314	122	9 237 1318
K2THETA	E6,1735	= 147	7 1468 1477	LATFWDV	21,2746	902		LGYRO8IN	43,2366	288	1 288
K2VAL	27,2002	53	1 781	LATITUDE	E5,1402	= 142	6 142 393	LIGHTSET	05,3063	233	2 230 231
K3	E6,1715	= 150		LATLONG	13,2000	= 29	1 1128	LIM(-22)	27,3730	1277	1 1272
K3S1	22,2370	370		LATVEL	E7,1676	= 166	18 166 905	LIMALARM	26,3637	603	2 601
K3VAL	27,2004	53	1 781	LATVMETR	E7,1674	= 166	13 166 906	LIMITCOM	42,3330	435	1 435
K4	22,2372	370		LATVNEG	21,3152	905	1 904	LIMITS	4734	= 1090	7 922 1415
K4SQ	22,2374	370		LATVPOS	21,3145	905	1 904	LIMITSUB	30,3700	923	7 913 918
=====	=====	=====	=====	LAXIS	E4,1676	= 135	5 136 853	LINGUID	31,3101	811	2 802
L	0001	= 108	310 109 1501	LBUFE2	00,2470	1054	2 1078 1080	LINRAT	17,2301	1440	2 1440
L*WCR*T	0130	= 137	2 798	LCHAN	0001	= 109	19 173 1432	LINRATP	16,3114	1427	1 1429
L,PVT-CG	E6,1527	148	1 1482	LDANZIG	00,3713	1080	1 1079	LINSET	31,2647	806	1 802
LADQSAVE	E7,1712	= 166	5 166 906	LDATALST	0334	115	2 115 989	LINSET?	31,2643	806	1 802
LAGSLIST	4753	= 224	1 223	LDLOOPST	04,3614	1387	1 1387	LINUS	5464	= 1367	2 487 752
LALQTORV	13,2422	1130	1 930	LDNDUMP	05,3642	991	1 991	LINUSCHR	10,3247	1364	2 1352 1353
LAMBERT	12,3223	1189	1 697	LDNDUMP1	43,3056	303	1 303	LINXLOGC	31,3270	814	2 803
LAMLOOP	12,3337	1190	3 1191 1192	LDNOUMP1	05,3643	991	1 991	LITIT	25,3650	623	1 623
LAMENTER	12,2714	1180	1 1193	LDNPHAS1	05,3337	237	1 234	LMAGSIDL	05,2407	= 219	3 208 219
LAMPTST	06,2766	196	2 185 186	LDNPHAS2	05,3562	988	1 986	LMAGSI02	05,2136	= 219	1 219
LAND	E7,1632	= 165	19 165 815	LDPOSMAX	11,2305	= 1197	1 1196	LMAGSI03	05,2145	= 219	1 219
LANDALT	E5,1712	= 138	3 331 930	LEFET	00,2342	1051	1 1048	LMAGSI04	05,2154	= 219	1 219
LANDISP	21,2340	897	4 829 830	LEFT-	00,2336	1051	1 1048	LMAGSI05	05,2157	= 219	1 219
LANDJUNK	31,2172	795	1 248	LEFTNCOM	40,3156	446	1 446	LMCSTADL	05,2172	= 211	2 208 219
LANDLAT	E5,1706	= 138	4 138 930	LEETS	4331	473	5 427 1286	LMCSTA01	05,2127	= 211	1 211
LANDLONG	E5,1710	= 138	4 138 930	LEGAL?	21,2274	837	2 830	LMCSTA02	05,2136	= 211	1 211
LANOTEMP	E7,1542	= 164	9 164 809	LEGALTST	40,2527	417	2 417	LMCSTA03	05,2145	= 211	1 211
LARGE	00,3065	1065	1 1065	LEMALONE	01,2266	310	1 309	LMCSTA04	05,2154	= 211	1 211
LARGE2	00,3112	1067	2 1065 1066	LEMCONIC	13,3100	1209	5 352 952	LMCSTA05	05,2157	= 211	1 211
LARGE3	00,3074	1067	1 1065	LEMGEOM	13,2000	= 29	1 334	LMCSTA06	05,2224	211	4 211 217
LARMENT	5601	1375	1 1378	LEMMASS	1331	123	21 209 1488	LMCSTA07	05,2226	211	2 211 217
LASINEX	00,3631	1079	1 1079	LEMONM	0056	= 109		LMDSASDL	05,2303	= 215	1 219
LAST	16,3304	1430	2 1430	LEMPREC	13,3057	1209	13 36 971	LMDSAS02	05,2136	= 215	1 215
LASTBIAS	06,3663	349	1 858	LEMSTORE	23,2357	706	1 706	LMDSAS03	05,2145	= 215	1 215
LASTCHG	17,3074	1451	1 1450	LEMVEC	43,3057	303	1 278	LMDSAS04	05,2154	= 215	1 215
LASTLADW	F7,1743	= 165	1 167	LFNGHOT	E5,1412	= 142	9 142 401	LMDSAS05	05,2157	= 215	1 215
LASTLROT	25,3535	573	1 572	LESCHK	05,3340	237	1 237	LMDSAS06	05,2170	= 215	1 215
LASTNEGY	21,3076	904	2 903	LETABBIT	4743	= 97	3 746 837	LMDSAS07	05,2341	215	1 215
LASTOK	21,3046	903	2 903	LETA8ORT	0215	= 97	4 795 855	LMDSAS08	05,2355	216	1 215
LASTPOSY	21,3060	904	2 903	LETITLIV	27,2244	758	1 758	LMDSAS09	05,2224	= 216	1 215
LASTISEG	07,3503	1318	1 1318	LGCLCADR	01,3767	1302	1 1301	LMINT	24,3160	576	1 576
LASTTIME	01,3476	1127		LGCL2CDR	5307	1126	1 1126	LMKAQSN	F6,1410	144	1 228
LASTXCMO	0113	= 112	1 541	LGCMP	06,3531	346	3 339 349	LMLSALDL	05,2357	= 217	1 220

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS EOLLOWS:

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 BD BAQLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEE, # OF REFS, PAGE OF FIRST REE, PAGE OF LAST REF.

SYM80L	DEE	H	REFERENCES	SYMBOL	DEE	H	REFERENCES	SYMBOL	DEE	H	REFERENCES
LMLSAL01	05,2127	= 217	1 217	LOCSKIRT	22,2744	= 377	7 366 368	LOSSM	1101	= 615	3 609 611
LMLSAL02	05,2136	= 217	1 217	LOCTHETA	10,3577	1393	1 1393	LOSVDI/4	E3,1760	= 615	5 609 611
LMLSAL03	05,2145	= 217	1 217	LODESCNT	20,2003	58	1 1481	LOSVEC	E5,1413	= 142	3 142 400
LMLSAL04	05,2154	= 217	1 217	LODMIXNN	42,2121	319	1 319	LOSVEL	E3,1760	= 128	6 128 615
LMLSAL05	05,2157	= 217	1 217	LODNLV	42,2137	319	1 319	LOS1	E5,1444	= 142	
LMLSAL06	05,2170	= 217	1 217	LODNNLOC	41,2113	421	8 420 440	LOS2	E5,1452	= 142	
LMLSAL07	05,2276	= 217	1 217	LODNNTAB	42,2103	319	1 421	LOTEMIN	0124	= 112	
LMLSAL08	05,2224	= 217	1 217	LODPHALF	11,2272	= 36	3 336 1195	LOTEMOUT	1010	= 117	1 437
LMLSAL09	05,2226	= 217	1 217	LODPMAX	11,2305	1096	3 36 1197	LOTHRUST	33,2355	= 863	1 863
LMDEMEGAN	E6,1407	144	2 228 1420	LODPMAX1	11,2307	1096	1 36	LOUNITX	11,2272	= 36	
LMONLY	16,2451	1420	1 1420	LODPI/4	04,2757	= 36	1 1132	LOUNITY	11,2270	= 36	
LMOONBIT	4741	= 95	1 228	LODSAMPT	4400	475	3 451 1333	LOUNITZ	11,2266	= 36	
LMOONFLG	0174	= 95	5 36 1207	LOENERGY	12,3451	1192	1 1191	LOUPE	21,3747	1478	1 1477
LMOR8MDL	05,2066	= 209	1 219	LOGSUB	32,3613	857	1 848	LOVEL	30,2263	842	2 842
LMOR8MO1	05,2127	209	4 209 217	LOKON8IT	4747	= 82	1 562	LOWCRIT	E5,1476	= 137	3 137 798
LMOR8MO2	05,2136	209	6 209 219	LOKONSW	0012	= 82	4 286 521	LOWFCOLD	31,2323	798	1 798
LMOR8MO3	05,2145	210	6 209 219	LOLIM	12,3512	1193	2 1190	LOWIDCOD	05,2065	208	1 992
LMOR8MO4	05,2154	210	6 209 219	LOMAT	35,3403	686	2 682 684	LOWLOAD	10,3401	1366	1 1367
LMOR8MO5	05,2157	210	6 209 219	LONG	1122	= 120	13 120 1130	LOWSUPER	30,2000	= 33	8 225 665
LMOR8MO6	05,2170	210	3 209 217	LONGBASE	1151	120	2 1295 1301	LOWVERB	41,2034	420	1 420
LMPOS	E4,1755	= 135	4 135 576	LONGCADR	1147	120	2 1126 1127	LOW10	5012	1092	21 247 1235
LMREND01	05,2232	= 213	1 219	LONGCALL	5277	1125	4 387 1302	LOW11	4356	474	7 171 1009
LMREND02	05,2127	= 213	1 213	LONGCLCL	01,3724	1301	2 1301	LOW2	6244	= 1094	1 1048
LMREND03	05,2136	= 213	1 213	LONGCYCL	01,3463	1126	2 1126 1127	LOW3	4757	= 1094	2 247 1045
LMREND04	05,2145	= 213	1 213	LONGEXIT	E3,1434	125	4 1126 1127	LOW4	4762	1090	2 1087 1369
LMREND05	05,2154	= 214	1 213	LONGGYRO	07,3516	1318	1 1317	LOW5	4346	474	14 412 1333
LMREND06	05,2157	= 214	1 213	LONGPOOH	01,3516	1127	2 1126	LOW7	6073	998	14 243 1365
LMREND07	05,2224	= 214	1 213	LONGRTRN	01,3503	1127	1 1127	LOW7+2K	5013	1092	1 1004
LMREND08	05,2276	214	2 213 217	LONGTIME	1153	120	13 1125 1301	LOW8	4357	474	20 206 1387
LMTRAP	F6,1406	144	2 228 1420	LOOKANGL	E7,1665	= 165	1 811	LOW9	5094	1091	12 260 1108
LMVEL	E4,1763	= 135	3 510 576	LOOPCT	E7,1603	= 156	5 643 651	LOWZEROS	11,2274	= 36	4 263 1181
LNCHTM	E7,1656	= 163	3 163 507	LOOPER	17,2737	1448	3 1442 1449	LPS20.1	24,3151	576	4 508 581
LNGCALL2	01,3447	1126	1 1126	LOOPMX	34,2057	642	1 643	LPS20.2	25,3565	577	1 508
LOADDAP	20,2000	= 30	1 307	LOOPRATE	16,3653	1465	2 1465 1466	LRADRET	E7,1646	= 165	3 165 896
LOADDAP1	01,2000	= 27	2 58 308	LOOPSIN	22,2417	370	1 371	LRADRET1	E7,1654	= 165	2 895 896
LOADITIS	10,3334	1365	1 1362	LOOP1	23,3622	1259	1 1258	LRALPHA	E7,1412	153	2 153 896
LOADLV	41,2775	440	10 419 448	LOOP2	23,3621	1258	1 1259	LRALPHA2	E7,1414	= 153	1 153
LOADLV1	41,2001	419	1 289	LOOP2.3	27,2160	603	1 604	LRALT	25,3073	564	2 503 893
LOADSTAT	1014	118	4 440 471	LOOP3	20,2656	1483	2 1483 1484	LRALT8IT	4747	= 102	
LOADTIME	10,3462	1390	32 222 1220	LOOSE	37,2730	399	1 400	LRALTFLG	0276	= 102	
LOASCENT	20,2001	58	1 1481	LOSCALAR	0004	= 109	4 394 1448	LRBETA1	F7,1413	= 153	1 153
LOC	0164	115	45 384 1366	LOSC8BIT	4740	= 85	4 563 615	LRBETA2	E7,1415	= 153	
LOCTR	0064	= 111	31 385 1361	LOSCMFLG	0041	= 85	9 508 609	LRBY8IT	4735	= 99	7 244 875
LOCKANGL	22,2402	370	1 364	LOSCOUNT	E7,1454	154	38 198 622	LRYPASS	0245	= 99	2 789 795
LOCSAM	14,2347	932	3 932 960	LOSDESRD	E7,1707	= 159	6 159 602	LREGCHK	04,2735	711	1 710

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 8D BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYM80L TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
LRESC	20,2607	1482	1 1482	LRWVZ	E7,1421	153	1 889	M/SCON3	42,3376	436	4 435
LRHEIGHT	25,3272	568	1 567	LRXCDU	E4,1660	= 132	5 132 894	M/SLIMIT	42,3322	435	2 435
LRHJ08	34,3717	893	1 873	LRXCDUOL	E4,1740	= 135	3 135 892	M/SNORM	42,3336	435	7 435 436
LRHMAX	E7,1416	153	2 886	LRXCDU	E4,1661	= 132	2 132 887	M/SOUT	42,3277	435	1 430
LRHTASK	21,2314	873	1 829	LRXCDUOL	E4,1741	= 135	1 135	MAGSUB	4512	532	9 534 555
LRINH	0254	= 100	2 287	LRZCDU	E4,1662	= 132	4 132 894	MAGVEC2	E5,1717	= 140	6 140 1193
LRINHBIT	4744	= 100	2 885 888	LRZCDUOL	E4,1742	= 135	3 135 892	MAINENG	30,2433	847	1 847
LRILCTR	E7,1666	= 165	5 165 896	LSDISP	15,2252	930	1 930	MAINLINF	30,2716	851	1 852
LRMCTR	E7,1670	= 166	5 166 896	LSORIENT	15,3647	978	2 930 971	MAINRTNF	34,3432	734	1 737
LROFF	43,2325	287	1 277	LSPDS	15,3663	980	4 932 1233	MAINRTN1	34,3456	735	1 735
LRON	43,2322	286	1 277	LSR22.3	26,2370	586	3 518 604	MAJ+	07,3442	1317	1 1316
LRPOSALM	33,2571	876	1 875	LSR22.4	26,3143	594	1 586	MAJ-	07,3562	1320	1 1316
LRPOSBIT	4746	= 102		LSTANKCH	43,3731	1287	1 1286	MAKEACCS	37,3501	860	2 859
LRPOSCAL	43,2651	294	2 291	LSTLIM	4747	= 758	1 758	MAKECADR	4645	994	16 286 1480
LRPOSCAN	25,3543	573	1 572	LSTPTR	0144	= 113		MAKEGEN	10,3412	1367	1 1355
LRPOSCHK	25,3220	567		LSTL	E3,1400	125	48 169 1297	MAKEMARK	10,2242	1349	1 1353
LRPOSFLG	0275	= 102		LST2	E3,1410	125	41 235 1123	MAKEMAX	20,2755	1486	1 1486
LRPOSNXT	25,3512	572	2 572 573	LST2CON	41,2145	421	1 421	MAKEPLAY	10,2421	1353	3 1352 1367
LRPOSOUT	40,2635	431	1 430	LST2FAN	43,2002	277	2 277 479	MAKEPRIO	10,2365	1352	1 1353
LRPOS2	25,3471	572	2 280 895	LS2IX	E3,1757	128	4 512 576	MAKERUPT	7753	1453	2 1452 1453
LRPOS2K	43,2151	280	1 277	LTHVACA	05,3343	237	4 236	MANFLAG	16,2177	1408	1 1407
LRP2ALM	43,2160	280	1 280	LUNABIT	4740	= 86		MANMODE	16,3006	1425	1 1425
LRRCTR	E7,1667	= 165	4 166 896	LUNAFLAG	0060	= 86	8 665 1134	MANUCALL	22,3177	380	1 380
LRSCK	25,3417	570	1 570	LUNDESCH	25,2421	550	1 336	MANUF8IT	4736	= 93	
LRSCTR	E7,1671	= 166	4 166 896	LUNG	15,2734	963	2 961 962	MANUFLAG	0152	= 93	
LR522	32,2000	= 33	2 56 580	LUNLANAD	36,3136	756	1 748	MANUOFF	22,3113	379	1 379
LR522.1	32,2376	580	1 517	LUNLAND	31,2522	804	1 756	MANUSTAL	22,3067	379	
LR522.1X	E7,1735	= 161	6 161 584	LUNPOS	15,3663	= 980	2 499 1234	MANUSTAT	22,3122	379	1 378
LR522.2	24,3230	583	1 517	LUNRSALN	0005	= 251	2 250	MANUSTOP	22,3213	382	1 379
LR524.1	26,3405	598	3 526 604	LUNSFCHK	24,2714	519	9 504 526	MANUVER	26,2000	= 31	1 486
LR524.11	26,3433	599		LUNSPH	11,3264	1234	1 1233	MANUVER1	26,2000	= 31	1 496
LRUPT	0011	= 108		LUNVFL	15,3774	982	1 1235	MARKCHEX	07,2216	267	2 267 276
LRVEL	25,3107	564	1 892	LV	0044	= 109	2 1065 1067	MARKCNTR	E7,1546	= 160	13 160 276
LRVELBIT	4744	= 102		LVBUF	6272	1005	1 1029	MARKCOP	10,2271	1350	1 1350
LRVELFLG	0273	= 102		LVFL8IAS	25,2000	56	1 567	MARKCTR	E7,1460	= 154	5 508 719
LRVELX	25,3101	564	1 503	LVLIMITS	21,3114	904	4 903	MARKEBAN	1071	119	1 1366
LRVELY	25,3077	564	1 503	LVMINLM	21,3204	905	6 904 905	MARKEND	10,2204	1349	1 1348
LRVELZ	25,3075	564	2 503 564	LV SQUARE	0042	= 109	2 1065 1070	MARKFLAG	1071	= 1366	1 1350
LRVJ08	33,3601	892	1 889	LVHTLIST	5215	1114	1 1118	MARKFMSK	10,2704	1358	2 1349
LRVMAX	E7,1417	153	2 888 889	LXA	01,2351	1082	1 1007	MARKFORM	10,2216	1349	
LRVTIMDL	E4,1743	= 135	2 215 892	LXC	01,2355	1082	1 1007	MARKNV	0370	116	5 1350 1359
LRVTIME	E4,1656	= 132	7 132 894	L14/OUT	40,2711	432	1 432	MARKOCT	10,3405	1367	1 1357
LRWH	E7,1420	153	1 886	=====	=====	=====	=====	MARKOVER	10,3274	1364	1 1348
LRWVX	E7,1423	153		M/SCON1	42,3373	436	1 435	MARKPERF	10,2316	1351	1 1360
LRWVY	E7,1422	153		M/SCON2	42,3374	436	1 435	MARKPLAY	10,2255	1350	4 1350 1366

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SYMBOL	DEF	F	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
MARKRET	10,3266	1364	1 1363	MEASINC	23,2D00	=	31 1 1144	MINIRECT	11,3361	1236	3 507 1218
MARKRUPT	07,2332	269	2 168 169	MFASINC1	23,200D	=	31 1 1148	MINISHT	21,3664	1476	1 1476
MARKSTAT	1312	122	34 237 276	METHOD1	22,2242	367	1 367	MINLMD	D1,20DD	58	1 309
MARKTEST	26,2462	587	1 586	METHOD2	22,2216	367		MINMINLM	D1,2DD1	58	1 309
MARKTYPE	07,2514	273	5 270 275	METHOD3	22,2266	368	2 367	MINPERE	22,3365	723	2 722 725
MARKWAKE	10,2676	1358	1 1365	MFI	E4,1634	=	132 12 364 366	MINPERM	22,3363	723	1 725
MARK2PAC	1073	119	2 1358 1359	MEISYM	E6,1701	=	15D 12 366 368	MINQR	17,2237	1439	2 1439
MARK3MSK	1D,336D	1366	2 1349	MFREF	15,3444	973	2 976 977	MINRTN	17,2244	1439	1 1439
MARK4MSK	1D,3361	1366	1 1349	MFS	E4,1634	=	132 5 132 364	MINTIMES	16,3604	1435	1 1432
MARSLEEP	1C,3327	1365	1 1350	MGARET	3D,3246	913	1 923	MINTIME2	D5,3447	986	1 987
MASKREG	E5,1534	=	142	MGC	E5,1743	=	138 3 139 1248	MINUS1	7746	=	1D94 2 1317 1364
MASS	1244	=	121	MGLVF8IT	4752	=	91	MINUS2	7745	=	13D2 3 234 1297
MASSCTR	0161	=	1489	MGLVFLAG	0130	=	91 2 701	MIS	E6,1644	15D	18 15D 496
MASSFIX	2D,2513	1481	3 1481	MG2	D7,37D1	1324	1 1324	MISCJUMP	6333	10D7	1 10D4
MASSMON	33,2225	861		MIDAVBIT	4752	=	97	MIXAD	41,2260	423	1 423
MASSMULT	31,2425	800	2 797	MIDAVFLG	0224	=	97 3 122D 1238	MIX8ACK	4D,3D47	445	1 445
MASSI	E7,1566	=	162	MIDDGIM	1D,2D00	=	28 1 701	MIX8R	014D	=	113 13 319 446
MATINC	D14D	113	9 113 1D34	MIDFLAG	DD02	=	81 5 1213 1241	MIXCON	4771	=	319 1 319
MATMOVE	14,3237	944	6 941 97D	MIDFLBIT	4737	=	81	MIXNN1	41,2234	423	1 423
MAX	DD16	=	1199	MIDGIM	1D,2DD2	7D1		MIXNN2	41,2246	423	1 423
MAXANG	22,2364	37D	1 365	MIDGIM1	1D,2D05	=	701	MIXNOUN	41,2221	423	1 420
MAXCHECK	12,2640	1179	1 1179	MIDORLST	17,3063	145D	1 145D	MIXTEMP	D125	=	112 3 417 423
MAXCHK	22,3636	729	6 627 728	MIDTOAV1	13,36D3	1219	1 742	MKABORT	07,2D44	26D	1 250
MAXCOGA	12,3311	119D	2 1189 119D	MIDTOAV2	13,3577	1219	1 765	MKALARM	07,2325	268	1 267
MAXDB	05,3062	233	1 227	MIDIFBIT	4751	=	97	MKDEX	E7,155D	=	16D 9 16D 276
MAXDT	13,3337	1214	2 1213	MIDIFLAG	D223	=	97 4 1219 1221	MKOV8IT	4751	=	89 2 1351 1358
MAXDV	DD,2642	106D	1 1D56	MID2	13,3676	122D	1 122D	MKOVFLAG	D11D	=	89
MAXDVSW	014D	=	113	MID5	4347	474	1 441	MKREFJ	D7,2461	272	1 269
MAXISHFT	21,366D	1476		MID7	4144	452	4 452 1366	MKRELEAS	D7,2D47	26D	1 268
MAXJETS	17,3275	1456	1 1456	MIN	DD1D	=	1199 4 1178 1179	MKRUPT88	4D61	169	1 168
MAXNM	22,3645	729	3 729	MIN+	D7,3437	1317	1 1316	MKTIME	E7,1752	=	161 9 161 893
MAXPLUS	2D,2763	1486	2 1485 1486	MIN-	D7,3557	132D	1 1316	MKVAC	D7,2D14	259	
MAXRA	27,3433	1268	2 1268	MINABDV	3D,3D53	856	1 844	MKVACFND	07,2D31	259	5 259
MAXTEST	0D,2565	1056	4 1055 1069	MINADR	17,2254	1439	1 1439	MKVB52	07,262D	275	
MAXTFF	27,3623	1274	1 1273	MINANG	22,2362	37D	1 365	MKVB53	D7,2617	275	
MAXTFF1	27,3622	1274	1 1271	MINB12	774D	=	989 1 987	MKVB54	D7,2616	275	1 275
MAXTRIES	24,2341	511	1 52D	MINB1314	05,35D2	987	1 987	MKVB54*	D7,2621	275	1 267
MAXTRY5	25,2474	553	1 554	MINCHECK	12,26D4	1178	1 1178	MLOS	F3,1766	128	6 559 615
MAXV8ITS	21,2D05	57	8 9D3 9D5	MINCOGA	12,3327	119D	1 1193	MMADREF	41,2D33	419	1 419
MAX250	35,3672	693	1 676	MINCON	42,3534	448	1 447	MMATRIX	D024	=	1143 8 1135 123D
MCTOMS	25,3D71	563	2 559 562	MINCON1	42,3271	435	1 437	MMCHANG	41,3430	46D	2 419 422
MDOT	E7,1735	=	158 2 158 781	MINCON2	42,3267	434	2 434	MMDSPLAY	5315	1288	1 232
MDOTAPS	36,2D10	53		MINCSM	4741	=	58 1 3D9	MMNUMBER	0775	117	1D 242 837
MDOTDPS	36,2DD2	53	1 833	MINDEX	0774	117	4 243 247	MMSAVE	E7,1567	=	836 2 836
MD1	4362	474	3 471 1384	MINIMP	43,3D11	299	1 278	MMTEMP	106D	=	247 3 247

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SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
MNKEYIN	0015	=	109	2 233 1332	MOREIDLE	16,2154	1408	3 1405 1406	MXMYMZ	26,2726	590
MODABORT	07,3714	1324	2 1324	MORNUM	40,2312	414	2 413	MXM3	22,2312	369	4 364 495
MODDONE	12,2112	1170	3 1170	MOVATHIS	13,2747	=	36	1 1218	MXV	7333	1033
MODE	0163	115	35 339 1366	MOVEACSM	13,2674	1206	3 1152 1206	MY	E7,1702	=	160 5 160 596
MODEA	1107	=	119	4 337 550	MOVEALEM	13,2747	1207	4 36 1207	MZ	E7,1710	=
MODE8	1111	119	4 119 553	MOVEPCSM	13,2723	1206	3 1152 1206	M11	E6,1412	144	9 169 1432
MODECADR	1304	122	10 122 1324	MOVEPLEM	13,2770	1207	3 1151 1207	M21	E6,1413	144	4 204 1445
MODEFXIT	07,2730	1305	8 1304 1324	MPAC	0154	115	885 114 1498	M22	E6,1415	144	7 203 1445
MODEGOOD	07,3704	1324	1 1324	MPAC+	00,2437	1054	2 1053	M31	E6,1414	144	4 204 1445
MODESLP	07,3710	1324	1 1324	MPAC+6	0162	=	433	7 433 475	M32	E6,1416	144
MODESW	07,2000	=	28	1 1304	MPAC-	00,2433	1053	2 1053	=====		
MODE2CHK	4550	534	2 533 555	MPACSHR	00,2033	1042	2 1050 1071	NARROWDB	20,2150	1402	1 1402
MODE70	21,2270	832	2 830	MPACSRND	00,2050	1043	1 1042	NAVKEYIN	0016	=	109 6 233 270
MODE71	21,2272	832	1 830	MPACTST	42,3550	448	1 447	NBDONLY	06,3555	347	1 1116
MODNGDEL	12,2613	1178	2 1178	MPACV8UF	7531	1038	5 612 1257	NBDX	E3,1460	125	6 339 1116
MODPSDEL	12,2651	1179	2 1179	MPAC2SAV	0165	=	1366	NBDY	E3,1461	125	2 341 348
MODRFG	1011	117	22 227 1381	MPERFMSK	10,3373	1366	2 1349	NBDZ	E3,1462	125	2 341 348
MODROUT8	04,2037	=	460	1 460	MPTEMP	0135	113	64 113 1081	NBD2	06,3602	347
MONADR	40,3436	459	1 459	MR,KLEAN	05,2643	228	2 227 1377	NBD3	06,3606	347	
MON8ACK	41,3350	452	1 452	MRKID8IT	4735	=	88	NBPOSPL	37,2012	386	
MONBUSY	41,3351	452	1 451	MRKIDFLG	0074	=	88	NBRANCH	11,3136	1232	3 1230 1241
MONDEL	41,3320	451	1 451	MRKNVBIT	4743	=	88	NBRANCH1	11,3126	1232	1 1231
MONDO	41,3321	451	1 451	MRKNVFLG	0102	=	88	NBUSMASK	10,3366	1366	1 1353
MONITOR	41,3230	450	7 421 422	MRUPT8IT	4747	=	89	NB1N82	23,2415	=	36
MONIT1	41,3232	450		MRUPTFLG	0106	=	89	NB2CDUSP	30,3504	919	1 913
MONIT2	41,3245	450	2 450	MSKDATR1	20,2021	307	1 307	NCDU	E6,1701	=	150 3 378 379
MONREF	41,3347	452	1 452	MSTORE1	01,2364	1082	2 1083 1086	NCDARSE	14,3523	950	4 941 970
MONREPOS	06,3115	202	1 202	MS100	7726	=	1408	NCSHVEL	E7,1662	=	163 2 507
MONREQ	41,3275	451	2 451	MU(P)	0032	=	1243	NDCMPTST	41,2436	428	
MONSAVE	1020	118	7 237 452	MUCHTIME	01,3506	1127	2 1126	NDCDOW	E6,1646	=	151 6 151 918
MONSAVE1	1021	118	12 237 478	MUEARTH	13,2006	61	8 696 1241	NDCXCHNGE	12,2247	1172	2 1172
MONSAVE2	1022	118	4 450 465	MUL8USH	21,3612	1475	1 1475	NDCXCTR	E5,1414	=	142 7 142 389
MOON8IT	4740	=	81	MULTEXIT	5624	1376	3 1375 1376	ND1	4361	474	6 394 892
MOONCNTR	14,2404	932	1 932	MULTFAIL	5630	1376	1 1375	NEARONE	27,3742	1277	4 847 1274
MOONFLAG	0003	=	81	29 686 1241	MUM	13,2004	61	NEFDLBIT	4750	=	82 1 1410
MOONG	31,2007	59	1 819	MUM(-37)	30,2002	59	1 841	NEEDLER	20,2322	1413	1 1409
MOONGQN	22,3516	725	1 725	MUNFLAG	0141	=	92	NEFDLFR2	20,2353	1413	1 1413
MOONMX	24,3561	1138	2 1135 1137	MUNFL8IT	4744	=	92	NEEDLES	20,2373	1414	1 1414
MOONOTH	0173	=	36	2 312	MUNGRAV	33,3162	884	NEEDLES3	20,2362	1413	1 1413
MOONPAD	22,3373	723	1 722	MUNRETRN	33,2514	875	1 884	NEEDLE11	20,2334	1413	
MOONRATE	30,2004	59	1 843	MUNRVG	33,3120	883		NEEDLFLG	0013	=	82 2 281
MOONSPOT	33,2251	862	1 861	MUTABLE	04,2004	60	5 702 1189	NEG	6740	1020	4 1020
MOONTHIS	0174	=	36	6 312 1217	MWAITBIT	4741	=	88	NEGCOS	13,2532	1132
MORECADR	20,2445	1415	1 1415	MWAITELG	0100	=	88	NEGDRIVE	21,3721	1477	1 1477
MOREDES	25,2627	557	2 557	MX	E7,1674	=	160	6 160 591	NEGDOT	17,3223	1455

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SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
NEGFNCT1	21,3375	1469	1 1469	NEWMODE	6057	998	6 1014 1391	NOATTOFF	07,3241	1311	4 180 1310
NEGLMLV	21,3161	905	1 904	NEWMODEA	5314	1288	3 247 836	NOBITS	E5,1442	=	142
NEGMAX	4735	= 1094	12 380 1486	NEWMODEX	5311	1288	7 386 1387	NOCHG	35,3526	688	1 688
NEGONE	7746	1093	15 234 1497	NEWOPS	6067	998	1 997	NODOOT	24,2004	68	1 1138
NEGOUT	13,2540	1132	1 1132	NEWPAR	14,2574	936	1 936	NOOESNB	25,2533	554	1 554
NEGP	12,3426	1191	3 1190 1191	NEWPHASE	31,2446	802	1 805	NOOESSM	25,2471	553	2 550 553
NEGSGN	40,2374	415	1 412	NEWPOS	E7,1650	= 163	4 163 507	NOOIO	24,2012	69	1 1138
NEGSHAFT	25,2570	555	1 555	NEWPRIO	0063	= 111	12 247 1355	NODOBIT	4753	= 86	2 242 244
NEGTFE	27,3617	1274	2 1273	NEWSTATF	12,2666	1180	1 1182	NODOFLAG	0054	= 86	6 222 1331
NEGTHRST	17,3753	1502	1 1501	NEWTC	12,2165	1171	1 1171	NODSPOUT	06,2130	175	2 172
NEGTOCK	16,3715	1466	1 1465	NEWTN	34,2702	650	2 650	NODSPY	06,2152	175	1 175
NEGTOCKU	E6,1516	= 148		NEWVEL	E7,1642	= 163	3 163 507	NODVMON1	33,2345	863	1 862
NEGTOCKU	E6,1520	= 148		NEWZCOMP	22,3647	1152	1 1146	NODVMON2	33,2351	863	1 862
NEGTOIKP	E6,1514	= 148		NEXTCOU	07,3033	1307	4 1307 1308	NOEBANK	43,3370	1282	1 1283
NEGTOVFL	12,2337	1173	1 1173	NEXTCOL	11,3466	1238	2 1239	NOEND	25,3262	567	1 567
NEGUQ	E6,1500	147	11 147 1477	NEXTCORE	01,2671	1102	2 1101	NOGIMLOC	22,2744	377	1 377
NEGUR	E6,1502	= 147	4 1406 1470	NEXTES	35,3155	679	1 678	NOGIMRUN	06,2462	185	2 184
NEGUSUM	21,3714	1477	3 1475 1477	NEXTIME	E6,1704	= 150	3 380 381	NOGO	22,2732	376	3 376 378
NEGVMAXY	21,3104	904	2 904	NEXTINCL	05,3465	987	1 987	NOGORL	27,3034	784	1 784
NEGO	4754	1090	31 172 1451	NEXTINSL	05,3610	989	1 986	NOGUESS	12,3476	1192	1 1190
NEG1	7746	= 1094	5 339 1094	NEXTLINE	22,3507	725	1 725	NOIBNKS	6062	998	1 1039
NEG1/2	4734	1090	6 235 1123	NEXTP	E6,1470	145	7 145 1425	NOINT	13,2653	1205	1 1204
NEG100	5172	1111		NEXTU	E6,1471	= 145	5 1400 1437	NOKILL	43,3123	305	1 306
NEG12	00,3733	1081	3 1049 1071	NEXTV	E6,1472	= 145	5 1400 1438	NOLITE	33,3572	891	2 890
NEG180	40,3066	445	1 445	NGUIDSUB	E7,1645	= 165	3 803 815	NOLOKON	23,2026	286	1 286
NEG2	7745	1093	10 245 1475	NICKLEOP	34,2077	642	1 645	NOLRRBIT	4742	= 100	2 873 885
NEG3	7744	1093	7 890 1437	NIGNLOOP	E7,1644	= 165	3 790 815	NOLRRREAD	0252	= 100	1 895
NEG4	6111	999	2 1003 1280	NINE	4320	= 1094	2 1495	NOMONLST	05,2172	= 208	
NEG5	41,2115	421		NJETSBIT	4735	= 83		NOMINIMP	43,3016	300	1 278
NEG7	5660	= 247		NJETSFLG	0017	= 83	1 762	NOMORE	25,3174	566	2 566 571
NETNEG	20,3630	1497	1 1497	NN	E7,1464	154	4 213 646	NOMTPI	E4,1722	= 133	9 637 686
NETZERO	6120	1000		NNAOTAB	42,2154	320	1 319	NONAVKEY	05,3075	233	1 233
NEWAGS	32,2024	222	1 222	NNAOTEM	0146	113	8 319 443	NOPIE	35,3304	682	1 682
NEWANGL	22,3007	378	1 377	NNTYPTAB	42,2320	323	1 319	NOQRSM	5274	1124	1 1423
NEWANGLE	24,3706	1140	4 1138 1141	NNTYPTM	0147	113	5 319 442	NOQRSM	5272	1124	1 1452
NEWOATA	21,2477	899	1 898	NO.CORES	01,2631	1101	2 1101 1106	NORATES	30,2510	848	1 848
NEWDEL	12,2647	1179	2 1178 1179	NO.PJETS	E6,1521	148	3 148 1465	NORBACK	40,3051	445	1 445
NEWDELHI	22,3003	378	1 381	NO.UJETS	E6,1522	= 148	3 148 1465	NORDSTAL	25,2456	552	3 550 553
NEWOFX	12,2267	1172	3 1172 1173	NO.VJETS	E6,1523	= 148		NOREASON	33,3253	885	1 885
NEWIBIT	4737	= 95		NO.WOS	6243	1003	5 1003 1072	NORESET	07,3403	1315	
NEWIFLG	0172	= 95	3 1210 1214	NO-ATP	30,2667	850	1 850	NORFINAL	13,3276	1213	
NEWJOB	0067	111	22 236 1287	NO-INT	13,2063	251	1 251	NORLITE	33,3555	890	2 890
NEWLIST	05,3460	987	2 986 987	NOADJUST	42,3717	500	1 500	NORMADR	42,3375	436	1 435
NEWLOAD	30,2102	840	1 840	NOADS	20,3343	1493	1 1493	NORMAL	01,2334	310	1 309
NEWLOC	0065	= 111	9 1098 1106	NOATTCNT	30,3721	923	3 911 914	NORMBNCH	10,2734	1359	1 1365

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UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR FRASE ANYWHERE MD MULTIPLY DEFINED
 80 BADLY DEFINED CO DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
NORMEX	E7,1461	154	18 640 706	NOUPEBIT	4746	= 84	1 517	NVDSPI	10,2772	1359	1 1359
NORMEXIT	32,2527	582	1 581	NOUPFLAG	0030	= 84	2 304	NVMONOPT	4155	465	1 1359
NORMGAM	E4,1503	= 130	7 130 1153	NOUT	1016	118	9 172 480	NVQTEM	1037	119	2 465
NORMLIZE	33,2421	868	2 257 858	NOUTCOR	4760	= 1094	1 237	NVSAVE	0371	116	3 226 1365
NORMLI21	33,2450	868	1 868	NOUVEAU	04,2305	246	1 244	NVS8BRNK	4201	465	2 465
NORMLI22	33,2453	868	1 868	NOVAC	5072	1098	32 173 1406	NVS8COM	4164	465	1 477
NORMLOP	37,2604	398	1 398	NOVACADR	01,3772	1302	1 1299	NVS8ENDL	40,3437	459	2 459 461
NORMRET	10,3302	1365	2 1363	NOVAC2	01,2622	1101	1 1098	NVS8WAIT	4445	477	
NORMS8IT	4742	= 93		NOVAC3	01,2625	1101	1 1102	NVS8WT1	4455	477	1 477
NORMSCL	16,3577	1435		NOVRWRT	35,3360	684	1 685	NVSU8	4154	465	3 278 1365
NORMSW	0156	= 93	6 696 1184	NOV37MM	04,2474	250	1 242	NVSU88	41,2000	419	1 465
NORMTEM1	1045	= 118	3 943 1356	NOWMATX	32,2267	506	1 506	NVSU8COM	4170	465	
NORMTEST	00,3512	1076		NPTRAPS	E6,1431	= 144	4 1407 1420	NVSU8ENO	4202	465	4 459 467
NORMT4	06,2007	170	2 170	NQTRAPS	E6,1432	= 144	4 1407 1421	NVSUBSY1	04,2604	477	1 477
NORMUNIT	10,3700	1396	11 352 1396	NRMAG	0040	= 1262	4 1265 1272	NVSUBUSY	4442	477	2 477 1362
NORMUNX1	10,3676	1396	1 596	NRMIDBIT	4737	= 88		NVSU81	41,3544	466	2 419 465
NORMWAKE	10,3206	1363	1 1365	NRMIDFLG	0076	= 88		NVSU82	41,3571	466	1 466
NORMZI	0044	= 1153	12 1152 1153	NRMNVB8IT	4744	= 89		NVTEMP	0123	= 112	9 465 477
NORDAT	17,2731	1448	3 1447 1452	NRMNVFLG	0103	= 88	1 1360	NVWORD	0367	116	6 752 1365
NORRGMON	06,3132	= 204	7 198 202	NRTERM	0020	= 1262	2 1271	NVWORD1	1067	119	2 752 1361
NORRM8IT	4750	= 91	2 201 235	NRTRAPS	E6,1433	= 144	4 1407 1421	NV50DSP	10,2773	1359	3 1351 1361
NORPMON	0126	= 91	6 285 524	NRUPIBIT	4750	= 89		NWAITBIT	4742	= 88	
NOR29FLG	0061	= 86	2 851 865	NRUPTFLG	0107	= 89		NWAITFLG	0101	= 88	
NOR29NOW	33,2623	877	6 607 877	NR29ROR	5014	= 606	1 877	NXAX	15,2455	957	1 956
NOSHIFT	10,3742	1397	6 1396	NR29EBIT	4741	= 86	3 235 616	NXPOSVEL	31,2132	620	1 621
NOTALLOW	21,3537	1474	2 1473	NSAMP	1111	= 119	3 565 567	NXTBNK	43,3641	1286	2 305 1287
NOT8ITI2	40,3671	484	2 483 484	NSRCHPNT	E7,1732	= 159	5 159 602	NXTFL33	06,2432	183	7 192 193
NOTHRBIT	4740	= 90	1 747	NSTEER	36,3645	768		NXTIBT	06,2420	183	3 183
NOTHROTL	0116	= 90	5 761 789	NTARG8IT	4751	= 92		NXTIFAIL	06,2225	177	11 186 191
NOTIME	13,3706	1221	2 1219 1220	NTARGCHK	35,3504	687	1 687	NXTIF8IT	06,2213	177	3 177
NOTMIN	17,2764	1448	2 1448	NTARGFLG	0146	= 92	3 687	NXTRRLAX	25,2252	545	1 545
NOTMUCH	20,3322	1492	1 1491	NTP/2	34,2376	646	2 646	NXTRST	05,3023	232	1 232
NOTPLAN	15,2567	959	1 959	NUCHANG2	01,3006	1105	1 1111	NXTSUPR	43,3666	1286	1 1286
NOTP20	25,3041	563	1 562	NUDIRECT	01,3222	1111	1 1111	NXT6ADR	E6,1463	145	5 234 1450
NOTSHIFT	24,3217	576	1 576	NULLCLOCK	36,3025	753	3 753 754	NZACCDOT	0063	= 1472	3 1473
NOTWCSM	26,2422	586	1 586	NUM	40,2175	412	9 411 412	N45PROC	35,3610	690	1 689
NOTWLEM	26,2454	587	1 587	NUMBERT	E6,1741	= 146	21 1424 1501	N49DSP	24,2670	519	1 518
NOULLAGE	36,2656	750	4 748 767	NUMGRPS	4756	= 238	2 231 232	N49FLAG	E7,1744	= 160	5 167 519
NOUN	40,2370	415	1 412	NUVCSM	E3,1600	127	1 588	N99LOOP	31,2036	619	1 619
NOUNADD	0145	= 113	29 423 473	NUVLEM	E3,1652	127	1 588	=====			
NOUNCADR	1017	118	9 420 473	NVBNKTEM	1040	118	1 465	OANB	05,3370	264	3 263 956
NOUNREG	1002	117	15 237 471	NV8USMSK	10,3371	1366	1 1361	OBLATE	11,2726	1230	2 1226 1227
NOUNTEM	0122	= 112	3 423	NVCADR	10,3362	1366	1 1362	OCCDS	14,2436	933	2 932 933
NOUNTEST	41,2460	428	2 438 439	NVCOM	40,2357	415	1 415	DCCULT	14,2601	936	2 935 936
NOUPDOWN	43,3064	304	1 303	NVDSP	10,2743	1359	2 1360 1366	OCTAL27	21,2271	832	1 830

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 8D BADLY DEFINED CO DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYM80L TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
OCTAL3	6244	1003	1 1094	OCT30001	05,3346	238	1 234	OC24100	43,2127	279	1 278
OCT8ACK	41,3411	456	1 458	OCT30002	6470	= 1094		OC40010	06,2773	196	1 195
OCT00010	4750	= 247		OCT3005	04,2322	247	1 246	OFFCALC	26,3523	600	1 602
OCT00012	24,2342	511	1 505	OCT31	6010	239	4 224 1474	OFFSTFAC	26,3650	603	1 600
OCT00240	21,3560	1474	1 1473	OCT32001	05,3342	237	1 235	OFFTUNIT	10,3740	1397	1 1397
OCT02100	06,3131	202		OCT32002	06,3127	202	1 201	OGC	E5,1737	= 138	16 138 1249
OCT05776	06,3033	198	1 197	OCT33	4764	1091	3 239 1091	OGCPL	37,2475	394	1 401
OCT10000	4737	= 232		OCT34	07,2624	275	1 269	OGCT	E5,1747	= 139	2 139 968
OCT10001	7662	= 1094	1 197	OCT348AR	42,3574	449	2 449	OGF	E6,1715	= 150	
OCT10002	33,2242	861	1 877	OCT3400	10,3365	1366	1 1356	OHWELL1	04,3343	1382	5 1382 1383
OCT10200	10,3413	1367	1 1353	OCT34300	10,3374	1366	1 1349	OHWELL2	04,3366	1383	4 1382 1384
OCT11	4320	= 1090		OCT35	4765	1091	2 1091 1377	OKDESN8	25,2507	554	1 554
OCT1103	5702	1377		OCT37667	04,2364	247	1 243	OKDESSM	25,2412	550	1 553
OCT120	4775	= 1094	2 245 246	OCT37737	06,2162	175	1 185	OKEXIT	24,3244	583	1 583
OCT13	15,2222	929	1 929	OCT37766	7726	1093	2 170 1408	OKMAX	35,3131	678	1 678
OCT14	5742	1378	8 196 1481	OCT37771	37,3524	860	1 859	OKPHI	22,2722	375	1 375
OCT140	4776	= 1094	1 270	OCT37774	7727	1093	1 832	OKTHETA	22,2702	375	1 375
OCT1400	5007	1091	11 473 1423	OCT37776	7730	1093	3 174 1363	OKTOCOPY	10,2411	1353	2 1353 1358
OCT14000	5024	= 1294	2 1293 1294	OCT40001	6106	999	2 1094 1117	OKTOENT	10,3164	1362	1 1365
OCT15	4761	1090	4 194 1068	OCT40010	07,3162	1309	2 1309 1311	OKTOGRAB	13,3466	1215	1 1215
OCT15000	5025	= 196	1 194	OCT40072	04,2365	248	1 243	OKTOPLAY	10,2452	1354	3 1353
OCT16	4317	= 1068	1 1068	OCT40200	7734	1093		OKU12	22,2256	367	1 367
OCT1601	37,3054	401	1 401	OCT40201	01,3365	1120	1 1117	OKU21	22,2232	367	1 367
OCT1720	06,3000	196	1 192	OCT40400	5642	1377	3 1352 1378	OKU31	22,2302	368	1 368
OCT176	00,2126	1045	2 1051	OCT40420	10,3411	1367		OK2DELAY	00,3752	1371	1 1371
OCT177	6073	= 1302	1 1299	OCT41000	43,2321	285	2 284 285	OLDATAGD	1113	= 119	4 565 571
OCT17770	5030	1092	2 1292 1294	OCT50	4771	1091	4 319 1365	OLDATA	21,2456	898	2 898
OCT20	4747	= 756	2 741 752	OCT500	04,2321	247	3 245 246	OLDESBIT	4753	= 82	2 607 609
OCT20002	06,3130	202	1 202	OCT501PV	24,3076	524	1 524	OLDESFLG	0016	= 82	
OCT201	24,2337	511	1 509	OCT51	43,3212	313	1 312	OLDPMIN	E6,1456	145	4 1407 1426
OCT20100	10,3415	1367	1 1352	OCT523	33,3703	895	1 895	OLDPRIO	5402	1293	1 1296
OCT203	26,2231	488		OCT54	06,2774	196	1 180	OLDQRMIN	E6,1457	145	4 1407 1439
OCT205	24,3077	524	1 523	OCT55000	41,3730	482	1 481	OLDTIME	32,3542	836	1 836
OCT217	5706	1377		OCT60000	4101	= 1094	2 1294 1363	OLDXFORP	E6,1436	145	5 145 1418
OCT220	04,3214	1327	1 1326	OCT62	4774	= 1329	1 1329	OLDYFORP	E6,1437	= 145	2 1418
OCT23	4360	= 1094	2 755 1003	OCT63	17,2255	1439	1 1439	OLDZFORQ	F6,1440	= 145	3 1407 1419
OCT23146	21,3447	1472	1 1473	OCT67777	10,3410	1367		OMEG/MS	37,2000	59	1 393
OCT24	6007	239	7 246 868	OCT7	4757	= 1368	5 1292 1368	OMEGA	F7,1500	= 160	9 160 1148
OCT24100	10,3127	1362	1 1350	OCT700	04,2366	748	2 244 245	OMEGA.K	E6,1741	= 147	8 1468 1469
OCT25	4362	= 1094		OCT740	06,3001	196	1 190	OMEGAD	F7,1732	= 159	3 331 525
OCT26	04,2323	247	2 245	OCT74160	05,3345	238	1 235	OMEGAM1	E5,1712	= 141	3 141 1149
OCT27	11,3721	1242	1 1227	OCT75	06,2775	196	1 195	OMEGAM2	E5,1720	= 141	3 141 1149
OCT272	06,2776	196	1 189	OCT77000	06,3002	196	1 189	OMEGAM3	E5,1726	= 141	3 141 1150
OCT27470	05,3344	237	1 235	OCT7777	05,3052	233		OMEGAP	E6,1417	144	15 144 1433
OCT30000	4355	= 233		OCT77770	5660	1377	5 247 1378	OMEGAPD	E6,1641	149	12 149 1433

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF OEE, # OF REES, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	OEE	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
OMEGAQ	E6,1420	= 144	14 740 1441	ORBITAL	11,2000	= 28	1 1223	P	E5,1737	= 140	14 140 1196
OMEGAQD	E6,1642	= 149	7 382 1435	ORBITAL1	11,2000	= 28	1 1242	P-RATE	16,2477	= 1420	
OMEGAR	E6,1421	= 144	8 1406 1441	ORBITAL2	13,2000	= 29	2 61 1242	P-RHCCTR	0043	= 108	4 1428 1429
OMEGARD	E6,1643	= 149	7 382 1435	ORBMANAD	32,3612	= 838	1 835	PACCFUN	E6,1557	= 1498	2 1491
OMEGAUV	E6,1424	= 144	12 144 1446	ORBMANUV	0003	= 251	5 250 838	PACKOPTN	15,3370	= 971	1 971
OMEGAV	E6,1425	= 144	2 145 149	ORBWF8IT	4746	= 87		PACTIVE	05,3031	= 232	1 232
OMEGCALC	26,3552	= 601		ORBWFLAG	0066	= 87	3 1217 1239	PARAM	04,3005	= 1183	3 1182 1195
OMEGDISP	E7,1732	= 159	3 159 601	ORDER8IT	4746	= 95		PARAM30	35,2017	= 624	
OMEGMONT	13,2000	= 61	1 1208	ORDERSW	0201	= 95	3 1178 1179	PASSIVE	23,2373	= 706	4 632 706
ONE	4753	= 1094	182 172 1495	ORIG	E4,1515	= 131		PASTFOPT	4132	= 452	1 452
ONE/SP	25,3576	= 577	1 577	ORIGCHNG	11,3305	= 1234	1 1234	PASTEVB	4124	= 452	2 452 459
ONE8-2	24,2344	= 512	1 506	ORIGEX	E4,1512	= 130	4 130 1235	PASTIT	07,2211	= 267	1 275
ONEBIT	04,2777	= 1181	1 1192	ORIGIN	E5,1773	= 141		PAUTND	30,3135	= 911	2 910
ONEOPP	37,3063	= 402	1 391	OTHCONIC	37,3315	= 715	1 715	PAXAOIOL	16,2201	= 1408	1 1407
ONEOCT	26,3652	= 603	1 600	OTHERS	13,3522	= 1217	1 1218	PAXOIST	F6,1565	= 1498	2 1495
ONEORTWO	5370	= 1293	1 1295	OTHERV	34,3613	= 738	1 738	PAXEILT	16,2635	= 1422	1 1422
ONESEK	22,3165	= 380	4 379 381	OTHINT	37,3326	= 715	1 715	PAXIS	16,2210	= 1416	2 1408 1499
ONFSTO2S	30,3714	= 923	3 917 921	OTHPREC	13,3043	= 36	5 665 722	PAXISAOB	20,3655	= 1499	1 1484
ONETENTH	20,2434	= 1414	1 1414	OTHSHP	22,3333	= 722		PBIASX	E3,1452	= 125	1 125
ONETHTH	34,2107	= 642	1 645	OURPERMS	E7,1617	= 164	2 164	PBIASY	F3,1454	= 125	
ONLITES	25,3656	= 623	2 622	OURRCBIT	4740	= 103	6 1427 1440	PBIASZ	E3,1456	= 125	
ONULLAGE	36,2662	= 750	1 745	OURRCFLG	0306	= 103		PBIT	4742	= 145	4 1427 1430
OP/INERT	43,2174	= 282	2 280 282	OURTEMPS	E7,1542	= 164	1 164	PBODY	E4,1430	= 129	18 130 1241
OPJUMP	6076	= 998	1 998	OUT	13,2332	= 719	1 719	PCLOOP	05,2777	= 231	1 232
OPJUMP2	6246	= 1004	1 998	OUTGOAVE	32,3707	= 865		PCONS	E4,1750	= 136	3 136 850
OPJUMP3	6262	= 1005	1 1004	OUTHERE	0161	= 1366	3 1362 1364	POA	0026	= 139	
OPONLY	06,2347	= 181	1 179	OUTLINK	0057	= 109		POB1	E6,1561	= 1498	1 1495
OPTAXIS	07,2142	= 263		OUTOFLIM	24,3060	= 523	2 523 524	POB2	E6,1562	= 1498	1 1495
OPTCAOR	1305	= 122	1 237	OUTOFLIN	E5,1533	= 138	3 138 792	POB3	E6,1564	= 1498	1 1495
OPTCOARV	43,2226	= 284	1 284	OUTROUTE	1260	= 121	4 243 865	POB4	E6,1563	= 1498	1 1495
OPTIONVN	22,3316	= 722	1 721	OUTSNUFF	43,3232	= 313	1 277	PDDL	6522	= 1015	1 1006
OPTIONX	1051	= 118	13 286 722	OUTO	0010	= 109	5 171 175	POSPFRIT	4740	= 88	2 487 488
OPTION1	1144	= 120	8 320 1356	OUT22.1	32,2532	= 582	2 582	POSPFLAG	0077	= 88	3 488 530
OPTION2	1145	= 120	13 505 975	OUT22.2	24,3247	= 584	1 583	POVL	6556	= 1016	1 1006
OPTION3	1146	= 120		OVERFFIX	37,2275	= 391	2 389 393	POXCHNGE	12,2303	= 1173	2 1172
OPTN8IT	4745	= 85		OVERFLOW	7016	= 1023	3 1022 1046	PEGI	16,3257	= 1430	2 1429
OPTNREG	E5,1463	= 142		OVERFLWY	7013	= 1023	4 1021 1046	PERFCHEK	10,3010	= 1360	
OPTNSW	0046	= 85	3 733 734	OVERFLWZ	7010	= 1023	4 1021 1046	PERFDLAY	E5,1574	= 143	1 387
OPTN1	34,3342	= 733	1 733	OVERSUB	16,2277	= 1417	12 1419 1435	PERFRAS	37,2772	= 400	1 398
OPTN2	34,3422	= 734	1 734	OVERSUB2	20,2435	= 1414	3 1410 1411	PERFMASK	10,3350	= 1366	2 1354 1356
OPTSTALL	07,3665	= 1324	1 938	OVF+	00,2414	= 1052	2 1052	PERF2MSK	10,3354	= 1366	2 1354 1356
ORBCHGO	24,2031	= 505	1 505	OVINO	0121	= 112	13 816 1104	PERF4MSK	10,3356	= 1366	1 1356
ORBCHG1	24,2043	= 505	1 505	OVFLCLR	12,3221	= 1188	1 1188	PERIAPD	23,2307	= 704	1 644
ORBCHG2	24,2055	= 505	1 505	OVFLOWCK	E5,1576	= 143	3 386 401	PERIAPD1	23,2277	= 704	5 627 735
ORBCHG3	32,2227	= 505	1 505	=====	=====	=====	=====	PERIODCH	12,2070	= 1170	1 1170

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 BD BADLY DEFINED CO DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYM80L TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEE, # OF REES, PAGE OF FIRST REE, PAGE OF LAST REF.

SYM80L	OEF	H	REFERENCES	SYM80L	OEF	H	REFERENCES	SYM80L	OEF	H	REFERENCES
PERROR	E6,1462	145	8 169 1432	PICGXT	14,2633	937	1 937	PIPINDEX	E5,1415	= 142	6 142 392
PFAILOK	07,3227	1311	1 181	PICKANG1	27,2125	495	1 495	PIPJ088	37,2166	388	1 388
PFAILOK2	07,3222	1311	1 1311	PICKAXIS	27,2146	496	2 494	PIPSOONE	37,3435	859	1 872
PFLITEDB	20,2142	1402	3 761 841	PICKX	26,2350	496	2 496	PIPSRINE	37,3533	= 960	2 964
PERAT8IT	4750	= 86	1 926	PICNSWP	14,2652	937	1 937	PIPTIME	E4,1663	= 132	6 135 894
PERATFLG	0051	= 86	4 776 941	PIC1	14,2507	935	3 935	PIPTIME	1234	121	21 210 1218
PGUIDE	1247	= 121	6 121 883	PIC2	14,2512	935	1 935	PIPTIME1	E7,1556	= 162	13 162 1220
PHASCHNG	5353	1292	121 243 1388	PIC3	14,2522	935	5 935 936	PIPUSE	07,3246	1312	
PHASETAB	10,2000	= 28	2 1288 1294	PIC4	14,2525	935	1 935	PIPUSE1	07,3252	1312	1 349
PHASE1	0753	117	3 232 1296	PIE	E7,1610	= 164	11 164 816	PITCH	E4,1770	= 136	2 331 841
PHASE2	0755	117	2 768 859	PIESET	E7,1604	= 164	5 164 800	PITCHANG	E4,1604	= 134	7 134 500
PHASE3	0757	117		PIINACT	05,3036	232	1 232	PITCHOEE	27,3147	786	2 786
PHASE4	0761	117	1 863	PINBALL1	40,2000	= 35	2 314 411	PITEALL	21,2006	819	2 169
PHASE5	0763	117	1 744	PINBALL2	41,2000	= 35	1 419	PITTIME	E6,1402	144	2 329 785
PHASE6	0765	117	1 749	PINBALL3	42,2000	= 35	3 296 434	PJETSLEC	16,3335	1431	6 1426 1433
PHASJUMP	5363	1293	1 1292	PINBALL4	04,2000	= 27	1 470	PLANET	15,2540	959	7 939 967
PHEXIT	13,3176	1211	1 1211	PIN8RBIT	4746	= 89		PLANTIN	24,2000	= 31	2 68 1135
PHI	0024	= 531	2 529	PIN8RFLG	0105	= 89	1 1359	PLANTIN1	26,2000	= 31	1 1141
PHIV	E4,1445	= 130	6 130 1237	PINBRNCH	10,2723	1358	7 242 1366	PLANVEC	E7,1551	= 160	5 160 949
PHS881	E3,1437	125		PINTOMSK	10,3222	1363	1 1363	PLAST	E6,1452	145	5 1419 1429
PHS882	E3,1441	125		PINMASK	7737	= 1366	1 1359	PLAYJUM1	10,2470	1354	3 1359 1366
PHS883	E3,1443	125		PINSUPBT	4201	= 465	5 289 469	PLAYTEM1	0155	= 1367	27 1348 1357
PHS884	E3,1445	125		PINSUPER	40,2000	= 35	1 289	PLAYTEM3	0157	= 1367	3 1356 1364
PHS885	E3,1447	125		PINTEST	43,2002	= 479		PLAYTEM4	0160	= 1367	11 1348 1364
PHS886	E3,1451	125		PIPIABIAS	E3,1452	= 125	1 339	PLENTY	25,3211	566	1 566
PHSCHNGA	5357	1292	1 243	PIPACHK	37,2126	388	1 387	PLUSX	27,2446	776	
PHSCHNG2	10,2102	1294	1 1293	PIPAGE	1257	= 121	6 121 871	PMINE	34,2073	642	2 651
PHSNAME1	E3,1436	125	5 1294 1299	PIPASC	37,3077	402	1 398	PMINM	34,2103	642	
PHSNAME2	E3,1440	125	1 825	PIPASCE	E3,1453	= 125	1 339	PMMASK	10,3367	1366	1 1354
PHSNAME3	E3,1442	125	1 825	PIPASCFX	E3,1453	125	1 125	POINTER	0156	= 1302	7 1300 1302
PHSNAME4	E3,1444	125		PIPASCFY	E3,1455	125		POINTVSM	E7,1766	= 161	7 167 954
PHSNAME5	E3,1446	125	2 890	PIPASCEZ	E3,1457	125		POLISH	0117	112	39 112 1089
PHSNAME6	E3,1450	125		PIPASR	37,3530	870	4 347 960	POLLFY	5051	1097	2 1097
PHSPART2	01,3760	1302	1 1302	PIPATASK	37,2151	388	2 388	POLY	7221	1029	7 857 1276
PHSPROT1	1054	118	5 1293 1301	PIPATMPX	1160	120	3 862 900	POLYCNT	0140	= 113	4 1029 1030
PHSPROT2	1056	118	3 244 829	PIPATMPY	1161	120	3 862 900	POLYCOEF	12,3042	1185	1 1187
PHSPRDT3	1060	118	1 247	PIPATMPZ	1162	120	3 862 901	POLYCOM	7231	1029	1 1029
PHSPROT4	1062	118	1 247	PIPAX	0037	= 108	14 320 1390	POLYLODP	7241	1030	1 1030
PHSPRDT5	1064	118		PIPAY	0040	= 108	6 396 1390	POLYRET	0141	= 113	3 1029 1030
PHSPRDT6	1066	118		PIPAZ	0041	= 108	8 396 1390	POLYTEMP	E6,1737	= 146	10 1425 1452
PHS2CAOR	01,3765	1302	1 1297	PIPCTR	1056	= 829	4 609 859	POLY2	7244	1030	1 1030
PI/16	27,3726	1277	2 1273 1275	PIPCTR1	E7,1712	= 829	2 829 897	PON	37,2251	389	1 389
PICAPAR	14,2452	934	1 934	PIPFAIL	06,2650	192	1 196	PON2	37,2240	389	
PICBXT	14,2654	937	1 937	PIPFREE	07,3263	1312	1 864	PON4	37,2245	389	1 389
PICENO	14,2627	936	1 935	PIPFREF2	07,3260	1312	1 1312	POO000	5652	1377	6 259 1354

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SYM80L TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
P00D001	5720	1378	2 1074 1127	P0WR5ERS	7214	1029	2 824	PRI017	5027	1092	4 743 854
P00FIZZ	04,2254	246	1 245	PQR8IT	16,3113	1427	1 1428	PRI02	4741	= 1094	
P00H	04,2160	244		PRATE	E4,1754	= 136	7 136 850	PRI020	4736	= 1094	8 284 862
P00KLEAN	05,2647	229	1 245	PRDITAB	01,2000	= 254	3 1300 1302	PRI021	5031	1092	4 341 858
POSALARM	33,3666	895	2 895	PRE8JUMP	5316	1288		PRI022	7707	1092	4 305 877
POSALPH	21,3511	1473	2 1473	PRE8RET1	32,3442	835	1 847	PRI023	7710	1092	1 270
POSCODE	1052	= 958	6 331 958	PREC/IT	34,3552	737	2 733 734	PRI024	7711	1092	2 862 895
POSDEL	12,2633	1179	1 1178	PREC18IT	4744	= 87		PRI025	7712	1092	4 502 863
POSDELX	12,2255	1172	1 1172	PREC1FLG	0064	= 87	6 251 1214	PRI026	7713	1092	9 381 616
POSDRIVE	21,3723	1477	1 1477	PRECSET	23,2341	706	5 652 737	PRI027	7714	1092	5 207 1406
POSEC	42,3410	436	2 436	PREDOT	7153	1028	2 1033 1036	PRI03	5015	1092	12 267 1094
POSFNCT1	21,3373	1469	1 1469	PREDSPAL	40,3416	459	1 430	PRI030	4355	= 1094	12 189 1365
POSGMBL	37,2064	387		PREGUIDE	31,2454	802	1 808	PRI031	7715	1092	5 349 1435
POSGN	40,2407	415	1 411	PREMM1	04,2436	249	2 243 247	PRI032	7717	1092	4 873 1361
POSGOOD	33,3660	895	1 895	PREMON1	21,2027	820	1 820	PRI033	7720	1092	1 1353
POSITA	15,3677	980	1 981	PREMON2	21,2030	820	1 820	PRI034	7721	1092	2 991 1094
POSIT8	15,3702	980	1 981	PRENV8SY	4437	477	1 477	PRI035	7722	1093	1 1116
POSITD	15,3721	981	1 982	PREPOS29	25,3601	608	1 607	PRI036	7723	1093	
POSITE	15,3767	982	1 981	PREREAD	37,3374	858	1 744	PRI037	7724	1093	8 247 1399
POSITE	15,3742	981		PRERORS	43,3254	1280	3 1281	PRI04	4740	= 1094	4 289 501
POSITON	E5,1416	= 142	6 142 394	PRESINE	00,3526	1077	2 1077	PRI05	5017	1092	10 244 1204
POSMAX	4733	1090	44 186 1499	PRESTAND	37,3643	1329	1 1329	PRI06	5020	1092	4 547 1423
POSNV	E5,1520	= 143	2 399 400	PRESTORE	6420	1011	1 1011	PRI07	5021	1092	7 290 725
POSTAND	37,3720	1330	2 1329 1330	PRFMSTAQ	4761	= 950	1 948	PRLIMIT	30,3047	856	2 849
POSTAURN	36,3223	761	4 256 767	PRI0BQRT	10,2450	1354	2 1352 1361	PROCEED	10,3264	1364	1 1362
POSTCDH	E7,1601	156	3 156 651	PRI0CHNG	5146	1100	17 290 1363	PROCEDE	06,2075	173	
POSTCOM	37,3747	1331	2 1331	PRI0CH2	01,3067	1107	1 1100	PROCKEY	40,3450	462	1 173
POSTCSI	E7,1577	156	2 644 651	PRI0DBIT	4736	= 88	1 1359	PROCTNON	06,2242	179	1 179
POSTHRST	17,3713	1501	4 1501 1502	PRI0DFLG	0075	= 88		PROGLARM	5621	1376	1 1375
POSTJUMP	4635	993	56 180 1397	PRI0DSP	10,2362	1352	2 517 519	PROGRAV	15,2717	963	1 963
POSTORKP	E6,1513	= 148	1 210	PRI0DSPR	10,2357	1352	2 525 1376	PROG20	24,2022	504	2 249 504
POSTORKU	E6,1515	= 148	5 209 219	PRI0ENT	5575	1375	2 1376 1378	PROG20A	24,2062	507	3 505 507
POSTORKV	E6,1517	= 148		PRI0LARM	10,3451	1376	7 508 895	PROG21	24,3402	665	1 249
POSTTPI	E7,1603	156	5 156 735	PRI0OCT	10,3404	1367	2 1350 1357	PROG22	24,2022	= 504	1 249
POSUPDAT	33,3215	885		PRI0PLAY	10,2471	1354	2 1350 1353	PROG25	24,2427	514	1 249
POSVMAX	21,3067	904	2 904	PRI0RITY	0167	115	34 236 1355	PROG52	15,2050	926	1 248
POS1/2	4736	= 1094	2 1117	PRI0TIME	1165	120	2 1353 1363	PROJ	0022	= 165	
POS1/4	11,3701	= 1242		PRI0I	4742	= 1094		PROJMAX	31,3763	827	1 816
POS1CHK	33,2564	876	1 875	PRI0IO	4737	= 1094	5 299 786	PROJMIN	31,3764	827	1 816
POS2CHK	33,2535	875		PRI0I1	5022	1092		PROK	30,2561	849	2 849
POUT8IT	4745	= 92	1 798	PRI0I2	4644	993	3 226 767	PRONV8IT	4745	= 89	
POUTFLAG	0142	= 92	3 804 812	PRI0I3	5023	1092	3 753 964	PRONVFLG	0104	= 89	1 1360
POWFRDB	20,2152	1403	1 1402	PRI0I4	5024	1092	3 515 1297	PRSHRTMP	4415	475	4 432 434
POWFLITE	23,2000	= 31	1 1254	PRI0I5	5025	1092	5 196 1365	PRT2CADR	01,3766	1302	1 1299
POWFLIT1	23,2000	= 31	1 1261	PRI0I6	5026	1092	6 196 748	PSEUDO55	E7,1612	= 164	3 164 799

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SYM80L TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
PSIV	E4,1453	= 130	3 130 1237	P20LEM81	24,2204	509	1 523	P30S	35,2000	= 34	1 624
PSKIPADR	16,3606	1435		P20LEM82	24,2207	509	1 509	P30S1	34,2000	= 33	1 626
PSHIBIT	4741	= 100	2 875 885	P20LEM83	24,2211	509	2 509 510	P30ZFRD	35,2363	641	10 631 662
PSHIGAT	0251	= 100		P20LEMB4	24,2226	510	1 509	P31	35,2414	662	1 249
PTBAO	05,3047	232	3 232	P20LEM85	24,2156	509	1 517	P32	35,2027	631	1 249
PTIGINC	E7,1402	153	2 675 736	P20LEMB6	24,2174	509	2 509	P32/P72A	35,2053	631	1 631
PTOACSM	13,2705	1206	1 1211	P20LEMB7	24,2151	508		P32/P728	35,2075	632	1 633
PTOALEM	13,2760	1207	2 312 1211	P20LEMC	24,2247	510	3 517 519	P32/P72C	35,2116	632	1 651
PULSEFLG	0303	= 103		P20LEMC1	24,2275	510	3 255 511	P32/P72D	35,2122	632	1 632
PULSEIMU	10,3625	1394	1 393	P20LEMC2	24,2312	511	1 511	P32/P72E	35,2124	632	1 632
PULSEM	14,3072	942		P20LEMC3	24,2232	510	4 509 522	P32/P72F	35,2132	632	1 632
PULSES	4735	= 103	5 299 1438	P20LEMC4	24,2246	510	1 510	P32STRT	35,2032	631	1 631
PURGENCY	16,3442	1433	4 1425 1429	P20LEMD	24,2315	511	1 510	P33	35,2162	637	1 249
PURRS4	10,2570	1356	2 1354 1356	P20LEMD1	24,2321	511	2 511	P33/P73A	35,2165	637	2 637 638
PUSH	00,3247	1072	1 1008	P20LEMD2	24,2330	511	1 511	P33/P738	35,2177	637	1 638
PUSHLOC	0166	115	37 267 1104	P20LEME	24,2261	510		P33/P73C	35,2246	638	1 637
PUSHUP	5214	1003	1 999	P20LEMT	24,2262	510	5 508 521	P33/P73D	35,2252	638	1 638
PUTA00	41,2332	424	3 424	P20LEM1	24,2104	508	2 508 526	P33/P73E	35,2260	638	1 638
PUTCOM	41,3075	442	8 438 440	P20LEMT1	24,2272	510		P33/P73F	35,2271	638	1 638
PUTCOM2	41,3155	443	4 442 445	P20REG	04,2324	247	1 246	P34	35,2511	670	1 248
PUTOCFSF2	41,3207	443	1 443	P20S	24,2000	= 31	8 504 665	P34/P74A	35,2514	670	2 670 671
PUTDECSE	41,3174	443	2 442 443	P20S1	25,2000	= 31	3 537 577	P34/P748	35,2534	670	1 670
PUTOPCOM	41,3130	442	1 443	P20S2	25,2000	= 31		P34/P74C	35,2536	670	1 672
PUTNDRM	41,3137	442	1 442	P20S3	26,2000	= 31	1 586	P34/P74D	35,2577	671	1 671
PUTSENR	41,3206	443	1 443	P20S4	32,2000	= 33	1 505	P34/P74E	35,2602	671	1 671
PUTXY	41,2714	439		P21	E6,1701	= 150		P35	35,2667	675	1 248
PUTXYZ	41,2632	438		P21ONENN	24,3500	666	1 665	P35/P75A	35,2676	675	1 675
PVALVEST	1276	122	7 206 227	P21PROGA	24,3434	665	1 666	P35/P758	35,2703	675	1 675
PWRCNT	0140	= 114	2 823	P21PROG1	24,3412	665	1 666	P38	34,3271	732	1 248
PWRPTR	0117	= 114	4 823	P21PRDG2	24,3443	665	1 665	P39	34,3517	736	1 248
P00HCHK	13,3347	1214	2 1213 1214	P21PROG3	24,3451	666	1 665	P39/P79A	34,3530	736	1 736
P05P06	37,2000	= 35	1 1329	P21PROG4	24,3454	666	1 665	P39/P798	34,3537	737	1 735
P06	37,3641	1329	1 249	P21TIME	E7,1756	= 161	7 161 666	P39/P79SW	0176	= 95	4 733 736
P12	30,2000	= 33	2 59 839	P22ONE	24,2343	511	1 505	P39P79	34,3454	735	1 735
P12AORES	30,2306	843	1 840	P25FLAG	0006	= 82	3 302 789	P39SWBIT	4743	= 95	
P12IGN	36,2506	747	1 739	P25FL81T	4743	= 82	2 243 514	P40/RET	1142	120	4 753 761
P12INIT	30,2204	842	3 836 839	P25LEMT	24,2460	515	1 515	P40A/P	35,3711	755	1 755
P12LM	30,2006	839	1 249	P25LEM1	24,2441	514	3 255 515	P40A/PMO	35,3735	755	1 755
P12LM8	30,2046	839		P25LEM2	24,2467	515	1 515	P40AORES	36,3131	756	1 760
P12RET	30,2150	841	1 851	P25LEMT1	24,2462	515	1 515	P40ALM	36,3722	769	2 760 764
P12SPDT	36,2144	= 741	1 739	P25OK	24,2475	515		P40AUTO	35,3707	755	2 741 834
P12TABLE	36,2022	739	1 843	P3XORP7X	35,3643	692	1 689	P40CAOR	32,3521	836	1 836
P20FLGON	35,2325	639	7 631 736	P30	35,2000	624	1 249	P40IGN	36,2467	747	1 740
P20LEMA	24,2132	508	3 508 521	P30EXIT	E5,1773	= 141	1 141	P40IN	36,3200	761	1 765
P20LFMB	24,2140	508	6 508 509	P30N33	35,2004	624		P40LM	36,3147	760	2 248 836

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
P40PHS1	36,3236	762	2 762	766 P52LS	15,2223	930	1 927	P73	35,2164	637	1 248
P40S	36,2000	= 35	5 53	760 P52OUT	15,2164	928	1 929	P74	35,2513	670	1 248
P40SJUNK	36,2360	745	2 740	P52T	15,2105	927	2 927	P75	35,2673	675	1 248
P40SPOT	36,2144	741	3 739	741 P52V	15,2125	927		P76	13,2207	717	1 248
P40SXT4	36,3213	761	2 761	763 P52W	15,2134	928	1 927	P76LOC	13,2000	= 29	1 717
P40S1	27,2000	= 32	4 53	771 P57	15,3317	971	1 248	P76SUB1	13,2340	719	1 718
P40S2	35,2000	= 34	1 755	P57A	15,3324	971		P78	34,3274	732	1 248
P40TABLE	36,2036	739	1 756	P57AA	15,3326	971	1 971	P79	34,3524	736	1 248
P40ZOOM	36,2564	749	1 739	P57C	15,3357	971	2 971	=====			
P40ZOOMA	36,2571	749	1 749	P57D	15,3361	971	1 971	Q	0002	= 108	441 109 1501
P41ADRES	36,3132	756	1 762	P57JUMP	15,3543	975	2 969	Q+1	6736	1020	5 172 1364
P41BLANK	36,2261	743	1 743	P57OPT0	15,3557	976	2 975	Q+10000	4643	993	1 995
P41FJET	36,3303	762		P57OPT1	15,3600	976	1 975	Q+2	6740	= 1020	5 532 1373
P41FJET1	36,3305	762	1 762	P57OPT2	15,3616	977	1 975	Q**DG**D	31,3155	812	1 812
P41IN	36,3310	763	1 762	P57OPT3	15,3617	977	1 975	Q-RATE	16,2533	1421	2 1420
P41LM	36,3272	762	1 248	P57POST	15,3264	969	3 968	969 Q-RHCCTR	0042	= 108	3 1428
P41MANU	36,3215	761		P63ADRES	32,3246	793	1 789	Q,RORGTS	17,2055	1436	1 1436
P41NORM	36,3312	763		P63DISPS	31,3441	817	3 756	803 QACCDOT	F6,1510	= 147	6 1406 1484
P41SPOT	36,2147	741	2 740	741 P63IGN	36,2440	746	1 740	QAXIS	F7,1715	= 166	3 842 855
P41TABLE	36,2052	740	2 756	770 P63IGN1	36,2476	747		QCDUWUSR	E6,1645	= 151	3 151 917
P42ADRES	36,3133	756	1 764	P63LM	32,2772	789	1 248	QCHAN	0002	= 109	2 1088
P42CADR	32,3522	836	1 836	P63SPOT	36,2147	= 741	1 740	QDIFF	E6,1446	= 147	3 1467 1471
P42IGN	36,2516	747	5 740	747 P63SPOT2	32,3210	792	1 792	QERRCALC	17,2563	1445	2 1408 1436
P42LM	36,3410	764	2 248	836 P63SPOT3	32,3230	793	1 793	QERRCALL	16,3622	1435	1 1435
P42SPOT	36,2144	= 741	1 740	P63SPOT4	32,3242	793	1 793	QERROR	E6,1446	= 145	5 147 1446
P42TABLE	36,2060	740	1 756	P63TABLE	36,2074	740	2 756	793 QGIM8ITS	5007	= 1423	1 1423
P478OD	36,3504	766	1 766	P63ZOOM	36,2556	748	1 740	QGIMTIMR	E6,1630	149	9 149 1474
P47BODY	36,3513	766	2 765	766 P64CEED	31,3463	818	1 818	QLAST	E6,1453	145	5 1419 1441
P47LM	36,3436	765	1 248	P64DISPS	31,3445	817	3 803	818 QMAJ	E5,1746	= 139	15 139 978
P50S	15,2000	= 30	5 265	962 P64NOW	43,2330	287	1 277	QMIN	E5,1745	= 139	23 139 968
P50S1	14,2000	= 30	2 60	932 P65START	31,2616	805	1 802	QOK	26,2556	588	1 588
P51	14,3340	948	3 248	949 P65VERT	31,3502	818		QPLACE	E5,1417	= 142	7 142 394
P518	14,3374	948	1 948	P66NOW?	31,2575	805		QPLACES	E5,1420	= 142	3 142 393
P51C	14,3405	948	1 949	P66VERT	31,3516	819	1 818	QPRET	0052	= 109	20 312 1238
P51D	14,3424	949	1 948	P67NOW?	31,2534	804		QRATEDIF	E6,1434	= 144	2 1441
P51E	14,3446	949	1 949	P70	21,2166	830	1 248	QRAXIS	16,3607	1435	4 1424 1432
P51FIVE	4756	= 950		P70A	21,2167	830	2 256	830 QRBIT	4741	= 145	4 1427 1442
P51G	14,3471	949	1 949	P70CADR	04,2376	248	1 248	QRCNTR	E6,1746	= 147	8 1467 1478
P51ZERO	4755	= 950	1 948	P70INIT	32,3302	832		QRCONTRL	17,2151	1438	1 1437
P52A	15,2060	927	2 927	P70NOW?	21,2155	830		QRNDXER	0066	= 1472	9 1473 1474
P52B	15,2062	927	1 927	P71	21,2171	830		QRTIME	17,2452	1442	2 1442
P52D	15,2141	928	3 928	930 P71A	21,2172	830	2 256	830 QRUPT	0012	= 108	13 170 1423
P52E	15,2102	927		P71NOW?	21,2142	829		QSAVED	E7,1462	154	2 689 690
P52F	15,2162	928	1 927	P71RET	32,3525	836	1 832	QTEMP	E7,1630	157	5 626 773
P52H	15,2166	928	1 927	P72	35,2031	631	1 248	QTEMP1	E7,1663	157	6 157 768

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 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYM80L TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
QTSN45	23,3437	1252	1 1246	RATEDBI	4767	= 1502	1 1501	RDOITD	E4,1666	= 135	3 135 847
QUAGUIO	31,3147	812		RATEDONE	16,3115	1427	1 1427	ROOMM	E7,1746	= 161	4 161 604
QUARTER	4737	= 1094	4 1076 1081	RATEINOX	1325	123	4 227 835	RDOITMSAV	E7,1744	= 161	4 160 581
QUICTRIG	23,3521	1256	5 612 1256	RATELIM1	4766	= 1502	1 1501	RDOITV	E7,1614	156	4 157 646
QUIKDSP	06,2134	175	1 170	RATELIM2	17,3664	= 1501	2 1502	RDRRET	E7,1673	= 160	3 160 597
QUIKFAZ5	33,3535	890	11 862 889	RATELOOP	16,3624	1465	2 1417 1465	RDRLOCS	25,2054	503	1 503
QUIKOFF	06,2165	175	1 175	RATERRRD	16,3206	1429	1 1429	RDRPTB8	4063	169	1 168
QUIKRUP	06,2144	175	1 175	RATES	30,2516	848	1 848	RORUSECK	43,2652	295	5 280 291
QUIT8IT	4747	= 97		RATESP	05,2027	68	2 981	ROSP	E5,1434	= 142	
QUITFLAG	0221	= 97	4 313 1213	RATESTOP	31,3416	816	1 816	READACCS	37,3425	859	1 871
=====	=====	=====	=====	RATESTRT	05,3054	233	1 227	REAOCOUK	22,2403	370	2 364 494
R	E7,1516	= 162	23 162 883	RATEVAR	E3,1772	128	1 589	REAOLBIT	4746	= 100	2 873 875
R(CSM)	E3,1717	= 136	5 609 883	RATT	0000	= 1243	37 352 1220	REAOLQ	40,2747	433	4 433 435
R*TL**P	23,3604	1259	2 1259	RATT1	0016	= 1243	10 224 791	REAOLQ1	40,2760	433	1 434
R-OTHER	E3,1717	127	5 136 335	RBRFG	E5,1402	= 137	2 137 826	READLR	0256	= 100	1 880
R-RATE	16,2571	1421	2 1421	RCB-13	05,2025	68	1 981	REAOPIPS	10,3501	1390	
R-RHCTR	0044	= 108	3 1428	RCOUFAIL	0274	= 102		REAORBIT	4743	= 87	3 234 616
R-TO-RP	24,3531	1137	5 795 1230	RCOUFRIT	4745	= 102		REAORDOT	32,2414	580	1 582
RACCDOT	E6,1512	= 147	4 1406 1470	RCDOUBIT	4737	= 101		REAORFLG	0063	= 87	1 617
RACTCADR	05,3055	233	1 232	RCOUOFLG	0266	= 101		REAOV	33,3512	889	1 889
RACT1	E4,1706	132	11 133 656	RCNORM	0042	= 140	3 1174	REAOV8IT	4747	= 100	1 889
RACT2	E4,1714	132	9 133 657	RCO	E7,1626	= 167	6 167 855	REAOVFL	0257	= 100	1 889
RACT3	E7,1533	156	20 647 735	RCS	17,2060	1436	4 1443 1444	RECALTST	40,3545	471	2 440 461
RAOARANG	26,3324	596	2 591 592	RCSFLGS	1273	121	55 226 1478	RECAL1	40,3550	471	1 471
RADAREAD	25,3150	566	2 169	RCSMON	06,3156	206	1 206	RECAL2	40,3561	471	2 472
RADARFF	4000	= 27	1 531	RCSMONEX	5270	= 205	2 206 207	RECAL3	40,3573	471	
RAOARUP	25,2000	= 31	3 56 622	RCSMONIT	06,3156	= 206	2 174	RECRATIO	13,3741	1243	1 1233
RADCADR	1306	= 122	4 237 552	RCSMONT	06,2000	= 28	1 205	RECTEST	11,3207	1233	3 1233 1234
RAOIN	25,3331	568	1 568	RCV	E3,1534	= 126	27 126 1236	RECTIFY	11,3345	1236	8 1151 1234
PAOLITES	25,3616	622	2 567 571	RCVCSM	E3,1606	127	1 596	RECTOUT	13,3200	1211	2 1211 1212
RADMODES	0110	= 101	116 169 877	RCVLEM	E3,1660	127	2 510 596	RECYCLE	34,3376	734	1 735
RAONNOOP	25,3530	572	2 548 572	ROBAPENO	25,3562	574	4 557 574	RED-OVER	31,3471	818	1 817
RADSAMP	25,2003	502	2 292 502	ROCOUS	14,3253	945	1 944	REDES-OK	31,3473	818	1 817
RADSTALL	07,3667	1323	15 280 895	RDE	13,3747	1243	1 1230	REDESIG	31,2725	808	1 802
RANGCONV	32,2013	56	1 581	ROES	1316	= 122	4 122 545	REDESMON	21,2032	820	1 820
RANGE	E4,1604	131	10 131 712	ROESGAIN	25,3066	563	2 561	REDES1	31,2777	809	1 809
RANGBO	26,2474	587	3 587 594	ROESIREO	E5,1755	= 140	2 140 1194	REDFLAG	0143	= 92	5 789 818
RANGEOSP	E5,1531	= 138	3 138 807	ROG	E5,1402	= 826	2 811 812	REOFLBIT	4746	= 92	2 808 817
RANGEVAR	E3,1770	128	1 588	ROGIMS	32,3750	894	1 892	REDO	37,2002	386	1 305
RAPFG	E5,1432	= 137	1 137	RODIF	E6,1450	= 147		REDOCTR	0320	115	3 209 230
RAPD	0020	= 1268	1 1268	ROLONOR	40,2767	434	1 433	REDOEXTIP	37,3371	716	1 712
RAPREC	E7,1475	= 156	2 676 679	ROM	13,3745	1243		REDOMANC	26,2126	487	1 486
RASFLAG	0106	= 98	6 1214 1215	RODT	E4,1712	= 136	5 136 853	REDOMANN	26,2103	486	
RATERIAS	22,3133	380	1 380	ROOTBIAS	25,2001	56	1 569	REDOOMASK	10,3357	1366	2 1351
RATEOAMP	16,3177	1429	4 1427	ROOTCONV	32,2011	56	1 581	REDOPRIO	10,2415	1353	1 1366

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
REDD02.17	36,2330	744	1 255	REPETE	35,3141	678	1 678	REAILS	40,3667	484	1 483
REQ004.2	36,2333	744	2 255 765	REPIPI	37,3543	871	1 872	RFAILS2	41,3727	482	1 481
RFD05.5	37,3437	859	1 257	REPIP3	37,3551	871	1 872	RGXIT	E7,1663	=	157
REDD06.7	36,3350	763	1 258	REPIP4	37,3555	871	4 872	RGIMBITS	5020	=	1423 1 1423
REOSPTM	32,2027	222	2 222	REPOSBIT	4741	=	101 1 608	RGIMTIMR	E6,1632	=	149 5 1407 1467
REFLASH	10,2335	1351	1 752	RPOSOMON	0270	=	101	RGOODENO	25,3555	574	6 543 574
REFLASHR	10,2340	1351	2 762 818	REPOSRT	25,2144	541	1 545	RGU	E5,1543	=	138 7 215 812
REFMF	15,3470	974	3 796 975	REQADD	41,2064	420	1 420	RGVGCALC	31,3035	810	7 802 809
REFSMBIT	4737	=	86 7 221 1326	RFQCOM	41,2310	424	2 424	RHCACTIV	17,2305	1440	1 1440
REFSFLG	0057	=	86 7 689 969	REQOATX	41,2303	424	3 438 439	RHCMOVED	16,3202	1429	1 1427
REFSNMAT	F3,1733	127	52 209 974	REQDATY	41,2305	424	3 438 440	RHCSCALE	4745	=	104 1 309
REGCOARS	15,2154	928	1 929	REQDATZ	41,2307	424	3 420 440	RHCSCFLG	0313	=	104
REGQDSP	10,2343	1352	2 743 752	REQEXLOC	41,2207	422		RIGHT	00,2236	1049	1 1051
REGQDSPR	10,2346	1352	1 817	REQEX1	41,3473	461	1 461	RIGHT-	00,2332	1051	1 1048
RFGSLEEP	07,3345	1314	1 1314	REQMM	41,3452	460	1 460	RIGHTR	00,2031	1042	1 1050
REGUP	6232	1003	3 1003	REQRET	1013	118	17 237 469	RIGHT5	4322	473	2 441 442
REINTBIT	4745	=	99 2 1215	REQUESTC	41,3477	461	1 461	RIGNX	E5,1464	=	137 2 137 791
REINTFLG	0236	=	99 5 719 1385	REREADAC	37,3600	871	3 257	RIGNZ	E5,1466	=	137 2 137 791
REJALM	07,2467	272	1 272	RERRCALC	17,2603	1445		RINIT	E4,1726	134	11 662 783
REJECT	07,2472	272	1 272	RERROR	E6,1450	=	145 5 147 1446	RLAST	E6,1454	145	5 1420 1441
REJFCT2	07,2505	272	1 272	RER60	26,2215	488	1 488	RLM	E4,1610	=	134 16 499 500
RELDSP	4457	477	10 242 837	RESAMPLE	25,3263	567	1 571	RLMSRCH	E7,1673	=	159 5 159 602
RELDSPON	4374	474	3 411 477	RESETRPT	21,2046	820	1 821	RLMUNIT	0014	=	603
RELDSP1	4502	478	2 451 463	RESFTX2	12,3131	1187	1 1185	RLS	E4,1422	129	12 215 1207
RELDSP2	4473	478	2 478	RESET22	04,2245	245	2 245	RM	E7,1754	=	161 6 161 617
RELINTQ	10,3104	1361	2 1357 1361	RESIGN	35,3165	679	1 679	RMAG1	0014	=	1262 4 1265 1274
RELINUS	26,2175	488	1 255	RESQ	33,2037	60	1 881	RMAX	E4,1404	129	1 597
RELOADSV	11,3546	1239	1 1238	REST	10,3120	1362	1 1359	RME	11,2307	=	36 1 1213
RELRET	0144	=	113 4 477 478	RESTART	01,2000	=	27 4 254 1301	RMM	11,2305	=	36
RELTA8	4066	170	4 172 456	RESTARTS	01,3523	1297	1 233	RMODINIT	05,3353	238	1 234
RELTA811	4101	170	2 171 1094	RESTORDB	20,2123	1402	8 303 1404	RMODINV	25,2233	543	7 543 554
RFMARK	07,2577	275	3 272 274	RESTREG	0366	116	4 226 1358	RN	1220	121	13 210 1217
REMOIST	42,2000	62	1 499	RFSTSLEP	10,3124	1362	1 1362	RND/TST	42,3537	448	3 447 448
REMODBIT	4736	=	101	RESULTCT	E5,1537	=	142 5 388 392	RNDCON	42,3276	435	2 436
REMODE	25,2171	542	2 557 608	RFSUM	5270	1124	26 175 1407	RNDREFDR	07,3150	1309	3 189 1329
REMODFLG	0265	=	101	RETJAOR	F6,1475	145	4 1439 1448	RNDVZBIT	4745	=	82 11 200 602
RENDEND	26,3141	593	1 590	RETNMORE	20,2442	1415	6 1410 1414	RNOVZFLG	0010	=	82 6 302 1329
REN0EZ	22,2000	=	31 1 1152	RETNON	06,2264	179	1 180	RNGEDATA	0260	=	100
RENDEZVU	0002	=	250 18 250	RETROOT	0132	=	114 3 823 824	RNGED8IT	4750	=	100 2 885 893
RENDNOD	04,2257	246	2 245	RETURNITJ	17,3423	1458	7 1457 1461	RNGSC8IT	4742	=	90 2 582 894
RENORAO	25,3276	568	1 567	REVCNT	6241	1003	5 307 1094	RNGSCFLG	0120	=	90 4 569 894
RENDVOD	04,2223	245	1 245	REVERSS	35,3170	679	1 679	RNRAD	0046	=	108 5 566 568
RENDWBIT	4753	=	91 1 305	REVERSAI	21,3736	1477	1 1477	RNI	E7,1542	=	162 9 162 1220
RENDWFLG	0131	=	91 13 251 1239	REVN1645	35,2504	663	2 625 663	ROA08ACK	25,2366	548	4 548 573
RENFWMK	07,2502	272	1 272	RFAILCNT	E4,1762	135	2 291 502	ROOCOUNT	E7,1644	=	165 3 804 821

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SYM80L	DEF	F	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
RODTRAP	20,2000	= 30	1 821	RQVV	F4,1513	= 130	7 130 1227	RRSONLY	25,2244	544	3 541 543
ROE	14,2006	60	1 932	RR-AZ	E4,1604	= 134	3 134 329	RRSPGAIN	25,2305	545	1 545
ROLLOVER	27,3136	786	1 786	RR-ELEV	E4,1606	= 134	2 315 329	RRTARGET	1101	= 119	14 119 615
ROLLTIME	E6,1401	144	4 310 786	RRANGLES	13,2133	336	1 550	RRTONLY	25,2241	544	5 541 608
RONE	E4,1612	= 131	19 131 1271	RRATE	E4,1606	= 131	6 131 713	RRTRKF	4570	535	3 622 623
ROO	04,2142	244		RRATEOIF	E6,1435	= 145	1 1441	RRTRUN	E7,1731	= 161	4 161 604
ROOAD	04,2362	247	1 243	RRAUTCHK	06,3006	197	2 174	RRTURNON	25,2062	537	1 198
ROOTCYCL	21,3763	1478	3 1476	RRBOR SIT	E7,1736	= 161	5 161 583	RRZERO	25,2343	548	1 280
ROOTLOOP	31,3614	824	2 824	RRCOUCHK	06,3037	199	2 197	RRZEROK	43,2142	280	1 280
ROOTMU	0020	= 1197	3 1174 1193	RRCHECK	4576	535		RRZEROS8	25,2071	538	2 537 548
ROOTPS	0126	= 114	5 823 824	RRDATA8T	4750	= 102		RRZ2	25,2370	548	1 548
ROOTPS+1	0127	= 114		RRDATAFL	0277	= 102		RR1AXIS	25,2246	544	1 544
ROOTPSRS	31,3543	823	1 812	RRDESOUN	25,3005	562	1 562	RR1AX2	25,2254	545	1 544
ROOTSTOR	31,3660	824	3 824	RRDESENO	43,2302	285	1 277	RR29GAIN	32,2771	615	2 614
ROPECHK	43,3526	1284	1 1281	RROESK2	43,2261	284	1 284	RSAMPOT	E4,1761	135	7 291 502
ROTATE	34,3052	653	2 652	RRDESNB	25,2475	554	2 284 520	RS880	E3,1432	125	2 210 230
ROTFMPI	E6,1735	= 146	3 1451	RRDESNBK	43,2227	284	1 282	RSCALE	32,2207	224	1 224
ROTEMP2	E6,1736	= 146	4 1451	RRDESSM	25,2373	549	2 521 600	RSFLGBTS	05,3061	233	1 231
ROTI NOEX	E6,1742	= 146	10 1424 1452	RRECT	E3,1502	= 126	15 126 1236	RSPHERE	13,3743	1243	2 1233 1234
ROTORQUE	16,3701	1466	1 1465	RRECTCSM	E3,1554	126	11 126 1208	RSTACK	E4,1604	= 134	12 291 502
ROTSENSE	E6,1736	= 148	9 1455 1463	RRECTHIS	E3,1626	= 127	4 312 1205	RSTKLOC	F4,1760	= 135	
ROT180	26,2326	496	1 496	RRECTLEM	E3,1626	127	3 127 1207	RSTOFGTS	21,3561	1475	1 1470
ROT45DEG	17,3100	1451	4 1436 1490	RRECTOTH	E3,1554	= 126	1 312	RSUBC	1101	= 119	3 506
ROUND	00,2116	1044	1 1008	RRGIMON	06,3071	201	1 199	RSUBF	14,2004	60	1 932
ROUND SUB	7135	1027	4 1039 1050	RRIMUDIF	43,2204	283	1 283	RSUBEM	14,2000	60	2 932
RP-TO-R	24,3504	1135	8 790 1208	RRINDEX	1317	= 122	3 544 545	RSU8L	E7,1626	= 163	4 163 507
RPAD	23,2275	704	4 705 1277	RRINIT	06,2564	188	1 188	RSU8M	14,2002	60	1 933
RPADTEM	E4,1606	= 131	6 131 729	RRLEADIN	25,2000	= 31	1 502	RTARG	E7,1441	154	7 209 699
RPAD1	23,2275	= 1277		RRLIMCHK	4523	533	4 202 553	RTARG1	E7,1467	= 159	11 695 699
RPASS1	E7,1475	156	4 156 652	RRLIMN8	25,2540	554	2 554	RT8	01,2445	1085	1 1085
RPASS2	E7,1517	156	7 156 657	RRLIMOK	4560	534	2 534 555	RT8/8HIZ	01,2444	1085	1 1007
RPASS3	E7,1547	156	12 643 737	RRLOSOSP	40,2017	314	2 314 315	RT8CNOES	10,2000	= 29	1 1390
RPASS36	E4,1612	= 134	5 134 710	RRLOSVEC	1101	= 582		RTERM	0022	= 1262	3 1271 1273
RPCRTIME	E7,1427	153	1 875	RRNB	23,2041	338	4 314 601	RTHETA	E4,1610	= 131	9 131 713
RPCRTQSW	E7,1430	153	1 875	RRN88IT	4746	= 82		RTIG	E7,1637	157	12 157 835
RPER	0016	= 1268	3 728 1268	RRN8SW	0011	= 82	5 550 576	RTMU	E4,1724	133	4 643 702
RPPREC	E7,1517	= 156	2 676 679	RROUT	25,2306	546	3 545 615	RINAPSE	E5,1710	= 140	3 1195 1196
RPQFLAG	0170	= 95	6 1210 1234	RROUTLIM	25,2335	547	1 546	RTNHOL0	E7,1605	= 164	4 164 800
RPQFL8IT	4735	= 95		RROUT2	25,2310	546	1 547	RTNLAM8	E5,1710	= 140	8 140 1193
RQV	E4,1504	= 130	8 130 1234	RRRANGE	25,3105	564	3 503 617	RTNPRM	E5,1753	= 140	3 140 1183
RPREXIT	0050	= 1143	3 1135 1137	RRRDOT	25,3103	564	4 503 616	RINSAYER	0145	= 114	3 1258 1259
RPRPXXX	24,3547	1137	1 1135	RRRET	1315	122	5 122 545	RINTR	E5,1710	= 140	1 1194
RPSV	E4,1521	= 130	5 130 1227	RRRS8IT	4751	= 102		RTNTT	E5,1710	= 140	5 1182
RPTORA	24,3521	1135	1 1135	RRRSFLAG	0300	= 102		RTORPA	24,3553	1137	1 1137
RPTOR8	24,3513	1135	1 1136	RRSHAFT	E7,1733	= 161	4 161 604	RTORPB	24,3542	1137	1 1137

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
RTRN	E7,1463	154	14 660 738	R04K	43,2605	294	1 291	R22LEM93	24,2614	518	1 593
RTRNCADR	01,3562	1297	5 1297 1302	R04L	43,2607	294	1 292	R22LEM96	24,2620	518	2 597
RTRNMU	10,2063	702	1 702	R04LR	43,2552	293	3 293	R22RSTRT	24,2677	519	1 255
RTSR1/MU	E4,1722	133	4 133 702	R04RR	43,2536	293	2 293	R22WAIT	24,2664	519	4 516 518
RTSTBASE	E4,1757	135	3 292 502	R04X	43,2473	292	1 294	R23LEM	24,3027	523	1 509
RTSTDEX	E4,1755	135	7 135 503	R04Y	43,2566	293	2 293	R23LEM1	24,3035	523	1 524
RTSTLOC	E4,1760	135	8 135 503	R04Z	43,2430	291	1 291	R23LEM11	24,3046	523	1 523
RTSTMAX	E4,1756	135	2 292 502	R1	0040	= 1197	18 645 1196	R23LEM2	24,3070	524	2 523 524
RTX1	E6,1775	152	12 627 1220	R1A	E5,1741	= 140	14 140 1196	R23LEM3	24,3073	524	2 523 524
RTX2	E6,1776	152	17 152 1220	R101	4317	473	13 416 1068	R24END	24,3122	526	1 525
RUFLAW1	17,3565	1462	1 1455	R1S	E7,1570	= 162	14 162 890	R24LEM	24,3100	525	1 521
RUFLAW12	17,3573	1462	2 1462 1463	R1SAVE	1074	119	4 237 1363	R24LEM1	24,3104	525	
RUFLAW2	17,3621	1462	1 1455	R1VEC	E5,1654	= 140	6 140 1189	R24LEM2	24,3110	525	2 526
RUFLAW3	17,3627	1463	1 1456	R10	21,2000	= 30	3 57 897	R24LEM3	24,3127	526	1 525
RUFSETUP	17,3647	1463	4 1462 1463	R10,R11	21,2102	829	3 255 860	R29	33,2045	607	2 608 877
RUNIT	E7,1741	= 166	7 166 897	R10,R11A	21,2115	829	1 873	R29,L0S	33,2123	608	1 607
RUPTAGN	0734	116	6 116 1124	R10FLAG	0015	= 82	1 839	R29/SERV	33,2000	= 33	1 606
RUPTREG1	0070	111	58 170 1402	R10FLBIT	4752	= 82	4 831 906	R29?	33,2602	877	
RUPTREG2	0071	111	25 177 1474	R11	21,2000	= 30	2 829 837	R29DLOOP	24,3257	610	1 610
RUPTREG3	0072	111	17 385 1474	R12LITES	25,3607	622	1 876	R2900DES	32,2545	611	1 610
RUPTREG4	0073	111	7 111 1332	R12STUFF	34,2000	= 33	1 893	R29DPAS1	32,2561	611	1 611
RUPSTOR	0063	= 111		R2	E5,1717	= 140	3 1180	R29DPAS2	32,2676	614	1 612
RUPT10BB	4065	169	1 169	R2D1	4320	473	7 416 1094	R29DVBEG	32,2550	611	2 611 613
RUTH	16,3077	1427	1 1427	R2VEC	E5,1662	= 140	10 140 1189	R29DVEND	32,2575	611	1 611
RUTMXTAB	42,3130	332	1 319	R21-503	24,2777	521	1 521	R29EXLOC	32,2770	615	1 612
RUTMXTEM	0153	114	2 319 441	R21END	24,3006	521	1 521	R29LOKON	32,2746	615	1 615
RVARMIN	E3,1774	128	1 587	R21LEM	24,2721	520	1 510	R29NODES	33,2617	877	2 877
RVBOTH	33,3064	883	1 862	R21LEM1	24,2754	521		R29RANGE	24,3340	617	1 617
RVC0N	13,3241	1212	1 1211	R21LEM2	24,2752	521	1 563	R29RDJ08	24,3310	616	1 616
RVEC	E5,1654	= 140	10 506 1195	R21LEM3	24,2763	521		R29READ	24,3275	616	2 615 616
RVQ	00,3274	1072	1 1008	R21LEM4	24,3016	521	1 521	R29REMOJ	33,2113	608	1 607
RVSU	0157	= 93	7 506 1182	R21LEM5	24,2731	520	1 520	R29RRR?	24,3363	617	1 617
RVSU8IT	4743	= 94		R21LEM6	24,2735	520	1 520	R29S1	25,2000	= 31	1 608
RWAITK	43,2145	280		R21SRCH	24,3011	521	1 521	R3D1	4321	473	5 416 470
RXZ	E7,1717	= 160	10 160 597	R22DISP	0314	= 115	6 329 597	R30LOC	22,2000	= 31	2 59 721
R02	04,2000	= 27	1 1326	R22LEM	24,2477	516	3 511 519	R300K	27,3740	1277	
R02BOTH	04,3175	1326	11 352 926	R22LEM1	24,2547	517	1 517	R31	37,2000	= 35	1 712
R02ZERO	04,3211	1326	1 1326	R22LEM12	24,2511	516		R31CALL	37,3113	712	1 298
R04	43,2424	291	1 277	R22LEM2	24,2557	517	2 517	R31SURF	37,3365	715	1 714
R04A	43,2456	291	1 292	R22LEM3	24,2577	517	2 517	R33	42,2002	290	1 290
R04B	43,2500	292	1 292	R22LEM42	24,2655	518	3 517 518	R36	04,2613	710	2 299 711
R04C	43,2515	292	2 292 294	R22LEM44	24,2650	518	1 518	R36INT	04,2633	710	1 711
R04END	43,2613	294	6 292 293	R22LEM45	24,2660	518	2 518	R36LM	04,2000	= 27	1 709
R04FLAG	0063	= 87	5 87 508	R22LEM46	24,2666	519	2 518	R36TAG2	04,2722	711	1 711
R04FLBIT	4743	= 87	4 291 566	R22LEM7	24,2644	518	1 518	R47	32,2000	= 33	1 221

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
R51	14,2656	938	1 928	R62	23,2000	= 31	1 497	SBANDEX	42,3741	500	1 500
R51.1	14,2660	938	1 256	R62DISP	23,2065	= 497	1 301	SBIT1	4753	= 1279	
R51.2	14,2714	938		R62FLASH	23,2065	497	2 497	SBIT10	4742	= 1279	
R51.3	14,2715	938	1 940	R65CNTR	E7,1743	= 161	5 515 587	SBIT11	4741	= 1279	2 1285 1286
R51.4	14,3006	939	1 939	R65LEM	23,2105	528	3 515 587	SBIT12	4740	= 1279	1 1285
R51C	14,2661	938	2 938 939	R77	43,2414	291	1 278	SBIT13	4737	= 1279	
R51E	14,2712	938	3 938	R77CHECK	25,3364	569	1 567	SBIT14	4736	= 1279	
R51F	14,2701	938		R77END	43,2627	294	1 278	SBIT15	4735	= 1279	1 1286
R51I	14,2702	938	1 938	R77FLAG	0117	= 90	2 291 294	SBIT2	4752	= 1279	
R51K	14,2775	939	2 939 941	R77FLBIT	4741	= 90	3 295 569	SBIT3	4751	= 1279	
R51P63	14,2776	939	1 792	=====	=====	=====		SBIT4	4750	= 1279	1 1283
R52	14,3610	953	1 938	S(X1)	0032	= 1197	6 1174 1180	SBIT5	4747	= 1279	
R52A	14,3620	953	2 953	S+ZERO	4755	= 1279	9 305 1285	SBIT6	4746	= 1279	
R528	14,3626	953	1 953	S+1	4753	= 1279	9 305 1287	SBIT7	4745	= 1279	1 1286
R54	14,3121	= 942	2 939 968	S+2	4752	= 1279		SBIT8	4744	= 1279	
R55	14,3066	942	1 939	S+3	6244	= 1279		SBIT9	4743	= 1279	1 1283
R55.1	14,3073	942		S+4	4751	= 1279		SBNK03	5020	= 1280	1 1285
R55.2	14,3101	942	1 942	S+5	4756	= 1279		SCA8BIT	4751	= 101	3 570 622
R55CDR	14,3120	942	2 941 942	S+6	6241	= 1279		SCALADJ	25,3402	570	1 569
R55RET	14,3114	942	1 942	S+7	4757	= 1280	1 1281	SCAL8AD	0261	= 101	
R56	14,2452	= 934	1 938	S-ZERO	4754	= 1280	1 1284	SCALCHNG	25,3350	569	1 568
R59	15,2301	955	4 955 957	S-1	7746	= 1280	2 1285 1287	SCALDONE	21,3633	1476	1 1475
R59A	15,2313	955	1 955	S-2	7745	= 1280		SCALECHK	25,3321	568	1 568
R59ALM	15,2466	957	1 957	S-3	7744	= 1280		SCALEDOT	17,3255	1456	1 1456
R59D	15,2432	957	1 956	S-4	6111	= 1280		SCALEFF	17,3243	1455	1 1455
R59E	15,2504	958	1 957	S-7	5660	= 1280	1 1281	SCALEFAC	31,2005	56	1 800
R59OUT	15,2523	958	4 955 957	SAMFTYP	15,3572	976	1 976	SCALEVEC	32,2142	223	2 222
R59RET	15,3123	967	1 958	SAMPLIM	1100	119	9 237 572	SCALLDOP	21,3616	1475	2 1475
R60INIT	32,3171	792		SAMPLSUM	1101	119	9 119 893	SCALPREP	37,3700	1330	2 1329 1330
R60LEM	26,2101	486	6 353 954	SAMPTIME	0013	= 108	5 222 475	SCALSAVE	0316	115	3 1329 1330
R60VSAVE	E5,1535	= 138	3 138 792	SAVE	E5,1464	= 142		SCALSHFT	E7,1716	= 160	4 160 597
R61	23,2000	= 31	1 528	SAVECOUT	F3,1766	= 615	11 612 614	SCALSTRT	21,3610	1475	1 1475
R618ANK	23,2274	531	1 530	SAVEDEN	27,3507	1272	1 1272	SCAXIS	F7,1760	= 161	25 161 956
R61C+L01	23,2111	528	2 528 530	SAVEFLAG	1072	= 1366		SCHZEROS	37,3056	401	4 393 396
R61C+L03	23,2115	528		SAVEHAND	E6,1460	145	7 1428 1440	SCLNORM	17,3044	1449	
R61C+L04	23,2255	530	2 529	SAVELOC	10,2602	1356	1 1355	SCNDSOL	34,2776	651	7 643 651
R61C+L05	23,2206	530	3 529 531	SAVELOCS	10,2575	1356	2 1352 1355	SCQUNT	1366	= 124	4 124 1284
R61C+L06	23,2231	530	3 530 531	SAVESHFT	21,3651	1476		SCOUTEND	40,2702	432	4 432
R61C+L1	23,2262	531	2 528 529	SAVESR	E6,1476	= 147	2 1467 1478	SCRATCH	E6,1742	= 147	2 1478
R61C+L2	23,2250	530	1 530	SAVES-30	E7,1475	= 162	8 162 744	SCRATCHX	0160	= 1489	5 1485 1489
R61C+L4	23,2260	531	2 530	SAVLEMV	E7,1735	= 159	4 599 600	SCRATCHY	0161	= 1489	3 1485 1486
R61FLAG	0024	= 83	2 528	SAVQR52	E7,1663	= 157	2 953 954	SCRATCHZ	0162	= 1489	4 1485 1486
R61FLBIT	4742	= 83	1 530	SAX	E5,1730	= 139	5 935 937	SCITFDSP	31,3740	826	1 825
R61LEM	23,2100	528	4 508 526	SBAND	42,2000	= 35	4 61 498	SD	22,2366	370	
R61TEST	26,2220	488	1 486	SBANDANT	42,3602	498	2 295 501	SDISPLAY	43,3121	305	1 1287

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SYM80L TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
SECAD	22,2027	364		SETGAMMA	13,2550	1133	2 1128 1130	SETXFLAG	27,3162	=	852
SECMAX	E7,1571	= 156	5 676 678	SETGLOCK	06,2465	185	4 184 185	SETXACT	43,2105	278	1 279
SECON1	42,3263	434	1 436	SFTGMEX	13,2556	1133	1 1133	SETX2	26,2502	587	1 587
SECON2	42,3265	434	1 434	SETIFLGS	13,2644	1205	8 251 1217	SEUDOPOD	04,2177	244	1 246
SEC01	4777	= 770		SFTINFL	05,2732	231		SEVEN	4757	1090	24 170 1488
SEC15	36,3733	770		SETISSW	06,2703	194	7 180 1312	SFAIL	1357	= 124	4 124 1281
SEC15DP	36,3732	770		SETLOC	01,2656	1102	3 1102 1106	SECOM	42,2145	320	1 320
SEC30DP	36,3734	770		SETMARK	10,2401	1352		SFCONST1	E5,1467	= 142	
SEC45	36,3737	770		SETMAX08	20,2127	1402	2 795 1402	SFCONUM	41,3047	441	2 429 443
SEC45DP	36,3736	770		SETMGA	10,2016	701	1 701	SFINTA8	42,2464	326	1 320
SELCTSUB	17,3130	1451	3 1437 1448	SETMIN08	20,2140	1402	6 523 1402	SFINTABR	41,3212	444	1 443
SELECTMU	10,2041	702	6 632 737	SETMOON	13,2716	1206	3 1206 1235	SFMIXCAL	40,3060	445	1 445
SELECTP	16,3514	1434	2 1431 1434	SETMUER	10,2052	702	1 702	SFNORCAL	40,3063	445	1 445
SELECTYZ	16,3534	1434	1 1424	SETNADD	4311	473	2 420 442	SFOUTAB	42,2554	327	1 320
SELFADR3	43,3253	1280	2 305 306	SETNCADR	4303	473	7 420 473	SFOUTABR	41,2600	430	1 430
SELFEBANK	01,3221	1111	1 1111	SETNEGU	21,3503	1473	1 1473	SFRET	41,3064	441	
SELFCHEC	43,2000	= 35	1 1279	SETNORM	10,2407	1353	1 1351	SFRET1	41,3046	441	
SELFCHK	43,3344	1281	5 237 1281	SETOVF	7002	1022	1 1025	SFRUTMIX	41,3034	441	5 423 445
SELFERAS	1357	124	1 124	SETOVF2	7151	1027	1 1023	SFRUTNOR	41,3026	441	5 429 445
SELFRET	1361	= 124	7 124 1281	SETPD	7612	1039	1 1006	SFTEMP1	0123	= 112	20 319 446
SELFSDUPR	40,2000	= 35		SETPOS	33,3722	896	1 896	SFTEMP2	0124	= 112	2 446 447
SENDID	05,3675	991	2 987 991	SETPOS1	33,3704	895	1 793	SGNAGREE	10,3516	1390	6 389 1213
SENDPULS	07,3106	1308	1 1307	SETPOS2	33,3721	896	1 895	SGNCHECK	12,2575	1178	2 1178 1179
SENSEGET	17,2065	1436		SETPRIO	10,2363	1352		SGNCOM	40,2422	415	1 416
SENSETYP	E6,1477	146	5 1433 1456	SETPRPOS	33,2104	607	1 607	SGNOVQVF	00,2402	1052	1 1052
SENSOR	17,3661	1463	2 1455	SETRAD	23,2325	705	1 704	SGNOFF	0123	= 112	3 415 416
SENSTEST	17,3301	1456	1 1456	SETRADX	23,2340	705	1 705	SGNON	0122	= 112	3 415 416
SEPMIN	42,3431	437	2 434 436	SETRE	13,2560	1134	2 1128 1130	SGNROOT	E5,1754	= 140	2 140 1194
SEPMNRET	0144	= 113	2 437	SETREX	0051	= 1134	2 1134	SGNTA8	40,2443	416	2 415 416
SEPSECRET	0144	= 113	2 436 437	SETROUND	00,2272	1049	3 1049	SGNT01	40,3070	445	1 444
SEPSEC	42,3400	436	1 435	SETRRCTR	25,2317	546	1 547	SGNTST1	40,2462	416	3 416
SEPSECNR	42,3413	436	3 434 436	SETRREC	25,2156	541	3 540 607	SHAFTBQ	26,2760	591	
SEPSFCL	42,3406	436	1 436	SETRXX	13,2573	1134	3 1134	SHAFTLIM	25,2564	555	1 555
SERVACDR	36,2103	= 756	1 762	SETSENSE	17,3233	1455	1 1455	SHAFTVAR	E4,1410	129	1 592
SERVEXIT	37,3525	867	8 739 866	SETTIME	17,2523	1443	1 1443	SHFTFLAG	E6,1737	= 147	3 1475 1476
SERVICER	33,2200	861	2 257 859	SETTIME4	06,2074	172	1 175	SHIFTR1	23,2407	708	11 627 735
SERVICES	33,2000	= 33	8 54 894	SETTIME5	16,2147	1407	1 1408	SHIFTR11	33,3062	882	3 883 884
SERVIDLE	32,3711	866	1 1377	SETTRKF	4564	535	2 200 539	SHOLTS	41,3661	481	1 480
SERVOUT	33,2403	864	3 863 864	SETUPOSP	10,2071	1288	1 1288	SHORTMP	7306	1031	10 413 1331
SERV1	37,2000	= 35	3 958 870	SETUPER1	37,3005	401	1 400	SHORTMP2	7312	1031	1 886
SERV2	32,2000	= 33	2 864 894	SETUP29D	33,2152	609	1 609	SHORTT	00,2017	1042	2 1005
SETAUG	40,2645	431	1 431	SETUP70	04,2370	248	1 242	SHORTV	00,2121	1045	1 1005
SETBANK	13,3036	1208	4 1206 1207	SETUP71	04,2367	248	1 242	SHOW	37,2457	393	3 388 390
SETCOARS	07,3117	1309	2 184 1306	SETVAC	41,3510	461	1 460	SHOWSUM	43,3106	305	1 305
SETEBANK	4313	473	2 423 433	SETWO	05,3504	987	3 987 989	SHOW1	37,2461	394	1 394

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SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
SHUTDOWN	16,2160	1408	1 1405	SKIPU	E6,1535	148	9 148 1467	SOPTION5	43,3334	1281	
SILOOOP	43,3275	1280	1 1281	SKIPV	E6,1536	= 148	3 1407 1467	SOPTION6	43,3335	1281	
SIGN	7654	1041	1 1006	SLAP1	05,2447	226	1 422	SOPTION7	43,3336	1281	
SIGNADS	0163	= 1498	11 1491 1497	SLEEP1E	37,3034	401	2 396 400	SOPTION10	43,3337	1281	
SIGNFIX	40,3031	444	2 444	SLEFT5	4340	474	1 457	SOUPLY	37,3071	402	
SIGNLCHK	25,2767	562	2 562	SLOAO	6500	1014	1 1006	SOUTHOR	E5,1421	= 142	3 142 389
SIGNMPAC	10,3664	1396	14 366 1274	SLOAD2	6054	997	5 1014 1396	SPARCIN	30,3644	922	3 811 921
SIGNRET	0125	= 112		SLOPE8IT	4751	= 84		SPARE	0007	= 208	11 209 219
SIGNTEST	40,2446	416	2 415	SLOPEHI	00,2314	1050	1 1075	SPCOS	5032	1097	5 203 1256
SIM2CADR	05,2454	226		SLOPELO	00,3007	1064	1 1076	SPECSTS	37,2572	397	
SIN8	E5,1646	= 138		SLOPESW	0033	= 84	2 1178 1189	SPECTEST	01,2646	1102	1 1106
SIN8LANK	40,2572	418	1 418	SMALL	00,3133	1068	1 1065	SPEEORUN	21,2560	900	1 899
SINCDU	0736	= 116	6 116 1259	SMALLEPS	27,2411	773	1 773	SPIRAL	1046	= 958	4 276 957
SINCDOUX	0742	= 116	6 491 945	SMALLTJU	16,3672	1465	1 1465	SPLRET	22,3541	= 726	1 36
SINCDOUY	0736	= 116	7 491 1261	SMALL2	00,3062	1065	1 1068	SPNOX	1272	121	8 378 379
SINCDOUZ	0740	= 116	8 491 1261	SMALPOIF	16,2476	1420	2 1420	SPSCOOE	4743	= 1303	
SINE	00,3530	1077	2 1008 1255	SMALRATE	17,3611	1462	1 1462	SPSCONT	20,2632	1483	1 1488
SINESLOC	23,3666	1259	1 1259	SMCOURFS	23,3673	1261		SPSIN	5033	1097	5 203 1256
SINGTMLC	26,2353	496	1 494	SMODE	1362	= 124	7 124 1281	SPSLOOP1	20,3031	1487	1 1488
SINI	24,2002	68	2 1139	SMOOECHK	43,3307	1281	3 1281 1284	SPSLOOP2	20,3046	1487	1 1488
SINNOOI	0010	= 1143	1 1139	SMPAC+	00,3405	1075	3 1074	SPSRCS	17,3700	1501	2 1433 1446
SINTH	0022	= 139	21 314 1249	SNAPAGN	05,3555	988		SPSSTART	17,3737	1502	1 1501
SINTHETA	E7,1727	= 160	3 161 596	SNAPENO	05,3574	989		SPT	5036	1097	1 1097
SINVEC1	26,2355	496	1 494	SNAPLOOP	05,3544	988	1 988	SPVAC	5116	1098	3 247 1355
SINVEC2	26,2357	496	1 495	SNGLCD	22,2376	370		SPVACIN	5112	1098	1 1098
SINZERO	30,3636	921	1 921	SNTH	E5,1727	= 140	15 140 1195	SQ	1077	119	2 1097
SIN50EG	30,3051	856	1 853	SNUFF8IT	4737	= 90	1 1447	SQRT	00,3207	1071	1 1008
SIN60DEG	26,3646	603	2 600	SNUFFER	0115	= 90	2 313	SQRTABRT	00,3402	1074	2 1074
SIX	6241	= 1094	39 184 1501	SNUFFOUT	43,3227	313	1 277	SQRTNEG	00,3373	1074	1 1074
SIXTY	43,3244	1280	1 1286	SN1	00,3553	1078	1 1077	SQRTNM2	00,3475	1076	1 1076
SIZETAB	01,2002	254	2 1300 1302	SN359+	35,2357	641	1 644	SQRTNORM	00,3502	1076	1 1076
SIZETST	42,3555	448	2 447 448	SQB	0042	= 1143	4 1138 1139	SQRTSHFT	00,3221	1071	1 1071
SKEEP1	1371	= 124	20 124 1287	SOLNS8IT	4751	= 91		SQRTSUB	00,3343	1074	3 1065 1079
SKEEP2	1372	= 124	10 124 1285	SOLNSW	0127	= 91	4 1189 1195	SR	0021	= 108	32 418 1478
SKEEP3	1373	= 124	14 124 1286	SOMEADS	20,3334	1493		SRCH08IT	4736	= 84	1 599
SKEEP4	1374	= 124	14 124 1287	SOMEERRR	37,3040	401		SRCHOPTN	0037	= 84	3 507 525
SKEEP5	1375	= 124	10 124 1286	SOMEKEY	07,2404	270	1 269	SROOV	00,2024	1042	1 1065
SKEEP6	1376	= 124	6 124 1287	SOMERR2	37,3047	401	1 391	SRTEST	00,3456	1076	1 1075
SKEEP7	1377	= 124	22 230 1286	SOPT	43,3713	1287	1 1287	SR30.1	22,3551	728	2 723 725
SKIPADD	10,2623	1357	1 1357	SOPTION	43,3676	1286	2 1285	SSP	6617	1016	1 1006
SKIPDB1	20,3265	1492	1 1491	SOPTIONS	43,3320	1281	2 1281	STABL?	31,2570	805	1 804
SKIP082	20,3346	1493	3 1492 1493	SOPTION1	43,3330	1281	1 1281	STACCOOT	20,2700	1484	2 1483 1484
SKIPPAKS	16,2713	1424	2 1423 1435	SOPTION2	43,3331	1281		STADR	6353	1009	1 1008
SKIPSIM	05,2456	226	1 226	SOPTION3	43,3332	1281		STALL	07,3672	1324	2 1323
SKIPTPER	22,3626	729	1 729	SOPTION4	43,3333	1281		STALTEM	0154	= 1216	3 1215

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SYM80L TABLE LISTING, INCLUDING DEEINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
STAP	E5,1730	= 138	9 138 964	STEERSW	0042	= 85	2 778 779	SUMTERMS	21,3707	1477	1 1477
STARAD	E5,1706	= 138	45 138 1251	STERN	31,2530	804		SUPDACAL	4651	994	2 453 1285
STARALGN	0736	= 116	2 116	STIKLOAD	01,2203	308	1 308	SUPDXCHZ	5165	1111	6 298 1111
STARCODE	0735	= 116	4 116 953	STIKSENS	E6,1442	145	8 227 1441	SUPERADR	16,2653	1423	1 1423
STARIND	E5,1757	= 139	16 139 967	STIKSTRT	05,3053	233	1 227	SUPERB8NK	0007	= 109	27 230 1375
STARM	0040	= 139		STILBADH	E7,1672	= 166	4 166 895	SUPERJ08	16,2654	1423	2 1423
STARS AV1	E5,1760	= 139	12 139 977	STILBADV	E7,1673	= 166	4 166 895	SUPERSW	4727	996	2 1358 1364
STARS AV2	E5,1766	= 139	9 139 976	STILLRCS	17,2616	1446	3 1440 1446	SUPFR011	4773	1091	3 858 1305
STARTA8	14,2000	= 30	1 63	STMIN-	20,3417	1494	2 1497	SUPER100	4745	= 1091	
STARTDAP	16,2046	1406		STMP	0020	= 982	7 981	SUPER101	4775	1091	1 1094
STARTDES	25,2432	551	2 550 554	STOPCLOK	36,3023	753	3 752 753	SUPER110	4776	1091	3 609 1094
STARTER8	5007	= 238	1 235	STOPRATE	20,2165	1403	9 303 1404	SUPRC0N	43,3245	1280	1 1286
STARTER	21,3761	1478	1 1476	STOP22.3	27,2217	604		SUREAGAN	07,2645	276	1 276
STARTMNV	26,2150	487		STORBNDS	12,2137	1171	1 1173	SURFDISP	15,3236	969	2 968 970
STARTPIP	37,2161	388	1 388	STORDEL	35,3177	679	2 678 679	SURFEND	07,2641	276	1 276
STARTIP47	36,3447	765	1 765	STORE	6421	1011	6 1010	SURFFBIT	4744	= 95	6 228 861
STARTIP64	31,2627	806	2 802 806	STORF,1	6413	1011	1 1010	SURFFLAG	0177	= 95	15 251 1207
STARTIP66	31,2537	804	1 805	STORE,2	6416	1011	1 1010	SURFJ08	07,2604	275	1 273
STARTIP67	31,2564	804	1 804	STOREMAX	12,2055	1170	3 1169 1170	SURFLINE	15,3156	968	2 967 976
STARTS81	05,3115	234	1 231	STORFMIN	12,2151	1171	1 1171	SURFREJ	07,2507	272	1 272
STARTS82	05,3137	234	1 231	STORFTGO	27,2722	782	2 782	SURFSTAR	15,2000	265	1 268
STARTSIM	05,2452	226		STORE1	6622	1016	1 1047	SURFSTOR	07,2521	273	1 270
STARTST0	6433	1012		STORFIS	26,3631	602	1 602	SURFSUP	15,3226	968	1 968
STARTSU8	05,3100	234	3 226 233	STORHAPO	22,3600	728		SVCT3	5240	1116	2 1116
STARTISW	05,2451	226		STORHPER	22,3612	729		SVCT3X	5256	1116	3 1116
STATE	0074	111	45 81 1088	STORJUMP	6371	1010	1 1009	SVDOWN1	13,2114	335	3 312 1205
STATEF8IT	4747	= 87		STORLP71	04,3570	1386	2 1386 1387	SVDOWN2	13,2070	334	2 1151 1207
STATEFLG	0067	= 87	8 586 1239	STORPOS	15,2350	956	1 957	SVEXITAD	21,2266	832	1 831
STATFINT	13,2604	1204	3 254 1205	STORTORK	16,3665	1465	1 1466	SVEXTADR	32,3746	866	1 866
STATFUP	13,2026	251	1 1205	STORV	20,3502	1495	1 1495	SW/	01,2513	= 1089	1 1007
STATEXIT	E4,1516	= 131	3 714 716	STORY	27,2454	776	1 776	SWANDBIT	4741	= 93	3 747 897
STATETXP	37,3241	714	1 712	STRAT	14,2563	936	1 936	SWANDISP	0155	= 93	2 795 865
STATINT1	13,2613	1204	2 255 1204	STRATGY	14,2555	936		SWBIT	0131	= 113	5 1087 1089
STATQUO	04,2301	246	2 246	STRIGYRO	07,3360	1315	2 1313 1318	SWBRANCH	6714	1019	1 1089
ST8LEOR8	34,2000	= 33	1 732	STRIGYR2	07,3364	1315	4 1316 1320	SWCALL	4622	993	5 232 1085
STCLOK1	36,2666	751	1 749	STRIDLE	5675	1377	1 1377	SWCHCLR	35,2567	671	1 671
STCLOK2	36,2667	751	2 741 792	STRSHQSM	43,3530	1284	2 305 306	SWCHSET	35,2545	671	1 670
STCLOK3	36,2670	751		SUBDIVIDE	16,2252	1417	3 1418 1419	SWINIT	05,3354	238	9 228
STCTR	20,2544	1481	1 1482	SUBEXIT	E7,1466	154	25 631 734	SWITCHES	01,2513	1087	1 1089
STCTR1	20,2547	1481	1 1482	SUBLIST	0337	= 989	12 986 989	SWRETURN	4631	993	9 259 1327
STDESIG	25,2602	557	2 543 557	SU8TR	00,3702	1080	1 1081	SWSKIP	01,2574	1089	2 1089
STDESIG1	25,2616	557		SUFFCHEK	12,3457	1192	3 1191 1192	SWSTORE	01,2550	1088	2 1088
STEER2	31,3405	816	1 815	SUHALFA	22,2677	375	1 375	SWWORD	0130	= 113	2 1087 1088
STEFR8IT	4741	= 85	3 816 863	SUHALFAP	22,2717	375	1 375	SXA	01,2361	1082	1 1007
STEERING	36,3641	768	2 740	SUMNEGU	21,3701	1477	2 1476	SYNCT4	06,2154	175	1 175

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

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 8D BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
SYSTEST	43,3072	305	1 278	S52.2	14,3534	951	2 928 944	TCP	E6,1443	145	3 1416 1430
S1	0050	=	109 30 370 1250	S52.2.1	14,3555	951		TCPIN	43,3210	313	1 313
S10BITS	5012	=	1280 2 1282	S52.2A	14,3546	951	1 951	TCPINAO	43,3213	313	1 312
S13BITS	43,3246	1280	1 1286	S52.3	14,3566	952	1 928	TCQ	6741	=	1288 4 279 536
S2	0051	=	109 46 336 1250	S8BITS	4357	=	1280 1 1287	TCQ8NK00	00,3455	1075	1 1075
S24.9SEC	36,3144	756	1 744	=====	=====	=====	=====	TCOCOWH	30,3446	917	1 923
S30.1	34,2000	626	1 624	T	0036	=	1197 13 506 1192	TCQR	E6,1455	145	3 1416 1442
S32.1F1	0132	=	91 4 642 651	T(X)	27,3707	1276	2 1273 1274	TCSI	E7,1631	157	8 209 654
S32.1F2	0133	=	91 4 642 651	T-OTHER	E3,1570	=	127 1 209	TCSLEEP	00,3772	1372	1 1371
S32.1F3A	0134	=	91 8 643 651	T/2SEC	15,3037	964	1 963	TCSURTR	00,3734	1081	1 1079
S32.1F3B	0135	=	91 8 643 651	TABLNTH	06,2037	172	1 172	TCTSKOVR	4353	474	1 758
S32/33.X	34,3120	656	2 640 655	TABLTTF	E7,1560	=	164 8 164 826	TCWAIT	4352	474	1 461
S32/33.1	34,3100	655	2 632 638	TABLTTFL	31,3733	826	1 812	TOEC	1115	120	9 120 1239
S328IT1	4735	=	91	TAO	7070	1025	1 1006	TOECAY	E7,1737	=	158 1 778
S328IT2	4736	=	91	TAGSUB	01,2436	1084	4 1082 1083	TDECAVFX	4770	1091	
S328IT3A	4737	=	91	TALIGN	E5,1774	=	139 9 211 971	TDEC1	0040	=	1243 62 222 1239
S328IT3B	4740	=	91	TANG	1107	119	34 119 614	TOEC2	E7,1571	=	156 2 706
S33/34.1	35,2726	676	2 637 671	TANGN8	E7,1750	=	161 12 161 617	TOELTAV	E3,1520	=	126 12 126 1238
S34/35.1	35,3236	681	4 675 737	TARGETDB	E6,1474	=	145 4 1430 1442	TDESIREO	E5,1670	=	140 5 140 1192
S34/35.2	35,3250	682	2 672 675	TARGETV	12,3550	1193	1 1193	TDISPSET	31,3674	825	2 807 812
S34/35.3	35,3333	684	1 688	TARGETOEX	31,2510	803	1 825	TDPDS	E5,1756	=	141 1 141
S34/35.4	35,3376	685	1 688	TARGETIME	E4,1712	=	133 2 734 737	TDEL	E5,1764	=	141 1 141
S34/35.5	35,3456	687	2 672 675	TASKOVER	5261	1124	79 180 1372	TEMK	1076	119	10 1097
S3435.25	35,3263	682	1 735	TAT	0014	=	1243 15 222 1220	TEMP	E5,1441	=	142
S40.1	27,2271	772	2 761 763	TAU.	E4,1473	=	130 15 130 1229	TEMPA0D	E5,1440	=	142
S40.18	27,2363	773	1 772	TAUROO	31,3746	827	1 819	TEMP88	0064	=	1294 1 1293
S40.13	27,2574	780	1 745	TAUVERT	31,3744	827	1 819	TEMP88CN	0073	=	1294 6 1293 1296
S40.13D	27,2662	781	2 780 781	TBASE1	1053	118	4 744 1298	TEMPFLSH	0374	116	3 243 1358
S40.130V	27,2707	782	1 782	TBASE2	1055	118	6 487 1215	TEMPG	0061	=	1294 8 1293 1296
S40.131	27,2644	781	1 781	TBASE3	1057	118		TEMPG2	0071	=	1294 3 1292 1295
S40.132	27,2652	781	2 781 782	TBASE4	1061	118	4 247 751	TEMPNM	0063	=	1294 3 1293 1296
S40.132*	27,2654	781	1 782	TBASE5	1063	118	1 860	TEMPNUM	E6,1740	=	146 2 1434
S40.133	27,2703	782	1 782	TBASE6	1065	118	1 751	TEMPOK	06,2525	186	2 186
S40.134	27,2704	782	2 781 782	TBRKPNT	E5,1502	=	138 2 138 842	TEMPOR2	0160	=	1366 10 1350 1360
S40.136	27,2006	53	1 781	TBUILDFX	4767	1091	1 1502	TEMPP	0062	=	1294 6 1293 1296
S40.136	27,2010	53	1 782	TBUP	E4,1664	=	135 14 135 850	TEMPPHS	0154	=	1302 9 1297 1302
S40.137	27,2675	782		TC	E3,1550	=	126 12 126 1236	TEMPPR	0070	=	1294 2 1293 1296
S40.138	27,2715	782	1 782	TCALARM2	43,3272	1280		TEMPP2	0072	=	1294 5 1292 1295
S40.2,3	27,2436	776	2 761 763	TCCSM	F3,1622	127		TEMPPR60	1164	120	9 486 852
S40.8	27,2472	778	1 768	TCODANZIG	27,3725	=	1276 5 576 1271	TEMPSW	0065	=	1294 8 1292 1295
S40.9	27,2745	783	1 768	TCOH	E6,1773	152	11 209 654	TEMPSWCH	0157	=	1302 3 1297 1302
S40.91	27,3064	784	1 784	TCFINDVC	4354	474	1 461	TEMPSW2	0066	=	1294 4 1292 1295
S40.92	27,2773	783		TCGETCAD	00,3761	1371	1 1372	TEMPTIME	E5,1430	=	142 3 142 393
S41.1	27,3156	788	4 763 766	TCLEM	E3,1674	127		TEMPVAR	E5,1667	=	141 3 1145 1146
S50	14,2347	=	932	TCNOVAC	4351	474	1 460	TEMP2G	0155	=	1302 9 1297 1302

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED	=	DEFINED BY EQUALS	J	DEFINED BY JOKER OR ERASE ANYWHERE	MD	MULTIPLY DEFINED
80 BADLY DEFINED		CO DEFINITION ASSOCIATED WITH CONFLICT		XX	MISCELLANEOUS TROUBLE	

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
TEMP31	E6,1735	= 145	6 1438 1439	TEFCOMMU	27,3333	= 1265	1 728	THRUST	0055	= 109	5 226 838
TEMX	1254	= 121	5 121 872	TEFOFLQ	0012	= 1262	2 1274 1275	TICKTEST	22,3430	724	2 721 724
TEMY	1255	= 121	3 121 872	TEFFLL	27,3625	1274	1 1272	TICKTFF	22,3420	723	1 723
TEMZ	1256	= 121	5 121 872	TEFELL	27,3627	1274	1 1272	TICKTPFR	22,3410	723	
TEM1	0141	113	23 113 1359	TEFNP	0034	= 1262	6 1265 1274	TIG	F7,1437	154	43 209 971
TEM2	0142	113	31 113 1393	TEFQ1	0016	= 1262	5 1271 1274	TIG-0	36,2367	745	2 256 745
TEM3	0143	113	19 113 1255	TEFRP/RA	27,3401	1268	1 728	TIG-30	36,2274	744	2 256 743
TEM4	0144	113	11 113 921	TEFRTALF	0030	= 1262	3 1266 1273	TIG-30.1	36,2264	743	1 743
TEM5	0145	113	6 113 920	TEFSW	0167	= 94	3 1271	TIG-30A	36,2271	743	1 743
TEN	4363	= 1094	10 223 1426	TEFSWBIT	4753	= 94		TIG-35	36,2236	743	3 256 742
TENOAPPR	E7,1426	153		TEFTEM	0044	= 1262	13 1271 1275	TIG-5	36,2343	745	4 255 750
TENDBRAK	E7,1425	153	3 287 814	TEFTICK	22,3453	724		TIGNOW	36,3241	762	2 748 761
TENDEG	23,2270	531	1 529	TEFVSQ	0024	= 1262	1 1265	TIGTASK	36,2545	748	1 740
TEPHM	E3,1706	127	10 128 1388	TEFFX	0042	= 1262	7 1271 1274	TIMECHECK	10,3174	1363	1 1363
TERMASC	27,3306	854	2 854	TEFFXTEST	27,3533	1272	1 1272	TIMECHK	22,3075	379	1 379
TERMATE	10,3245	1364	1 1362	TEFFZEROS	23,2423	= 1277	2 1271 1272	TIMEDELTA	13,3717	1221	4 1219 1220
TERMETV	5472	= 278	4 283 288	TEFF1/ALF	0026	= 1262	7 1266 1275	TIMEOTDL	04,3510	1385	2 1385 1388
TERMNVEC	12,3635	1194	1 1195	TEFF1/4	23,2413	= 1277	4 1265 1271	TIMFDIDR	04,3522	1386	1 258
TERMITMP	0157	= 114	3 1259	TEFI	E7,1451	= 154		TIMEGBL	21,3450	1472	2 1444 1484
TERM40	36,3256	762	3 761 762	TGO	E7,1514	= 162	36 162 854	TIMEHOLD	1105	119	7 564 617
TERRLAMB	E5,1757	= 140	2 1191 1192	TGOCALC	27,2520	778		TIMEINC	13,3671	1220	1 1221
TEST	01,2562	1089	1 1089	TGOCOMP	32,3555	837	2 833 836	TIMEQVEL	12,2320	1173	1 1171
TESTBIT	40,3525	470	3 470	TGOFFNOW	21,3533	1474	3 1473 1474	TIMEP	0030	= 982	3 980 981
TESTCDS	32,2667	613		TGOI	E7,1642	= 837	2 836 837	TIMER	F5,1470	= 142	
TESTLODX	31,3654	824	1 824	THDUMP	31,2414	800		TIMERA0	12,3556	1194	
TESTLOOP	13,3255	1213	6 1211 1240	THETA	0024	= 139	11 943 1246	TIMESTEP	11,3156	1233	4 1214
TESTNN	41,2046	420	1 452	THETACON	27,2434	774	1 772	TIMETEST	01,3571	1298	1 1301
TESTOFUE	40,3174	447	4 444 454	THETAD	0321	115	23 115 1393	TIMETHET	12,2745	1182	6 506 737
TESTV8	41,2041	420		THFTAN	E5,1452	= 143	1 143	TIMEX	35,3233	679	2 677 679
TESTXACT	43,2076	278	19 283 1381	THIRO	35,3674	693	1 678	TIME1	0025	= 108	21 180 1363
TESTY	35,2774	676	1 676	THIRTEEN	4761	= 1068	2 1065 1397	TIME2	0024	= 108	38 209 1390
TEST2.3	27,2156	603		THISAXIS	23,2415	= 36	2 36 713	TIMF2SAV	0314	115	4 115 1331
TEST3979	34,3445	735	1 734	THISPREC	13,3057	= 36	4 665 723	TIMF3	0026	= 108	4 234 1123
TET	E3,1516	= 126	30 126 1235	THISSHIP	22,3356	723	1 722	TIME4	0027	= 108	4 172 234
TETCSM	E3,1570	127	5 127 1388	THISVINT	13,2066	252	1 1220	TIMF5	0030	= 108	6 234 1416
TETLFM	F3,1642	127	3 127 1388	THROCHK	34,2656	650	2 649	TIMF6	0031	= 108	7 1399 1451
TETOTHER	F3,1570	= 127		THREE	6244	= 1094	45 248 1452	TIMQGBL	21,3456	1473	1 1474
TETTHIS	E3,1642	= 127	1 718	THREE/8	11,3673	1242	1 1228	TIMSUBM	0016	= 1143	3 1140
TEVFNT	1344	123	6 209 831	THREEDEG	32,2543	582	1 581	TIMSUBD	E3,1706	= 128	1 1140
TEF	E4,1540	= 131	11 131 729	THRESH1	36,2020	55	1 760	TINT	E7,1626	= 159	6 733 734
TEF/RTMU	0036	= 1262	6 722 1273	THRESH2	6000	55	3 765 839	TINTSDI	E4,1706	= 133	2 733 734
TEFFALFA	0032	= 1262	6 1266 1273	THRESH3	36,2021	55	1 760	TITER	E7,1611	= 156	5 676 678
TEFFBANK	22,3320	722	1 721	THROTLAG	31,2004	55	1 799	TIX	01,2412	1083	1 1007
TEFFCALLS	22,3565	728	1 728	THROTTL	31,2247	797	2 817 819	TJCALC	17,3304	1456	2 1456
TEFFCONIC	27,3332	1265		THROTUP	32,3564	838	2 834	TJETLAW	17,3207	1455	2 1433 1446

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 BD BADLY DEFINED CD OFFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYM80L TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
TJETU	E6,1525	= 149	2 1457 1458	TPOVL	6607	1016	1 1016	TRYSWN	25,2523	554	1 554
TJLAW	17,2623	1446	1 1449	TPERTICK	22,3460	724	1 724	TRYSW5	25,2461	553	1 550
TJLAWAOR	17,3045	1449	1 1446	TPIP	E7,1622	= 165	5 165 807	TRYUORV	16,2732	1424	1 1425
TJMIN	17,3676	1463	1 1461	TPIPOLD	E7,1571	= 164	3 164 807	TSSCALE	32,2204	224	1 223
TJP	E6,1524	= 148	18 148 1465	TPLEFTN	40,3153	446	3 432 446	TSCALINV	4750	= 826	1 825
TJU	E6,1525	= 148	14 149 1501	TPMODE	10,3537	1391	11 587 1187	TSENSE	17,2115	1437	1 1437
TJV	E6,1526	= 148	3 1406 1449	TPREV	E5,1761	= 140	2 1191 1192	TSIGHT	E7,1557	= 160	17 273 974
TJZERO	17,3761	1502	2 1502	TPSL1	4404	475	6 436 446	TSIGHT1	14,3023	940	1 938
TLAND	E5,1400	= 137	4 137 790	TPUSH	00,3272	1072	1 1072	TSKOVCOR	01,3515	1127	1 1127
TLIM	06,2514	186	1 177	TR*GL**P	23,3464	1255	1 1255	TSLS&TCQ	30,3570	920	1 920
TLOAO	6467	1014	3 370 1094	TRACE1	40,3236	454		TSLC	7615	1039	1 1006
TM	E6,1731	= 150	4 377 380	TRACE1S	40,3247	454		TSCLCLOOP	00,2201	1047	1 1047
TMANUCHK	22,3064	= 379		TRACKBIT	4747	= 84	14 295 1309	TSCLCTEST	00,2207	1047	1 1047
TMARK	E5,1432	= 142	4 142 393	TRACKFLG	0031	= 84	6 302 717	TSCLC2	00,2172	1047	1 1039
TMEXITL	05,3626	989		TRAKFWOV	E7,1701	= 166	2 166 899	TSNEXTP	16,2773	1425	4 1424 1425
TMFAIL2	04,3306	1333	2 1334	TRAKLATV	E7,1700	= 166	5 166 905	TSNEXTS	17,2145	1437	
TMFI	E6,1701	= 150	9 365 366	TRANSM1	F4,1400	= 133	2 133 399	TSNUMBRT	17,2135	1437	1 1439
TMIN	34,2111	642	2 651	TRANSPOS	22,2326	369	1 364	TSSL	00,2101	1044	3 1042 1051
TMINDEX	0336	= 115	7 115 989	TRANSP1	10,3634	1395		TSSR	09,2025	1042	
TMIS	E6,1701	= 150	15 150 364	TRANSP2	10,3650	1395		TSTA8	40,3635	483	1 484
TMOOE	6476	1014		TRANSTM	E7,1660	= 163	3 163 507	TSTART82	E4,1610	= 131	7 352 723
TMODULO	E4,1600	= 131	8 131 1174	TRANS4	17,2256	1439	1 1437	TSTCON1	41,3656	480	1 480
TMPTOSPT	33,2473	873	1 862	TRAPEOP	E6,1426	144	11 144 1420	TSTCON2	41,3657	481	1 480
TMRESUME	05,3630	989		TRAPEOQ	E6,1427	= 144	6 1406 1421	TSTCON3	41,3660	481	1 481
TNIT	E7,1727	= 158	4 158 784	TRAPEDR	E6,1430	= 144	6 1406 1421	TSTFBANK	27,2255	758	1 758
TNITPREV	E7,1731	= 158	2 783 784	TREOES	F7,1664	= 165	3 808 825	TSTFORDP	41,2466	428	1 427
TNTEST	06,2227	178	1 176	TRG*N8SM	23,3570	1257	5 265 965	TSTLTS1	41,3631	480	1 480
TNUV	E3,1526	= 126	12 126 1238	TRG*SMNB	23,3555	1257	2 581 896	TSTLTS2	41,3662	481	1 480
TOBALL	26,2114	486	1 486	TRIG1	23,3235	1246	1 1246	TSTLTS3	41,3667	481	1 481
TOBALLA	26,2116	486	2 487	TRIG2	23,3246	1246	1 1246	TSTLTS4	40,3467	463	1 481
TOBALLC	26,2137	487	1 487	TRIMACCL	31,2000	54	1 815	TSTORE	6453	1012	1 1012
TOCON2	5417	1293	1 1294	TRIMOONE	01,2320	310	1 786	TSTPOINT	23,3661	1259	
TOF-FF	27,2000	= 32	1 1265	TRIMGIM8	27,3106	785	1 310	TSTRLSRM	13,2575	1134	1 1134
TOF-FF1	27,2000	= 32	2 61 1277	TRIPA	E5,1664	= 141	5 141 1146	TSTRT	E7,1607	= 156	3 298 712
TOFAR	25,3574	577	1 577	TRKFLCOU	06,3070	200	2 200	TTEMP	E6,1705	= 150	8 378 381
TOBBAOF	22,2724	376	1 364	TRKFLON	4601	536	2 535 623	TTF/8	E7,1640	= 165	16 165 875
TOBBADI	22,2742	376	1 365	TRKMKCNT	E7,1460	154	11 154 1218	TTF/8CL	31,3107	811	3 802
TOPSEU00	17,2461	1442	1 1442	TRMTRACK	43,3034	302	2 277 604	TTF/8TMP	E7,1550	= 164	6 164 807
TORKJET1	20,2000	57	2 1483	TRMTRAK1	42,2054	302	1 302	TTFDISP	E7,1473	= 162	4 162 825
TORGCONS	20,3070	1488	1 1488	TRNSPSP0	22,2335	369	1 365	TTFINCR	31,2657	807	4 802 806
TORGNOX	E5,1440	= 143	8 386 401	TRUE360X	12,3203	1187	1 1186	TTFSCALE	4740	= 826	
TORQUE	37,2117	387	1 401	TRUNBQ	26,3054	592		TTHROT	E7,1615	= 164	3 164 799
TOTATTIER	43,2166	281	1 277	TRUNVAR	E4,1411	129	1 592	TTO	E4,1662	= 135	4 135 847
TPAGREE	7256	1031	19 290 1390	TRYCOUNT	25,3166	566	1 566	TTOAXIS	E6,1740	= 148	10 1458 1461
TPASS4	E7,1626	157	10 159 783	TRYGTS	17,2531	1443	1 1436	TTOGO	F7,1451	154	23 154 853

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED	= DEFINED BY EQUALS	J DEFINED BY JOKER OR ERASE ANYWHERE	MD MULTIPLY DEFINED
80 BAOLY DEFINED	CO DEFINITION ASSOCIATED WITH CONFLICT	XX MISCELLANEOUS TROUBLE	

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF OFF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
TTPI	E7,1633	157	19 209 679	UDB4	0137	= 1498	2 1495 1496	UPBUEF	1174	= 120	29 219 1388
TTPIO	E7,1635	157	3 633 638	UERROR	E6,1747	= 145	3 145 1446	UPCOUNT	1173	= 120	5 120 1383
TURNITON	35,3726	755	1 755	UHP	E7,1715	= 166	7 166 901	UPDAT8IT	4745	= 83	1 518
TURNDEFF	16,2673	1423	1 1423	UHPZ	E7,1723	= 166	5 166 902	UPDATCHK	33,3205	= 885	2 875 876
TURNOFFR	16,2703	1423	1 1423	ULC	F7,1721	= 160	8 160 596	UPDATEVG	36,3611	= 768	2 764 768
TURNON	17,3057	1450		ULLAGER	4746	= 104	3 750 1437	UPDATE2	04,2000	= 27	2 1221 1382
TURNONBT	4753	= 103		ULLAGFLG	0314	= 104	2 239 750	UPDATFLG	0027	= 83	15 302 735
TURNONFL	0302	= 103		ULLAGOFF	36,2540	748	1 256	UPDATIME	42,2016	290	1 290
TVEC	0032	= 1243	6 1231 1232	ULLGNOT	36,2316	744	1 744	UPDATNN	41,2320	424	3 452 467
TWEEKIT	0050	= 1199	4 1178 1192	ULLGTASK	36,2337	745	3 254 753	UPDATOFF	43,3067	304	1 278
TWELVE	5742	= 1478	1 1475	ULOS	E4,1714	= 133	6 676 684	UPDATRET	0117	= 112	3 424 425
TWIDDLE	5173	1114	28 388 964	UMPAC+	00,3170	1069	2 1069	UPDATVB	41,2340	424	10 417 467
TWO	4752	= 1094	112 36 1497	UMPAC-	00,3162	1069	2 1069	UPDAT1	41,2345	425	2 424 456
TWOPI	35,3670	693	4 632 678	UN	E5,1673	= 140	7 140 1195	UPDNLIST	05,2407	= 208	
TXO	E7,1653	= 167	4 167 852	UNAJUMP	00,2000	1008	1 1005	UPDTCALL	22,3206	381	1 380
TX789	E7,1467	= 160	3 160 1152	UNFC/2	E6,1651	= 151	18 151 909	UPDTMEND	42,2032	290	
TYPEP	16,3546	1434	1 1434	UNFV/2	E6,1665	= 151	5 151 909	UPDTPHAS	4756	= 1384	1 1385
TYPEPOLY	17,3166	1452	2 1451 1452	UNFVLM	30,3736	924	1 918	UPEND70	04,3644	1388	1 1385
T1TOT2	E4,1656	132	7 133 651	UNFVX/2	E6,1665	= 151		UPEND71	04,3553	1386	1 1385
T2A	30,3027	= 856	1 848	UNFVY/2	E6,1667	= 151	3 911 912	UPEND72	04,3605	1387	1 1385
T2TEST	30,2457	848	2 848 854	UNFVZ/2	E6,1671	= 151	3 911 912	UPEND73	04,3457	1385	
T2TOT3	E4,1660	132	5 331 651	UNIT	00,3023	1065	3 612 1397	UPENT2	10,3416	1368	4 1357 1362
T3	30,3031	856	1 848	UNIT/R	E7,1534	= 162	33 162 902	UPERROR	43,3746	1381	1 1381
T3RPT88	4057	169	1 168	UNITDV	00,3151	1069	3 1067	UPERROUT	04,3701	1389	4 1381 1388
T3RUPT	01,3404	1123	2 168 169	UNITGOBL	E7,1516	= 162	2 784 881	UPFLAG	5504	1369	70 281 1385
T3RUPT2	01,3411	1123	1 1124	UNITNORM	04,3075	1184	1 1184	UPFNDVAC	04,3465	1385	1 1384
T4JUMP	06,2116	174	2 173	UNITX	23,2421	1095	12 36 1095	UPJ08	04,3472	1385	1 1385
T4RPT88	4064	169	1 168	UNITY	23,2417	1095	5 36 896	UPLIM	12,3306	1190	1 1189
T4RUP	06,2000	= 28	2 170 171	UNITZ	23,2415	1095	9 36 881	UPLOADNV	04,3437	1384	2 1382 1383
T4RUPT	06,2000	170	2 168 169	UNKNOWN	0007	= 208		UPLOCBIT	4750	= 94	3 1333
T5ADR	1274	121	5 168 1484	UNLR/2	0024	= 165		UPLOCKFL	0164	= 94	
T5TEMP	0061	= 152	1 1414	UNLR8/2	0024	= 165		UPMNSVCD	04,3163	1222	1 1221
T6ADR	4055	169	1 168	UNP36	E4,1620	= 134	3 710	UPNEG	7560	1038	1 1038
T6FURTHA	E6,1466	145	11 1399 1451	UNRM	E4,1664	= 133	7 677 686	UPOK	04,3271	1333	
T6J08	17,2004	1399		UNSETRI	10,3233	1363	1 1362	UPDLOMDD	1171	= 120	3 120 1387
T6J08CHK	17,2000	1399	2 1399 1400	UNSPEN	04,3475	463	1 463	UPOUT	04,3632	= 1387	7 1382 1389
T6NEXH	E6,1464	145	12 234 1451	UNVEC	E7,1541	= 156	5 657 658	UPOUT4	04,3633	= 1384	3 1383
=====	=====	=====	=====	UNWC/2	E6,1657	= 151	10 151 911	UPPART2	04,3322	= 1382	1 1382
U=SCAXIS	27,2112	495	1 495	UNWCLOOP	31,3363	816	1 816	UPPART3	04,3503	= 1385	
UAXDIST	0141	= 1498	2 1495 1496	UNWCTEST	30,3474	918	2 912	UPPOS	7550	1038	1 1038
UAXIS	20,3230	1491		UNX/2	0000	= 151	7 911 918	UPPSV	24,2347	512	1 510
UCSM	E7,1634	= 163	3 163 506	UNY/2	0006	= 151	1 912	UPPSV1	24,2367	512	1 512
UDB1	0135	= 1498	2 1495 1496	UNZ/2	0014	= 151	8 911 912	UPPSV3	24,2411	512	1 512
UD82	0136	= 1498		UNZ2	06,2313	180	1 181	UPPSV4	24,2403	512	1 513
UD83	0140	= 1498		UPACTOFF	04,3706	1389	2 1388 1389	UPPSV5	24,2364	512	1 512

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 8D BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DFF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	P	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
UPRPTBB	4060	= 169	1 168	U2	E5,1711	= 140	5 140 1194	VBAD	33,3650	893	1 892
UPRPT1	04,3252	1333		U2POS	22,2224	367	1 367	VBCOARK	43,2171	282	1 277
UPRPT	04,3240	1333	1 168	U3POS	22,2274	368	1 368	V8FANDIR	41,2146	421	1 421
UPSTORE	04,3441	= 1384	1 1383	=====	=====	=====	=====	VBPROC	40,3440	461	5 422 469
UPSFLAG	E3,1501	= 126	6 126 1222	V	E7,1524	= 162	21 162 901	VBRELDSP	40,3457	463	1 411
UPTMP	1167	120	12 120 1387	V(CSM)	E3,1725	= 136	6 609 883	VBRESEQ	40,3455	462	1 422
UPTST	04,3312	1333	2 1333	V-OTHER	E3,1725	127	5 136 335	V8REG	E5,1410	= 137	2 137 826
UPTHROT	32,3371	834	1 933	V/SC	7623	1040	1 1006	V8RFG*	E5,1424	= 137	2 137 826
UPTHROT1	32,3401	834	1 837	V/SCDV	00,2750	1063	3 1062	V8RQEXEC	41,3466	460	1 422
UPTIMEAST	06,2676	193	1 196	V/SC1	7631	1040	1 1040	V8RQWAIT	41,3512	461	1 422
UPVER8	1172	= 120	5 120 1385	V/SC2	00,2654	1061	1 1040	V8SPILD	41,3006	440	2 438 439
UPVER8SV	1166	120	2 1381 1382	VACDSP	10,2532	1355	1 1355	V8SP2LD	41,3007	440	2 438 439
UPVERIFY	04,3404	1383	3 1383 1384	VACFOUND	01,2615	1101	5 1101	V8SP3LD	41,3010	440	1 438
UPVRYFNV	04,3440	1384	1 1383	VACSTOR	07,2526	273	1 270	V8TERM	40,3446	461	2 422 468
UPWAKE	04,3475	1385		VACT1	E7,1467	156	4 159 652	V8TSTLTS	41,3613	480	1 422
UP1	E4,1664	132	11 133 658	VACT2	E7,1511	156	3 646 658	V8UF	0122	112	71 112 1498
UP21	4362	= 1384	1 1383	VACT3	E7,1541	156	12 156 706	V8ZERO	43,2130	280	1 277
UP70	4755	= 1382	1 1381	VACT4	E7,1563	156	6 157 646	V804N12	26,2075	353	1 352
UP71	4753	= 1382	1 1381	VACX	E4,1537	= 130	1 130	V805N06	15,3634	977	1 972
UP72	4752	= 1382	1 1381	VACY	E4,1541	= 130	1 130	V805N09	5006	= 928	3 938 972
UP73	6244	= 1382	1 1381	VACZ	E4,1543	= 130		V806N18	26,2076	353	1 353
UR	0000	= 501	1 500	VAC1	0401	116		V806N98	37,2472	394	1 394
URATEDIF	E6,1424	= 145	5 1441 1443	VAC1ADRC	05,3341	237	1 236	V856CADR	6025	604	1 604
URP	0006	= 501	2 500	VAC1USE	0400	116	4 236 1101	V86N5	14,3171	944	1 943
URPV	0016	= 1243	6 1230 1243	VAC2	0455	116		V864	43,2710	295	1 277
URRECT	E5,1646	= 140	4 140 1174	VAC2USE	0454	116	3 236 1101	V867	31,2000	= 33	1 619
UR1	F5,1721	= 140	11 140 1195	VAC3	0531	116		V897DEX	4242	= 752	1 749
USEADD	41,2105	420	1 420	VAC3USE	0530	116	3 236 1101	V899CON	36,3146	756	1 752
USECOS	30,3625	921	1 921	VAC4	0605	116		V899DEX	5742	= 752	1 745
USEGTS	33,2341	863		VAC4USE	0604	116	3 236 1101	VCV	E3,1542	= 126	20 126 1236
USEJETS	33,2400	864	4 863	VAC5	0661	116	1 1302	VCVCSM	E3,1614	127	1 589
USEMAXDT	13,3332	1213	1 1214	VAC5USE	0660	116	3 236 1101	VCVLEM	E3,1666	127	2 510 588
USEPIOS	13,3001	1207	1 1207	VAD	6750	1021	1 1006	VDR	17,2441	1442	1 1442
USEQRELG	0304	= 103		VALMIS	37,2263	390	1 401	VDEF	00,3232	1072	1 1008
USEQRJTS	4736	= 103	6 767 1484	VALTCHK	33,3475	889	4 886 889	VDG	E5,1410	= 826	1 812
USERPRI0	0163	= 1366	3 1353 1363	VAL67	05,2043	68	3 980 981	VDGVERT	E7,1642	= 165	5 804 819
USPRCADR	4713	995	7 612 1255	VAP67	E5,1440	= 137	1 137	VDG2ITF	E5,1424	= 826	1 811
UT	E7,1676	= 158	9 158 776	VAPF6*	E5,1454	= 137	1 137	VD1	4360	474	15 237 1094
UV	0154	= 1498	7 1491 1497	VAPREC	E7,1503	= 156	2 676 679	VE	E4,1660	= 135	6 135 847
UXVECT	E7,1715	= 159	7 159 602	VARADAR	25,2047	503	1 502	VEARTH	E5,1706	= 139	6 139 960
UXVECTPR	0014	= 603	3 600	VARALARM	5735	1378	4 195 1326	VECAGREE	00,3010	1064	4 1061 1397
UYVECT	E7,1723	= 159	6 159 602	VARDELAY	5224	1114	11 179 1306	VECANG1	26,2361	496	1 495
UYVECTPR	0022	= 603	2 600	VARIANCE	E5,1706	= 141	12 141 1145	VECANG2	26,2363	496	1 495
UZ	0024	= 1243	4 1230 1232	VATT	0006	= 1243	25 576 1220	VECLEAR	27,2021	494	1 494
UIPOS	22,2250	367	1 367	VATT1	0024	= 1243	13 223 810	VECMODE	10,3515	1390	1 1393

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF RFFS, PAGE OF FIRST REF, PAGE OF LAST RFF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
VECOFANG	22,2723	375	2 375	VGBODY	F7,1477	= 162	9 162 847	VONE	E4,1620	= 131	9 713 1265
VECPPOINT	27,2016	494	4 353 529	VGDISP	F7,1661	= 157	7 329 785	VONE'	E4,1567	= 130	3 1265 1271
VECPPT	27,2000	= 32	1 493	VGNEW	27,2502	778	2 778	VOPENED	D6,3223	207	1 206
VECTEMP	E6,1723	= 151	3 494 496	VGPREV	E7,1704	= 158	10 255 785	VPASS1	E7,1503	156	6 156 652
VECSNAG	10,3744	1397	2 224	VGTTG	E7,1704	= 158	10 158 780	VPASS2	E7,1525	156	5 156 657
VECSHIFT	23,2377	707	3 644 657	VGU	F7,1624	= 165	11 165 819	VPASS3	E7,1555	156	9 648 737
VECTAB	E4,1531	= 130	10 130 1241	VGVECT	E7,1645	= 167	7 167 847	VPASS4	F7,1503	= 159	3 672 735
VECTABND	F4,1574	= 130		VHORIZ	E4,1666	= 135	3 135 810	VPD	0000	= 937	
VECI	E5,1722	= 139	7 967 977	VHY	E7,1702	= 166	4 166 902	VPDVL	6572	1016	
VEC2	E5,1730	= 139	6 967 977	VHZ	E7,1703	= 166	4 166 902	VPPREC	E7,1525	= 156	2 676 679
VEHUP8IT	4744	= 83		VIGN	E5,1462	= 137	2 137 791	VPROJ	7424	1036	1 1006
VEHUPFLG	D026	= 83	13 303 1151	VINIT	E4,1734	134	10 662 783	VRATEDIF	F6,1425	= 145	3 1442
VELCHK	25,3231	567	1 567	VINTEBIT	4751	= 87		VRECT	E3,1510	= 126	11 126 1236
VELCONV	21,2003	57	2 902 903	VINTFLAG	D071	= 87	25 251 1238	VRECTCSM	E3,1562	126	2 847 978
VELDABIT	4745	= 100	2 886 892	VIPRIME	E4,1742	134	10 663 784	VRECTLFM	E3,1634	127	
VELDATA	0255	= 100		VLAUN	E5,1510	= 143	5 399 400	VRIGHT2	DD,2242	1049	1 1049
VELSC	37,3101	402	1 398	VLAUNS	E5,1462	= 143		VROTATEX	7417	1035	3 1045 1067
VELUPDAT	33,3325	886		VLIGHT	25,3664	623	1 622	VROUND	7137	1027	6 1035 1036
VERB	40,2354	415	1 411	VLITE	4751	= 623	2 623 829	VRPREV	E7,1721	= 158	3 158 784
VERBFAN	41,2133	421	7 420 423	VLOAD	6504	1014	1 1006	VRTSTART	31,2547	804	1 805
VFRBMASK	4144	= 1366	1 1351	VLOAD*	6106	= 1094	1 1013	VSCALE	32,2211	224	1 223
VERBNOUN	E7,1613	156	6 640 738	VLOADCOD	4735	= 1094	1 1013	VSELECT	F7,1647	= 165	11 165 893
VERBREG	1001	117	20 237 471	VMAX	E4,1405	129	1 597	VSHRRND	D0,2073	1043	4 1045 1081
VERBSAVE	1041	118	3 420 459	VMFAS	E7,1650	= 165	4 165 892	VSHR?	00,2060	1043	1 1043
VERBTAB	41,2151	421	1 421	VMEASCHK	33,3320	886	5 885 890	VSO	00,3245	1072	1 1008
VERB37	D4,2000	= 27	1 239	VMOOF	6520	1014	3 1036 1390	VSQSU8	00,3317	1073	3 1065 1072
VERB69	43,2037	277	1 277	VMONITOR	21,3004	903	1 906	VSSL	00,2145	1046	3 1045 1051
VERB85	43,3235	314	1 278	VMOON	E5,1722	= 139	8 139 981	VSSR	00,2127	1045	1 1049
VFRB96	43,3214	313	1 278	VN	1226	121	10 210 1217	VSTILBAD	33,3651	893	1 892
VERIF8IT	4751	= 94	1 1384	VNCON	43,3136	306	1 305	VSTORE	6442	1012	
VERIFLAG	0165	= 94		VNDSPCON	40,3316	456	1 456	VSU	6746	1021	1 1006
VERIFYMK	07,2444	270	1 270	VNDSPLY	34,3617	738	4 732 735	VSURC	E3,1760	= 128	3 506
VERROR	E6,1750	= 145		VNLDRCOU	43,2260	284	1 284	VSUN	E5,1714	= 139	7 139 981
VERTDISP	31,3475	818	1 803	VNLDRCOU	43,2225	283	2 283 296	VTARGET	E5,1702	= 140	4 140 1193
VERTDRFT	37,2231	389		VNLODDT	42,2034	290	1 290	VTARGETAG	E5,1701	= 140	5 140 1193
VFRGUID	31,3477	818	1 802	VNLODGYR	43,2367	288	1 288	VTIG	E7,1645	= 157	9 157 835
VERTSKIP	37,2534	396	1 396	VNPLANV	15,2626	960	1 959	VTPRIME	E7,1563	= 157	5 672 735
VEX	E7,1741	158	3 761 779	VNP00H	35,3651	692	16 624 688	VUPDAT	33,3445	888	1 888
VFAIL	33,3560	890	2 888	VND641	37,2473	394	1 386	VV/SC	7626	1040	
VFLAG	0062	= 86	4 934 937	VN1	E7,1550	= 162	8 162 1220	VVARMIN	E3,1775	128	1 589
VFLAG8IT	4742	= 86		VN1645	35,3542	689	7 633 735	VVEC	E5,1743	= 140	15 140 1195
VFLSH8IT	4752	= 101	1 829	VN2	E7,1654	= 165	4 165	VVFCT	E7,1704	= 166	16 166 901
VFLSHFLG	0262	= 101	2 888 890	VOK	26,2631	589	1 589	VVXSC	7403	1035	
VG	F7,1713	158	6 158 778	VOK1	26,2672	590	1 590	VX8EAMNB	E4,1650	= 132	2 132 896
VGAIN*	27,2504	778		VOK2	26,2674	590	1 590	VXINH	0250	= 100	2 888 891

HEALTH KEY: NORMALLY DEFINED UNLESS FLAGGED AS FOLLOWS:

UN UNDEFINED = DEFINED BY EQUALS J DEFINED BY JOKER OR ERASE ANYWHERE MD MULTIPLY DEFINED
 8D BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYM80L TA8LE LISTING, INCLUOING OFFINITION, HEALTH, PAGE OF DEF, # OF RFFS, PAGE OF FIRST REF, PAGE OF LAST RFF.

SYMBOL	OFF	H	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES										
VXINHBIT	4740	=	100	1	888			V06N48	01,2332	310	1	310	V16N85B	36,3744	770	4	743	764			
VXM	7336		1033	1	1006			V06N49NB	24,2711	519	1	519	V16N85C	27,3331	855	1	854				
VXM/MXV	7341		1034	1	1033			V06N51	42,3763	501	1	501	V1683	36,3745	770	1	766				
VXRCM	E7,1701	=	159	3	159	602		V06N55	35,3663	693	2	631	691	V2	0022	=	937				
VXSC	7400		1035	1	1006			V06N55SR	34,3631	738	1	732		V3	0030	=	937				
VXSCAL	33,2016		56					V06N57SR	34,3633	738	1	733		V37	04,2037	242	2	313	460		
VXV	7457		1037	1	1006			V06N58	35,3664	693	1	672		V378A0	04,2066	242	1	246			
VY8FAMN8	F4,1642	=	132	3	132	896		V06N58SR	34,3635	738	1	735		V37FLAG	0162	=	94	2	834	865	
VYSCAL	33,2014		56					V06N59	35,3665	693	1	688		V37FL8IT	4746	=	94	3	243	1377	
VZBEAMNB	F4,1634	=	132	3	132	896		V06N60	31,3767	827	1	818		V37KLFAN	05,2652	229	1	245			
VZSCAL	33,2012		56	1	887			V06N63	31,3765	827	1	817		V37N0NO	04,2317	246	1	243			
VO	0006	=	937					V06N63*	30,3042	856	1	852		V37N99	04,2036	240	1	240			
V00N25	6010	=	224					V06N64	31,3766	827	2	817	818	V37QCA0	04,2361	247	1	246			
V00N34	4242	=	224					V06N71	07,2625	275				V37RET	04,2117	243	1	247			
V01N14	32,2200		224					V06N75	35,2356	641	2	632	638	V37RETAD	04,2363	247	1	243			
V01N25	10,3351		1366	2	1354	1356		V06N76	30,3043	856	1	840		V37XEQ	04,2325	247	1	247			
V01N46	20,2112		308	1	307			V06N79	15,2532	958	1	957		V37XEQC	04,2354	247					
V01N70	14,3707		954	1	953			V06N79*	07,2626	275	1	276		V41K	14,3505	950	1	948			
V01N70*	15,2531		958	1	955			V06N81	35,3666	693	3	624	687	V43K	43,2755	297	1	296			
V01N71	07,2330		268	1	261			V06N81SR	34,3636	738	1	735		V471XACT	43,2377	289	1	277			
V04N06	10,3355		1366	1	1356			V06N84	13,2336	719	2	717		V50N00	10,3353	1366	1	1361			
V04N06SR	34,3632		738	1	733			V06N87	14,3710	954	1	954		V50N00A	32,2201	224					
V04N12X	43,2645		294	1	292			V06N87*	07,2331	268	1	261		V50N16	32,2203	224	1	223			
V04N1272	23,2037		286	1	286			V06N89*	15,2173	928	1	930		V50N25X	43,2646	294	1	292			
V05N00M1	10,3370		1366	1	1359			V06N90N	04,2747	711	1	711		V50N48	01,2333	310	1	310			
V05N09	5006		1091	6	631	1376		V06N93	14,3117	942	1	942		V50PASTE	10,3056	1361	1	1361			
V06N05	24,2710		519	1	517			V06N99	31,2171	621	1	619		V6N22	14,3504	950	1	948			
V06N07	10,3352		1366					V06N99DS	31,2023	619	1	619		V6N34	24,3503	666	1	665			
V06N11	35,2354		641	1	631			V06N9933	31,2053	619	1	619		V67	43,3221	313	1	277			
V06N13	35,2355		641	1	637			V0647	01,2331	310	1	309		V67CALL	31,2011	619	1	313			
V06N16	32,2202		224	2	222			V1	0014	=	937			V67CLRF	31,2111	620	1	620			
V06N16N	04,2746		711	1	710			V1S	E7,1576	=	162	13	162	889	V67FLAG	0160	=	94	3	619	620
V06N18	26,2232		488	2	486	487		V1STO2S	10,3524	1391	4	378	1249		V67FL8IT	4744	=	94			
V06N22	5010		1091	1	497			V16N20	14,3065	941	1	941		V67SURF	31,2103	620	1	620			
V06N22*	15,2171		928	1	928			V16N40	36,3743	770	1	761		V67WW	31,2114	620	1	619			
V06N33	35,2025		625	2	624	662		V16N44	22,3317	722	2	722	725	V67XXX	31,2161	621	1	621			
V06N33*	24,2346		512	1	505			V16N45	35,3667	693	1	689		V70UPOAT	43,3732	1381	1	277			
V06N33A	30,3044		856	1	839			V16N54	37,3240	713	1	712		V71UPDAT	43,3734	1381	1	277			
V06N33SR	34,3630		738	1	732			V16N56	40,2076	315	1	314		V72UPDAT	43,3736	1381	1	277			
V06N34*	15,2172		928	2	927	971		V16N63	27,3330	855	1	854		V73UPOAT	43,3740	1381	4	277	1381		
V06N34SR	34,3634		738	1	733			V16N66	43,2643	294	1	293		V74	43,3053	=	303				
V06N37	35,3662		693	3	631	671		V16N67	43,2644	294	1	293		V82CALL	22,3242	721	1	298			
V06N42	35,2026		625	2	624	663		V16N72	43,2641	294	1	293		V82CON	43,2764	298	1	298			
V06N43	24,3502		666	1	666			V16N78	43,2642	294	1	293		V82EM8IT	4752	=	94				
V06N43*	31,2246		796	1	795			V16N80	24,3150	527	1	525		V82FMFLG	0166	=	94	7	723	728	

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 80 8AOLY OFFINFO CO OFFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYM80L TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYM80L	DEF	F	REFERENCES	SYM80L	DEF	H	REFERENCES	SYM80L	DEF	H	REFERENCES
V82FLAGS	E4,1537	=	131 6 131 724	WANGD	E5,1434	=	143 1 387	WRTDESIR	15,3162	968	1 968
V82G0FF	22,3247	721	1 721	WANGT	E5,1440	=	143 1 143	WSHAFT	E4,1402	129	1 595
V82G0FF1	22,3321	722	1 721	W8ANK	26,3274	596	1 595	WSIZE	26,3402	597	1 595
V82G0FLP	22,3267	721	1 722	WCALC	22,2746	377		WSURFPOS	E4,1406	129	2 595 620
V82G0N	22,3465	725	1 721	WCENTRAL	E6,1743	=	147 2 1468	WSURFVEL	E4,1407	129	2 595 620
V82G0N1	22,3503	725	2 725 726	WCHPHASE	E7,1620	=	165 16 165 825	WTABORT	01,3360	1120	1 1118
V82G0N2	22,3536	725	1 725	WCHPHOLD	E7,1617	=	164 7 165 817	WTLST2	01,3371	1122	8 1119 1120
V82G0N3	22,3541	726	1 726	WCHVERT	E7,1645	=	165 3 804 818	WTLST4	01,3255	1118	1 1122
V82PERF	43,2756	298	1 278	WDAGAIN	41,3371	456	2 456 457	WTLST5	01,3305	1119	1 1117
V82REDSP	22,3475	725	1 725	WDCNT	0137	=	113 5 454 457	WTLTCADR	01,3771	1302	3 1298 1301
V82STALL	22,3300	721	1 722	WDRET	0115	=	112 9 454 457	WTRUN	F4,1403	129	1 595
V83	37,3140	712	1 713	WEARTH	24,2020	69	1 1141	WVELSTOR	26,3256	595	1 595
V83CALL	37,3145	712	1 712	WEIGHT/G	1244	=	121 6 772 781	WWPOS	F4,1604	=	131 13 313 621
V83PERF	43,2766	298	1 278	WHATDISP	31,2502	803	1 817	WWVEL	E4,1606	=	131 10 332 621
V89CALL	26,2000	352	1 299	WHATEXIT	31,2476	803	2 814	=====	=====	=====	=====
V89CALL1	26,2050	353	1 353	WHATGUID	31,2462	802	1 811	X	0024	=	1197 22 1170 1186
V89PERF	43,2774	299	1 278	WHATOUT	31,2416	800		XACTALM	43,2114	278	1 284
V89RECL	26,2014	352	1 353	WHERE TO	31,2275	797	1 797	XACTO	43,2116	279	
V90PERF	43,3003	299	1 278	WHICH	E7,1453	154	30 257 863	XAD	01,2375	1083	1 1007
V97N00	10,3414	1367	1 1361	WHICHADR	32,3607	838	1 832	XAD2	01,2400	1083	2 1083
V97ORV99	36,2767	752	1 753	WHIMPER	5644	1377	3 866 1378	XCHNYLOC	10,3076	1361	1 1357
V99RECYC	36,3006	=	753 1 740	WHOCARES	E7,1467	=	155 7 164 1355	XCHQADD	10,2670	1358	1 1357
=====	=====	=====	=====	WHOLECON	42,3530	448	3 447 448	XCHSLEEP	10,2637	1357	1 1358
W	E5,1400	137	33 137 1238	WIDEDR	20,2151	1403	1 1402	XCHTOFND	10,3075	1361	3 1353 1357
W.IND	1257	=	123 4 123 595	WITCHONE	10,3060	1361	3 1353 1357	XCHX	01,2367	1083	1 1007
W.IND1	1260	=	123	WIXA	1320	122	5 1148 1150	XCOMMON	12,3077	1186	1 1188
WAITABIT	36,2541	748	5 739 741	WIXB	1321	122	3 1148 1150	XDC	E5,1664	=	138 12 138 1251
WAITADR	0063	=	111 3 1114 1118	WLINIT	26,3214	595	3 587 596	XDELVBIT	4744	=	85
WAIT8ANK	0062	=	111 1 1117	WLOOP	12,3024	1185	1 1185	XDELVFLG	0045	=	85 9 625 835
WAIT8R	5220	1114	2 1114 1124	WLSRFPOS	26,3237	595	1 595	XDIFF	12,2172	1171	1 1171
WAITEXIT	0061	=	111 7 1114 1371	WLSRFVEL	26,3254	595	1 595	XDSP8IT	4753	=	89 1 1334
WAITLIST	5203	1114	44 179 1318	WM	E4,1730	=	136 5 136 884	XDSPFLAG	0112	=	89 1 222
WAITMASK	10,2633	1357	1 1357	WMATEND	11,3575	1239	1 1237	XI	0030	=	1197 7 1171 1191
WAITPOOH	01,3520	1127	1 1117	WMATRXNG	43,3101	305	1 278	XKEP	E3,1552	=	126 3 140 1236
WAITTEMP	0064	=	111 3 1122	WORKTIME	16,2613	1422	1 1422	XKFPSCM	E3,1624	127	
WAIT2	01,3226	1117	2 1114	WZERO	05,3527	987	2 987 992	XKFPLEM	E3,1676	127	
WAKE	13,3450	1215	2 1216	WPLATI	E5,1560	=	143	XKEPNEW	E4,1527	=	130 3 130 1224
WAKECAD	00,3773	1372	1 1371	WPLATO	F5,1464	=	143	XMAX	0012	=	1197 10 1170 1173
WAKECADR	10,3363	1366	3 1357 1358	WPOSTORE	26,3241	595	1 595	XMIN	0014	=	1197 6 1171 1173
WAKEPLAY	10,2677	1358	1 1363	WRDRET	0115	=	112	XMKRUPT	07,2416	270	1 270
WAKER	00,3765	1371	1 1372	WRENDPOS	E4,1400	129	3 133 620	XMODULO	E4,1576	131	8 131 1175
WAKESTAL	13,3505	1216	2 1215	WRENDVEL	E4,1401	129	2 595 620	XN8	E5,1664	=	138 23 386 1395
WAKETEST	01,3041	1106	1 1106	WRITFP	5745	1399	6 1399 1448	XNBADR	37,2476	394	1 386
WAKE1	13,3451	1215	1 1215	WRITEU	5751	1400	1 1449	XN8R	10,3632	1395	1 1395
WANGI	E5,1436	=	143 1 387	WRITEV	5762	1400	1 1449	XN8NDX	14,3271	945	1 862

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 BD BADLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
XNBPIP	E4,1545	= 130	10 130 912	YRATE	E4,1756	= 136	5 136 850	ZNBPIP	E4,1561	= 130	1 912
XNB1	E7,1467	= 164	11 1395	YREG	1004	117	3 439 447	ZNB8AV	E4,1650	= 132	3 974 976
XNB1E8	10,3633	1395	1 1395	YREGLP	1007	117	2 117 447	ZNB1	E7,1467	= 164	
XORCHK	33,2742	879	1 875	YSCI	E5,1714	= 139	1 139	ZONEZERO	32,3356	834	2 833
XORFL81T	4743	= 100	1 875	YSCREF	E7,1612	= 162	1 776	ZONEORET	32,3410	834	1 834
XORFLG	0253	= 100	1 879	YSM	E5,1650	= 138	4 138 1248	ZONE1	17,3517	1460	2 1457 1460
XQVINFLG	0311	= 103	7 239 879	YSMD	E7,1612	= 162	6 162 978	ZONE2	17,3510	1460	
XQVINH18	4743	= 103	2 909 1425	YSZERO	07,2177	266	1 266	ZONE2,3	17,3504	1460	1 1457
XPREV	E3,1552	= 140	2 1171 1175	YUNIT	11,2270	1096	2 36 965	ZONE3	17,3512	1460	1 1460
XRANGE	E7,1640	= 167	4 167 840	YV	1126	= 120	11 120 1239	ZONE3LIM	E6,1556	= 149	1 1460
XREG	1003	117	5 320 442	YZCHK	07,2171	266	1 265	ZONE3MAX	20,3652	1499	1 1490
XREGLP	1006	117	3 414 442	=====	=====	=====	=====	ZONE4	17,3331	1457	
XRNT	26,2344	496	1 496	Z	0005	= 108	23 319 1377	ZONE4,5	17,3320	1456	
XSCI	E5,1706	= 139	1 139	ZACCDOT	20,2677	1484	1 1483	ZONE5	17,3363	1457	1 1457
YSCREF	E7,1604	= 162	3 776	ZATTEROR	20,2153	1403	13 300 1441	ZON1,2,3	17,3477	1459	1 1456
YSM	E5,1642	= 138	23 138 1248	ZAXIS1	E4,1704	= 136	6 136 853	ZOOM	36,2554	748	4 255 750
YSMADR	37,2477	394		ZDATA2	21,2454	898	1 906	ZOOMTIME	E7,1424	153	5 255 815
YSMD	E7,1604	= 162	14 162 978	ZDC	E5,1700	= 138	5 138 1251	ZPRIME	0026	= 139	7 1244 1245
XSQC(X1)	0034	= 1197	5 1173 1180	ZDOT	E4,1716	= 136	3 136 846	ZREG	1005	117	3 420 448
XSTORE	01,2343	1082	3 1082	ZDOTD	E4,1672	= 135	5 135 846	ZREGLP	1010	117	2 117 448
XSU	01,2406	1083	1 1007	ZERETAD	32,3407	834	1 834	ZRUPT	0015	= 108	2 1423 1452
XTRANS	17,3015	1449	3 1439 1447	ZERLINA	E7,1644	= 165	6 165 820	ZSCI	E5,1714	= 139	
XUNIT	11,2272	1096	8 36 1131	ZERO	4755	1090	317 172 1502	ZSCREF	E7,1620	= 163	1 776
XXALT	E7,1666	157	4 157 704	ZERO/SP	23,2423	= 604	1 577	ZSM	E5,1656	= 138	2 138 1248
XYMARK	E7,1547	= 160	18 160 953	ZEROANS	00,3376	1074	2 1074	ZSMD	E7,1620	= 162	5 163 978
X1	0046	= 109	64 267 1394	ZERODATA	21,3234	906	1 899	ZSPCR	15,2450	957	1 956
X1INPUT	E7,1607	= 157		ZERODP	11,2274	= 1096		ZUNIT	11,2266	1096	5 36 1232
X2	0047	= 109	28 499 1266	ZERODENBL	16,3164	1428	2 1428 1429	ZV	1134	= 120	8 1234 1239
X789	E3,1700	127	5 211 1152	ZEROHIGH	21,3574	1475	1 1475	ZITEM	0131	= 1498	4 1494
=====	=====	=====	=====	ZEROICDU	5457	1303	4 180 1305	Z123	2132	= 1144	1 1145
Y	E4,1740	= 136	4 136 855	ZEROING	37,2367	392	2 386 396	Z123COMP	17,3463	1459	3 1457 1459
YAW	E4,1766	= 136	3 136 841	ZEROING1	37,2371	392	1 392	Z3TEM	0152	= 1498	1 1490
YAWANG	E4,1606	= 134	2 499 500	ZEROLCUP	21,3744	1477	2 1477	Z5TEM	0132	= 1498	4 1493 1494
YANDUN	30,2162	841	1 841	ZEROLSTY	21,3210	905	7 904 905	=====	=====	=====	=====
YCO	E7,1630	= 167	4 167 849	ZERONDY	E5,1571	= 143	11 386 396	0.35356	20,3026	1487	1 1482
YCOMP	27,3316	855	2 840 846	ZEROD	23,2423	= 1152		0EBANK	43,3347	1282	
YCONS	E4,1752	= 136	3 136 850	ZERODT	21,3571	1475	1 1475	003140CT	5765	1400	4 1400 1438
YDC	E5,1672	= 138	5 138 1251	ZEROPUS	20,2742	1485	1 1485	06SEC	23,2272	531	1 530
YDOT	E4,1714	= 136	5 136 849	ZEROTJ	17,2526	1443		074000CT	16,3576	1435	1 1424
YDDID	E4,1670	= 135	3 135 847	ZEROVEEC	11,2274	1096	13 36 1242	=====	=====	=====	=====
YMKRUPT	07,2422	270	1 269	ZFROVECS	23,2423	1095	20 36 1152	1.2SPOT	01,2016	254	4 254 258
YNB	E5,1672	= 138	6 387 1248	ZI	E5,1642	= 141	25 141 1153	1.3SPOT	01,2024	254	1 254
YNBPIP	E4,1553	= 130	4 130 853	ZIXA	1322	122	4 1148 1150	1.95SECS	33,3175	884	
YNBSAV	E4,1642	= 132	4 132 976	ZIX8	1323	122	4 1148 1150	1-CSTH	E5,1733	= 140	4 140 1190
YNB1	E7,1467	= 164		ZN8	E5,1700	= 138	6 387 1248	1/.03	4733	= 1499	3 1491 1492

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
1/ACCFIX	06,3236	207	1 206	1JACCU	E6,1533	= 148	10 1482 1494	2.15SPDT	01,2046		255
1/ACCCJOB	20,2454	1480	2 207 1402	1JACCV	E6,1534	= 148	1 1482	2.17SPDT	01,2051		255
1/ACCONT	20,3143	1490	2 1482 1484	10VSQRT2	42,3764	501	2 499	2.2SPDT	01,2016	= 254	1 254
1/ACCRET	20,3561	1496	2 1484 1496	1REV	12,2051	1170	1 1169	2.21SPDT	01,2054		255
1/ACCS	20,2457	1480	2 864 1480	1SEC	4777	1091	16 285 900	2.3SPDT	01,2027	254	1 254
1/ACCSET	20,2447	1480	1 1406	1SEC+1	43,2650	294	2 291 293	2.5SPDT	01,2032		255
1/ACDAST	E6,1573	= 149	1 1456	1SECX	4777	= 394		2.7SPDT	01,2035		255
1/ACOSTP	E6,1553	= 1498	2 1491	1SECTX	E5,1572	= 143	2 396 397	2.7SPDT	04,2131	243	1 243
1/ACOSTT	0127	= 1498	5 1492 1497	1SEC2D	27,2731	782	1 781	2/3	11,3717	= 1242	1 1230
1/ANET	0160	= 1498	7 1492 1497	1STAR	15,3116	967	2 967 977	2BLANK	40,2601	418	6 415 471
1/ANET-	20,3602	1497	1 1493	1STOR2ND	10,3036	1360	1 1360	2DZERO	11,2274	= 1132	
1/ANETP	E6,1551	= 1498	5 1430 1491	1STOTWDS	16,2245	1417	3 1416	2EBANK	43,3363	1282	1 1283
1/ANET1	E6,1567	= 149	13 149 1495	1STQ2S	10,3520	1391	3 386 957	2INTOUT	40,2732	433	1 430
1/ANET2	E6,1570	= 149	6 1443 1488	1TO2&TCQ	30,3623	921	2 921	2J	33,2043	60	1 881
1/ATEM1	0123	= 1498	22 1494 1498	1TO2SUS8	10,3550	1391	6 1391	2J3REF/J2	13,2016	61	2 1231
1/ATEM2	0124	= 1498	4 1493 1494	10,11	21,2136	829	2 829	2K	4741	= 1094	3 1001 1106
1/DVO	E7,1566	= 856	2 844	10SEC*17	31,3730	826		2K+3	4444	477	1 477
1/DV1	E7,1632	= 167	5 167 844	10SECS	32,3573	838	1 852	2KFT/SEC	33,2741	879	1 889
1/DV2	E7,1634	= 167	5 167 844	10OB28	27,3100	785	1 784	2NDRETRN	22,3117	379	2 379
1/DV3	E7,1636	= 167	5 167 844	10OCS	33,3200	= 856	2 850	2PHAS81T	4743	= 92	1 806
1/GYRD	06,3507	346	3 341 348	10OMRUPT	7726	= 170		2PHASFLG	0140	= 92	1 813
1/MU	0016	= 1197	4 1169 1189	11DSPIN	40,3404	458	4 416 455	2PHSCHNG	5327	1292	12 504 864
1/NETMIN	20,3610	1497	2 1494 1497	12DD	23,3150	1152	1 1150	2PI/3	26,3403	597	3 591 855
1/PIPA	06,3263	339	3 398 964	12OMRUPT	06,2041	172	1 175	2PISC	04,2775	1181	2 1170 1188
1/PIPADT	1075	119	10 180 963	12OMS	5742	= 196		2RNDEND	40,3173	447	
1/PIPA1	06,3272	339	1 339	13-11,1	41,3726	482	1 481	2ROUND	40,3163	447	3 444 446
1/ROOTMU	0022	= 1197	5 1169 1180	13,14,15	7737	1093	5 297 1414	2SEC(17)	30,3027	856	1 856
1/RTMU	27,2014	61		13,7,2	4615	536	1 535	2SEC(18)	33,3200	884	2 846 856
1/RTMUE	22,2002	59	2 722 725	13ODEG	35,3705	693	1 670	2SEC(28)	33,3202	884	1 888
1/RTMUM	22,2000	59	1 725	14,11,9	06,2171	175	1 172	2SEC(9)	30,3040	856	1 844
1/SQRT3	31,2167	621	2 620	14MS	17,3041	= 1439	6 1439	2SECS	5000	1091	7 293 1310
1/WLOOP	12,3162	1187	1 1187	15/16	11,3705	1242	1 1230	2STARS	15,3114	967	1 977
1/IO	01,2336	310	1 309	15ADRS	01,2424	1084	7 1082 1086	2VEXHUST	E7,1741	= 779	
1/IOS	17,2300	1440		15BITADR	6251	1004	1 1010	2V1STQ2S	10,3541	1391	2 337
1/IOSEC	16,3111	1427		1500DEC	24,2712	519	2 511 519	20.5DEGS	25,2572	555	1 555
1/2DEG	31,3742	827	1 811	16OCT	30,3550	919	1 919	20J	33,2041	60	1 881
1/40	16,3603	1435	4 1418 1420	17TO20	43,3651	1286		20MRUPT	7730	= 174	3 172 175
1/6TH	14,3706	954	1 953	17OMS	4361	= 892	1 892	20SEC	32,2206	224	1 223
18ITDP	26,2365	496		180DEGS	31,3741	827	1 811	20SEC*17	31,3731	826	
181	11,2272	= 1143	1 1133	=====	=====	=====	=====	20OMS	16,3601	1435	2 1422
1DP82	34,2067	642	2 643 645	2.PG.FRT	7715	= 801	1 799	201R04	43,2647	294	1 292
1DPB28	34,2071	642	2 643 648	2.OSPT	04,2127	243		21/22REFG	0115	= 112	3 411 483
1JACC	E6,1530	148	11 148 1490	2.11SPDT	01,2040	255		22.3ENT	27,2211	604	
1JACCCQ	E6,1531	= 148	4 1466 1488	2.11SPT	04,2130	243		25/32	7715	= 1435	1 1430
1JACCR	E6,1532	= 148	4 1466 1488	2.13SPDT	01,2043	255		25KFT	33,2731	879	2 852 879

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SYMBOL TABLE LISTING, INCLUDING DEFINITION, HEALTH, PAGE OF DEF, # OF REFS, PAGE OF FIRST REF, PAGE OF LAST REF.

SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES	SYMBOL	DEF	H	REFERENCES
250DFC	24,2335	511	2 510	4.23SPOT	01,2120	256		504LPL	0016	=	1143 4 1142
250MS+1	4766	=	294 1 294	4.25SPOT	01,2123	256		504RM	04,2002		60 1 1134
26SECS	36,3742	770		4.27SPOT	01,2126	256		504RPR	0000	=	1143 4 1135 1137
27TQ30	43,3657	1286		4.3SPOT	01,2070	256	1 254	526ALARM	24,2123		508 1 576
=====	=====	=====	=====	4.31SPOT	01,2131	256		54DD	23,3146		1152 1 1148
3.2SPOT	01,2016	=	255 1 254	4.33SPOT	01,2134	257		59.99SEC	42,3536		448 1 448
3.3SPOT	01,2057	255	1 254	4.35SPOT	01,2137	257		59MIN	42,3535		448 1 447
3.5SEC	27,2733	782	1 781	4.37SPOT	01,2142	257		=====	=====	=====	=====
3/32	11,3703	1242	1 1230	4.5SPOT	01,2073	256		6.2SPOT	01,2016	=	258 1 254
3/4	11,3707	1242	5 956 1241	4.75POT	01,2076	256		6.3SPOT	01,2172		258 1 254
3/4DP	31,3754	827	2 811 813	4.9SEC	36,3145	756	1 743	6.5SPOT	01,2175		258
3/5	11,3671	1242	2 1230 1232	4SEC(17)	30,3025	856	1 848	6.75POT	01,2200		258
3/64	11,3677	1242	1 1230	4SECS	5003	1091	2 180 799	6DD	23,3147		1152 1 1150
3/8DP	31,3752	827	1 811	40CYC	16,3112	1427	1 1429	6FAILTAB	06,3252	=	207 2 206 207
3AXISBIT	4746	=	90 2 486 487	40CYCL	17,2277	1440	1 1441	6SEC	27,2737		782 2 782
3AXISFLG	0124	=	90 7 244 953	40FPS	30,3033	856	1 853	6SEC(18)	30,3035		856 1 844
3CSECS	13,3715	1221	1 1220	40SET	32,3502	836		6SECONDS	26,3655		603 1 599
3J22R2MU	13,2024	61	1 1232	42SET	32,3515	836	1 836	6SECS	25,3545		573 1 572
3SEC*17	31,3727	826	1 814	45SECNDS	24,2713	519		60DEC	05,3060		233 1 228
35FCNDS	26,3653	603	1 529	49FPS	30,2307	843	1 841	60MIN	35,2365		641 6 632 638
3SECS	5002	1091	1 797	=====	=====	=====	=====	60SCNDS	24,2474		515 1 515
30DEG	24,3251	584	1 583	5.2SPOT	01,2145	257	1 254	600MS	07,3722		1325 1 1308
30DEGCHK	24,3233	583		5.3SPOT	01,2161	257	1 254	600SEC	24,3476		666 1 666
30KFT	33,2737	879		5.4SPOT	01,2153	257		600SECS	13,2630		1205 2 254 1205
30RDMSK	06,2761	196	1 176	5.5DEGS	4562	534	2 534 555	63/64+1	7725		1093
30SEC*17	31,3732	826	1 812	5.5SPOT	01,2164	257		=====	=====	=====	=====
33DEC	4254	469	1 469	5.75POT	01,2167	257		7.5	33,3176		884 1 888
33RDMSK	5026	=	196 2 182	5/128	11,3715	1242	1 1230	7/12	11,3711		1242 1 1230
34DEC	4242	468	3 224 752	5/8	13,3735	1243	3 1207 1232	7SEC	27,2741		782 1 780
35KCHK	33,2753	879	1 875	5BLANK	40,2536	417	6 417 470	70DEC	32,3300		832
360-CDU	40,2625	431	2 431 445	5BLANK1	40,2557	418		77DECML	37,3075		402 1 396
360-CDUE	40,2634	431	1 431	5B10	01,2473	1086		770010CT	05,3057		233 1 227
360-CDUD	40,2623	431	1 430	5DEGREES	14,2450	933	2 933 968	79DISP	15,2476		957 2 957
360CHECK	12,3133	1187	2 1185	5DEGTST	15,3222	968	2 968	=====	=====	=====	=====
360LAM8	12,3472	1192	2 1189 1194	5FAILTAB	06,3242	=	207 2 206 207	8192AUG	07,3532		1318 1 1318
360SW	0206	=	96 3 1185 1187	5MKALARM	07,2454	271	2 270 276	82DEGS	4563		534 1 534
360SWBIT	4753	=	96	5SEC	36,3741	770	2 743 745	89SECS	27,2743		782 1 782
3990DEC	37,2471	394	1 389	5SECDP	36,3740	770	1 742	89TEST	40,2161		412 2 411
=====	=====	=====	=====	5SECS	27,2735	782	2 781	=====	=====	=====	=====
4.11SPOT	01,2101	256		50ET	33,2735	879		9/16	11,3713		1242 1 1230
4.13SPOT	01,2104	256		50KFT	33,2733	879		9,6,4	05,3352		238 1 231
4.15SPOT	01,2107	256		50SECS	32,3577	838		90SEC	32,3575		838 1 835
4.17SPOT	01,2112	256		504AZ	0022	=	1143 3 1141	90SECS	06,3005		196 2 179
4.2SPOT	01,2062	255	1 254	504F	0006	=	1143 5 1139 1140	99+LINT	31,3736		826 2 825
4.21SPOT	01,2115	256		504LM	E4,1412	129	3 1135 1230	99999CON	32,3251		793 1 790

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UNREFERENCED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

SYMBOL	DEF	F	PAGE	SYMBOL	DEF	H	PAGE	SYMBOL	DEF	H	PAGE	SYMBOL	DEF	H	PAGE
+AZ	21,2062		820	AUTOMBIT	4752	=	102	CDUNDX	E5,1536	=	142	DEC-12	11,2304		1096
+EL	21,2074		821	AUTOMODE	0301	=	102	CDUREADF	E5,1441	=	142	DEC-6	11,2303		1096
=====				AUTRATE1	4753	=	104	CDUREADI	E5,1442	=	142	DEC27	4764	=	1091
-AZ	21,2055		820	AUTRATE2	4752	=	104	CDUSCMD	0054	=	108	DEC29	4765	=	1091
-EL	21,2067		821	AUTRIFLG	0321	=	104	CDUTIMEF	E5,1436	=	142	DEC50	26,3656		603
-LOKONFG	23,2040		286	AUTR2FLG	0320	=	104	CDUTIMEI	E5,1434	=	142	DEC51	04,3174		1326
-MUDT1	33,2033		59	AUXFLAG	0147	=	93	CHAN	E5,1443	=	142	DEGINSEF2	40,3021		444
=====				AVEMDBIT	4753	=	98	CHKBIT10	17,2156		1438	DELRSPL	22,3541	=	36
?	6001	=	756	AVERAGEG	33,2272		862	CHKLIST	05,3454		987	DFLTEE	E7,1607	=	156
=====				AVELBIT	4747	=	85	CHKSAB	14,3124		943	DELYMID	E7,1573	=	156
ABORT	5644	=	1378	=====				CKIMUSE	5244		1116	DELVTEST	27,2274		772
ABRTDISP	30,2747		851	BADOPT	15,3633		977	CKMOMORE	43,3746	=	1381	DERCOF+1	0153	=	114
ABVAL	00,3201		1070	BADROOT	31,3647		824	CKRNDBIT	43,2676		295	DERCOF-1	0151	=	114
ACCDKFLG	0317	=	104	BHIZ	01,2447		1085	CLRFLAG	30,2725		851	DERCOF-2	0150	=	114
ACMDBIT	4737	=	84	BLASTEMP	E6,1707	=	150	CL17NET+	20,3352		1493	DERCOF-3	0147	=	114
ACOSABRT	00,3723		1081	BIGADS	20,3253		1491	CNGL	22,2400		370	DERCOF-4	0146	=	114
ADDRESS	6102		999	BIT14+7	26,2230		488	CNTCHK	07,2235		267	DERCOF-5	0145	=	114
ADRS+1	43,3633		1286	BIT4H	30,3037		856	CNTRCHK	43,3474		1283	DERCOF-6	0144	=	114
AFCCALC2	31,3204		813	BIT8,9	17,3043		1449	COARFINE	14,3220		944	DERCOF-7	0143	=	114
AFDUMP	31,2254		797	BLANKCHK	10,3005		1360	CDMAXGO	22,2176		366	DERCOF-8	0142	=	114
AGSBUFFE	E4,1621	=	133	BLANKRET	0114	=	112	COGAFBIT	4750	=	96	DESIGFLG	0271	=	102
AGSDISPK	32,2032		222	BNKCHK	43,3724		1287	COMPMAT	13,2237		718	DEX2	0144	=	114
AGSLIST	05,2407	=	208	BNKDPTN	43,3323		1281	COMPTBIT	4744	=	90	DFRNT	40,3364		458
AGSUPDAT	0001	=	250	BRSPOT1	31,2614		805	CDMPUTER	0122	=	90	DGOOD?	32,2735		615
ALCGKK	37,2627		398	BRSPOT2	31,2723		808	CONTIDES2	26,3540		600	DIDFLAG	0020	=	83
ALGORTHM	21,3323		1468	BRSPOT3	31,3077		811	CONV3	42,3621		499	DIMOBIT	4753	=	88
ALINEX	26,2045		352	BRSPOT4	31,3236		813	CDPYCYC2	33,2661		878	DMENFBIT	4743	=	90
ALKGG	37,2632		398	BUSYMASK	10,3402		1366	CDREQUND	01,2633		1102	DNLRALI	1341	=	123
ALMNCADR	5726		1378	BUTTONS	05,2731		230	COUNTPI	E5,1542	=	142	DNLSTADR	0332	=	115
ALPHATRY	21,3465		1473	B12-1	4356	=	474	CPH18IT	4735	=	81	DOALARM	5155	=	1378
ALTROUT	21,2353		897	B5TOB8	01,2462		1085	C5MDKFLG	0305	=	103	DOALIGN	15,3176		968
ALTSCALE	0272	=	102	=====				CS359+	35,2361		641	DODNADR	05,3446		986
ALTSGBIT	4743	=	102	CADRMARK	0373		116	CULTBIT	4745	=	87	DDNCHAN	05,3514		987
AMEMORY	E4,1400	=	129	CALCDIR	E5,1460	=	142	CYCLERIT	4742	=	85	DORSAMP2	25,2027		502
ANTENBIT	4740	=	101	CALCTHET	27,2277		772	CYCLSHFT	43,3503		1284	DOSHIFT	21,3645		1476
ANTENFLG	0267	=	101	CALC2BIT	4752	=	86	C1MP	E6,1721	=	150	DOTIXBR	01,2421		1083
AORBSFLG	0315	=	104	CALC3BIT	4751	=	86	C1PP	E6,1717	=	150	DPAGREE	7254		1031
ANSV	E6,1544	=	148	CALSAM	15,2604		960	C2MP	E6,1715	=	150	DPSBURN	E6,1746	=	146
APSESBIT	4747	=	96	CDELF/2	0016	=	1262	C2PP	E6,1713	=	150	DPO	0036	=	937
ARCOMP	21,2362		897	CDESBIT	4735	=	101	C2SQM	E6,1711	=	150	DPI	0040	=	937
ASCSPOT	33,2443		868	CDRVE	06,2012		171	C2SQM	E6,1707	=	150	DSKYFLAG	0113	=	89
ASECXT	E5,1573	=	143	CDUANG	E5,1543	=	142	=====				DSPECNCR	40,3262		455
ASTINCLQK	32,3177		792	CDUDANG	E5,1440	=	142	DAPDATA3	01,2275		310	DSPLV	41,3413		456
ATOPTHIS	13,2734	=	36	CDUFLAG	E5,1461	=	142	DAPLRUPT	E6,1752	=	152	DUMPCNIC	27,3400		1266
AUTDMANV	26,2144		487	CDULIMIT	E5,1443	=	142	DBSELFLG	0316	=	104	DUMPRPRA	27,3436		1268

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SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE
DUMPTFF1	27,3521	1272	END20EC	40,3305	455	GEOSTRT4	37,3025	401	INFINBIT	4745	= 95
QUMPTFF2	27,3616	1273	ENGONFLG	0123	= 90	GETAOSUV	20,3154	1490	INTFLAG	0227	= 98
OVCONTSET	33,2326	863	INTERDAT	07,2070	261	GETRVN2	37,3360	715	INTOTHIS	13,2300	718
DVMON	33,2317	863	ENTEROR	17,2353	1441	GET22/32	21,2736	902	INTVEC	E5,1462	= 143
OVMONCON	36,2526	748	ENTPASHI	41,2012	419	GLOKFEIT	4736	= 36	INTYPBIT	4750	= 87
OXCRIT+1	0125	= 114	ERADFBIT	4737	= 83	GMBLBIBR	21,3762	1478	INTZ	E5,1474	= 143
D21	E6,1703	= 150	ERASWAK1	13,3501	1216	GN/CCODE	5001	1091	IRIGCOMP	06,3330	341
D6OR9BIT	4752	= 87	ERASWAK2	13,3503	1216	GOAGIN	10,2723	= 1366	ISSUP	06,2321	180
=====			FRMINUS	40,3645	483	GOCL0SE	21,3753	1478	ISSWOFF	06,2716	194
E/BKCALL	04,2533	383	ERRTEST	17,3264	1456	GOOSP	10,2321	1351	ISWCALL	4700	995
E/CALL	04,2552	384	ETPI8IT	4745	= 85	GODSPR1	10,2330	1351	ITRO	6367	1009
E/JDBWAK	04,2566	385	EXTLOGIC	31,3264	814	GOOSP2	10,2322	1351	ITR1	6356	1009
E/SWITCH	04,2550	383	E0	E7,1674	= 160	G3GOMARK	10,2263	1350	ITR10	6141	1000
FARTCNTR	14,2363	932	E02	E4,1642	= 132	GOMARK2	10,2215	1349	ITR11	6201	1001
EIGHT	4750	= 1094	F1	E7,1676	= 160	GOMARK2P	10,2234	1349	ITR12	6133	1000
END-E3	E3,1776	= 128	E3	E7,1702	= 160	GOMARS	10,2207	1349	ITR14	6236	1003
END-E4	E4,1763	= 135	=====			GOPERFS	10,2560	1356	ITR15	6122	1000
END-E5	E5,1774	= 143	FALTOF	4370	474	GOPERFS	10,2500	1354	ITR7	6260	1004
END-E6	E6,1776	= 152	FAZAI	23,2677	1149	GOPERF1R	10,2556	1356	ITSWBIT	4735	= 93
END-E7	E7,1777	= 167	FAZB1	23,2775	1150	GOPERF2	10,2503	1354	=====		
END-E7.0	E7,1744	= 167	FDAIY	E4,1751	134	GOSERV	33,2277	862	JAMPROC	4243	469
END-E7.1	E7,1745	= 167	FDAI2	E4,1752	134	GQXDSP	10,2206	= 1366	JETSON	17,3337	1457
END-E7.2	E7,1774	= 167	FFTAG11	4000	= 27	GQXOSPR	10,2226	= 1366	JSWCHBIT	4736	= 81
END-E7.3	E7,1626	= 167	FFTAG12	4000	= 27	GRP4OFF	32,3404	834	=====		
END-E7.4	E7,1744	= 167	FFTAG13	4000	= 27	GTSGD+ON	21,3277	1467	KAOS	16,2612	1422
END-E7.5	E7,1655	= 167	FIGTIME	35,3010	677	GUESS	37,2020	386	KEYCOM	04,3224	1332
END-IN/M	E7,1670	= 157	FINALBIT	4746	= 85	GUESSBIT	4752	= 84	KLEFNEX	10,2211	1349
END-UE	1351	= 123	FINEK2	43,2357	288	GUFSS1	37,2255	390	K1	E6,1701	= 150
ENOBALL	26,2324	491	FIREP	16,3020	1425	GUILDEN	31,2527	804	K2	E6,1707	= 150
ENOCHKG	37,2366	392	FIREQR	17,2176	1438	GYTOBETQ	E5,1462	= 142	K3	E6,1715	= 150
ENDDAPT4	5270	= 204	FIRSTBIT	4741	= 92	G21	E6,1705	= 150	K3S1	22,2370	370
ENOHMSS	42,3602	= 449	FIXCLPAS	40,2402	415	=====			K4	22,2372	370
ENDLRH	34,3745	893	FLAGORGY	32,3012	789	ICORK2	43,2214	283	K4SQ	22,2374	370
ENDMANUV	26,2152	487	FLAPBIT	4744	= 97	IDADDTEM	0142	= 113	=====		
ENOMARKS	07,2317	268	FLASHH?	21,2121	829	IDAD3TEM	0152	114	LASTTIME	01,3476	1127
ENONVBSY	04,2612	477	FLPCBIT	4740	= 96	IOLERFT1	10,3154	1362	LATAZCHK	37,2021	386
ENDPASTE	4143	452	FLVBRBIT	4736	= 96	IG	E6,1723	= 150	LATEWDV	21,2746	902
ENOPINBF	4512	= 478	FREERET	0144	= 113	IGNALG	32,3024	789	LEMONM	0056	= 109
ENOPINS1	40,3672	= 484	FUELNEEO	E7,1664	= 165	IGNALGRT	32,3175	792	LOS1	E5,1444	= 142
ENDPINS2	41,3731	= 482	FUNCT3	21,3413	1469	IMMEORET	10,3242	1364	LOS2	E5,1452	= 142
ENORMOOF	4616	= 536	=====			IMU8ACK	37,2005	386	LOTEMIN	0124	= 112
ENOROLL	22,3226	382	GDUMP1	31,3421	817	IMUFIN20	07,3163	= 1325	LOUNITX	11,2272	= 36
ENDRQDAT	41,2316	424	GENMARK	10,2674	1358	IMUGOOD	07,3611	1321	LOUNITY	11,2270	= 36
ENDSPOCT	40,3415	458	GEOIMUTT	37,2004	386	IMUZERO3	07,2741	1305	LOUNITZ	11,2266	= 36
ENOVPUH	6537	1015	GEORGEK	37,3111	402	INCR0US	10,3564	1393	LRALBIT	4747	= 102

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UNREFERENCED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE
LRALTFLG	0276	= 102	-----	-----	-----	OCT40200	7734	1093	POOH	04,2160	244
LRBETA2	E7,1415	= 153	NBD3	06,3606	347	OCT40420	10,3411	1367	POSGM8L	37,2064	387
LRPOSBIT	4746	= 102	N3POSPL	37,2012	386	OCT67777	10,3410	1367	POSITF	15,3742	981
LRPOSCHK	25,3220	567	NB1NR2	23,2415	= 36	OCT77777	05,3052	233	POSTORKV	E6,1517	= 148
LRPOSFLG	0275	= 102	NDCMPST	41,2436	428	OGF	E6,1715	= 150	POSUPDAT	33,3215	885
LRS24.11	26,3433	599	NEEDLE11	20,2334	1413	OLDESFLG	0016	= 82	POS1/4	11,3701	= 1242
LRUPT	0011	= 108	NEGTOBKV	E6,1516	= 148	OMEGCALC	26,3552	601	POS2CHK	33,2535	875
LRVELBIT	4744	= 102	NEGTOBKV	E6,1520	= 148	OPTAXIS	07,2142	263	PRESJUMP	5316	1288
LRVELFLG	0273	= 102	NEGTOBKV	E6,1514	= 148	OPTION3	1146	120	PRECIBIT	4744	= 87
LRWVX	E7,1423	153	NEG100	5172	1111	OPTNBIT	4745	= 85	PRIDFLG	0075	= 88
LRWVY	E7,1422	153	NEG5	41,2115	421	OPTNRFG	E5,1463	= 142	PRIO1	4742	= 1094
LSTPTR	0144	= 113	NEG7	5660	= 247	ORBWBIT	4746	= 87	PRIO11	5022	1092
LUNABIT	4740	= 86	NEIZERO	6120	1000	ORDERBIT	4746	= 95	PRIO2	4741	= 1094
-----	-----	-----	NFWIBIT	4737	= 95	ORIG	E4,1515	= 131	PRIO36	7723	1093
MANUFBIT	4736	= 93	NJETSBIT	4735	= 83	ORIGIN	E5,1773	= 141	PROCEDE	06,2075	173
MANUFLAG	0152	= 93	NO.VJETS	E6,1523	= 148	OTHSHP	22,3333	722	PROJ	0022	= 165
MANUSTAL	22,3067	379	NB8ITS	E5,1442	= 142	OURRCFLG	0306	= 103	PRONVBIT	4745	= 89
MARKFORM	10,2216	1349	NOMDNLS	05,2172	= 208	OUTGAVE	32,3707	= 865	PSKIPADR	16,3606	1435
MASKREG	E5,1534	= 142	NORESET	07,3403	1315	OUTLINK	0057	= 109	PSTHIGAT	0251	= 100
MASSMON	33,2225	861	NORFINAL	13,3276	1213	-----	-----	-----	PULSEFLG	0303	= 103
MAXISFT	21,3660	1476	NORMSBIT	4742	= 93	P-RATE	16,2477	1420	PULSEM	14,3072	942
MDOTAPS	36,2010	53	NORMSCL	16,3577	1435	PARAM30	35,2017	624	PUTXY	41,2714	439
METHOD2	22,2216	367	NORMTEST	00,3512	1076	PBIASY	E3,1454	125	PUTXYZ	41,2632	438
MGLVFBIT	4752	= 91	NRMIDBIT	4737	= 88	PBIASZ	E3,1456	125	P121MB	30,2046	839
MIDAVBIT	4752	= 97	NRMIDFLG	0076	= 88	PDA	0026	= 139	P20LEM87	24,2151	508
MIDFLBIT	4737	= 81	NRMNVBIT	4744	= 89	PERFCEK	10,3010	1360	P20LEMF	24,2261	510
MIDGIM	10,2002	701	NRUPTBIT	4750	= 89	PHASE3	0757	117	P20LMWT1	24,2272	510
MIDGIM1	10,2005	= 701	NRUPTFLG	0107	= 89	PHSBB1	E3,1437	125	P20S2	25,2000	= 31
MIDIFBIT	4751	= 97	NSTEER	36,3645	768	PHSBB2	E3,1441	125	P21	E6,1701	= 150
MKOVFLAG	0110	= 89	NTARGBIT	4751	= 92	PHSBB3	E3,1443	125	P250K	24,2475	515
MKVAC	07,2014	259	NVSBAIT	4445	477	PHSBB4	E3,1445	125	P30N33	35,2004	624
MKV852	07,2620	275	NVSURCOM	4170	465	PHSBB5	E3,1447	125	P39SW8IT	4743	= 95
MKV853	07,2617	275	NWAITBIT	4742	= 88	PHSBB6	E3,1451	125	P41FJET	36,3303	762
MONI11	41,3232	450	NWAITFLG	0101	= 88	PHSNAME4	E3,1444	125	P41MANU	36,3215	761
MOONBIT	4740	= 81	-----	-----	-----	PHSNAME6	E3,1450	125	P41NORM	36,3312	763
MRKIDBIT	4735	= 88	OCT00010	4750	= 247	PHSPRDT5	1064	118	P51FIVE	4756	= 950
MRKIDFLG	0074	= 88	OCT02100	06,3131	202	PHSPRDT6	1066	118	P52E	15,2102	927
MRUPTBIT	4747	= 89	OCT10000	4737	= 232	PINR8BIT	4746	= 89	P52V	15,2125	927
MRUPTFLG	0106	= 89	OCT11	4320	= 1090	PINTEST	43,2002	= 479	P57A	15,3324	971
MU(P)	0032	= 1243	OCT1103	5702	1377	PIPASCFY	E3,1455	125	P63IGN1	36,2476	747
MUM	13,2004	61	OCT203	26,2231	488	PIPASCFZ	E3,1457	125	P65VERT	31,3502	818
MUNRVG	33,3120	883	OCT217	5706	1377	P1PUSE	07,3246	1312	P66NOW?	31,2575	805
MWAITBIT	4741	= 88	OCT25	4362	= 1094	PLUSX	27,2446	776	P67NOW?	31,2534	804
MWAITFLG	0100	= 88	OCT30000	4355	= 233	PMINM	34,2103	642	P70INIT	32,3302	832
MXMYMZ	26,2726	590	OCT30002	6470	= 1094	PON2	37,2240	389	P70NOW?	21,2155	830

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UNREFERENCED SYMBOL LISTING, INCLUDING DEFINITION, HEALTH, & PAGE OF DEFINITION.

SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE
P71	21,2171	830	R292	33,2602	877	SERET	41,3064	441	S40.92	27,2773	783
P71NOW?	21,2142	829	R300K	27,3740	1277	SERET1	41,3046	441	S50	14,2347	932
=====			R51.2	14,2714	938	SHAFTBO	26,2760	591	S52.2.1	14,3555	951
QUADGUID	31,3147	812	R51F	14,2701	938	SIGNRET	0125	= 112	=====		
QUITBIT	4747	= 97	R55.1	14,3073	942	SIM2CADR	05,2454	226	TRASE3	1057	118
=====			R60INIT	32,3171	792	SINB	E5,1646	= 138	TCALARM2	43,3272	1280
RCDUFAIL	0274	= 102	R61C+L03	23,2115	528	SLOPERIT	4751	= 84	TCCSM	E3,1622	127
RCOUEBIT	4745	= 102	=====			SMCOURS	23,3673	1261	TCLEM	E3,1674	127
RCOUBIT	4737	= 101	S+2	4752	= 1279	SNAPAGN	05,3555	988	TOECAYFX	4770	1091
RCDUOFLG	0266	= 101	S+3	6244	= 1279	SNAPENO	05,3574	989	TEMP	E5,1441	= 142
ROIEE	E6,1450	= 147	S+4	4751	= 1279	SNGLCO	22,2376	370	TEMPA00	E5,1440	= 142
ROM	13,3745	1243	S+5	4756	= 1279	SOLNSBIT	4751	= 91	TENOAPPR	E7,1426	153
RDSP	E5,1434	= 142	S+6	6241	= 1279	SOMEADS	20,3334	1493	TESTCOS	32,2667	613
REAOPIPS	10,3501	1390	S-2	7745	= 1280	SOMEERRR	37,3040	401	TESTV8	41,2041	420
RECAL3	40,3573	471	S-3	7744	= 1280	SOPTION2	43,3331	1281	TEST22.3	27,2156	603
REDOMANN	26,2103	486	S-4	6111	= 1280	SOPTION3	43,3332	1281	TFIOTHER	E3,1570	= 127
REMOBIT	4736	= 101	SAVE	E5,1464	= 142	SOPTION4	43,3333	1281	TFCONIC	27,3332	1265
REMOOFLG	0265	= 101	SAVEFLAG	1072	= 1366	SOPTION5	43,3334	1281	TEFSWBIT	4753	= 94
REPOSMON	0270	= 101	SAVESHFT	21,3651	1476	SOPTION6	43,3335	1281	TFETICK	22,3453	724
REQEXLOC	41,2207	422	SBIT1	4753	= 1279	SOPTION7	43,3336	1281	TFI	E7,1451	= 154
RERRCALC	17,2603	1445	SBIT10	4742	= 1279	SOPTION10	43,3337	1281	TCOCALC	27,2520	778
RGEXIT	E7,1663	= 157	SBIT13	4737	= 1279	SOUPLY	37,3071	402	THOUMP	31,2414	800
RHCSCFLG	0313	= 104	SBIT14	4736	= 1279	SPECSTS	37,2572	397	TICKTPER	22,3410	723
RLMUNIT	0014	= 603	SBIT2	4752	= 1279	SPSCODE	4743	= 1303	TIMER	E5,1470	= 142
RMM	11,2305	= 36	SBIT3	4751	= 1279	STARM	0040	= 139	TIMERA0	12,3556	1194
RNGEOATA	0260	= 100	SBIT5	4747	= 1279	STARTDAP	16,2046	1406	TMANUCHK	22,3064	379
ROO	04,2142	244	SBIT6	4746	= 1279	STARTXNV	26,2150	487	TMEXITL	05,3626	989
ROOTPS+1	0127	= 114	SBIT8	4744	= 1279	STARTSIM	05,2452	226	TMOOE	6476	1014
RPA01	23,2275	= 1277	SCALBA0	0261	= 101	STARTST0	6433	1012	TMRESUME	05,3630	989
RPOFLBIT	4735	= 95	SCLNORM	17,3044	1449	STARTSW	05,2451	226	TRACE1	40,3236	454
RCHECK	4576	535	SD	22,2366	370	STATERT	4747	= 87	TRACE1S	40,3247	454
RROATABT	4750	= 102	SECAO	22,2027	364	STCLOK3	36,2670	751	TRANSP1	10,3634	1395
RRDATAFL	0277	= 102	SEC01	4777	= 770	STOESIG1	25,2616	557	TRANSP2	10,3650	1395
RLDOSVEC	1101	= 582	SEC15	36,3733	770	STERN	31,2530	804	TRUNBQ	26,3054	592
RRNBBIT	4746	= 82	SEC150P	36,3732	770	STOP22.3	27,2217	604	TSNEXTS	17,2145	1437
RRRSBIT	4751	= 102	SEC300P	36,3734	770	STORHAPC	22,3600	728	TSSR	00,2025	1042
RRRSFLAG	0300	= 102	SEC45	36,3737	770	STORHPER	22,3612	729	TSTPOINT	23,3661	1259
RSTKLOC	E4,1760	= 135	SEC450P	36,3736	770	STRATGY	14,2555	936	TTESCALE	4740	= 826
RUPSTOR	0063	= 111	SELESUPR	40,2000	= 35	SUPER100	4745	= 1091	TURNON	17,3057	1450
RVSWBIT	4743	= 94	SENSEGET	17,2065	1436	S32BIT1	4735	= 91	TURNONBT	4753	= 103
RWAIK	43,2145	280	SETINFL	05,2732	231	S32BIT2	4736	= 91	TURNONFL	0302	= 103
R21LEM1	24,2754	521	SETMARK	10,2401	1352	S32BIT3A	4737	= 91	T6J0R	17,2004	1399
R21LEM3	24,2763	521	SETPRI0	10,2363	1352	S32BIT3B	4740	= 91	=====		
R22LEM12	24,2511	516	SETXFLAG	27,3162	= 852	S40.133	27,2703	782	UAXIS	20,3230	1491
R24LEM1	24,3104	525	SECONST1	E5,1467	= 142	S40.137	27,2675	782	U0B2	0136	= 1498

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 80 BAOLY DEFINED CD DEFINITION ASSOCIATED WITH CONFLICT XX MISCELLANEOUS TROUBLE

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SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE	SYMBOL	DEF	H PAGE
UDB3	0140	= 1498	VVXSC	7403	1035	ZERDTJ	17,2526	1443	=====		
UNFVX/2	E6,1665	= 151	VXSCAL	33,2016	56	ZNB1	E7,1467	= 164	300EGCHK	24,3233	583
UNKNOWN	0007	= 208	VYSCAL	33,2014	56	ZONE2	17,3510	1460	30KFT	33,2737	879
UNLP/2	0024	= 165	V0	0006	= 937	ZONE4	17,3331	1457	360SWBIT	4753	= 96
UNLRB/2	0024	= 165	V00N25	6010	= 224	ZONE4,5	17,3320	1456	=====		
UPONLIST	05,2407	= 208	V00N34	4242	= 224	ZSCI	F5,1714	= 139	4.11SR0T	01,2101	256
UPDTMEND	42,2032	290	V01N14	32,2200	224	=====			4.13SR0T	01,2104	256
UREND73	04,3457	1385	V06N07	10,3352	1366	OERANK	43,3347	1282	4.15SR0T	01,2107	256
URLOCKFL	0164	= 94	V06N71	07,2625	275	=====			4.17SP0T	01,2112	256
UPDK	04,3271	1333	V1	0014	= 937	1.95SECS	33,3175	884	4.21SR0T	01,2115	256
URRART3	04,3503	= 1385	V2	0022	= 937	1/RTMU	27,2014	61	4.23SR0T	01,2120	256
URRRT1	04,3252	1333	V3	0030	= 937	1/10S	17,2300	1440	4.25SP0T	01,2123	256
UPWAKE	04,3475	1385	V37XEQC	04,2354	247	1/10SEC	16,3111	1427	4.27SR0T	01,2126	256
USEGTS	33,2341	863	V50N00A	32,2201	224	18IT0R	26,2365	496	4.31SR0T	01,2131	256
USEQFLG	0304	= 103	V67FL8IT	4744	= 94	1SEXC	4777	= 394	4.33SP0T	01,2134	257
=====			V74	43,3053	= 303	10SEC*17	31,3730	826	4.35SR0T	01,2137	257
VACZ	E4,1543	= 130	V82EMBIT	4752	= 94	100MRUPT	7726	= 170	4.37SP0T	01,2142	257
VAC1	0401	116	=====			120MS	5742	= 196	4.55POT	01,2073	256
VAC2	0455	116	W.IND1	1260	= 123	17IC20	43,3651	1286	4.75POT	01,2076	256
VAC3	0531	116	WCALC	22,2746	377	=====			40SET	32,3502	836
VAC4	0605	116	WHATOUT	31,2416	800	2.0SRT	04,2127	243	45SECNOS	24,2713	519
VECTABND	E4,1574	= 130	WPLAT1	E5,1560	= 143	2.11SPOT	01,2040	255	=====		
VEHURBIT	4744	= 83	WPLAT0	E5,1464	= 143	2.11SPT	04,2130	243	5.4SR0T	01,2153	257
VELOATA	0255	= 100	WROPET	0115	= 112	2.13SR0T	01,2043	255	5.55POT	01,2164	257
VELUPDAT	33,3325	886	=====			2.15SPOT	01,2046	255	5.75POT	01,2167	257
VERIFLAG	0165	= 94	XACTO	43,2116	279	2.17SR0T	01,2051	255	5BLANK1	40,2557	418
VERROR	E6,1750	= 145	XOELVBIT	4744	= 85	2.21SR0T	01,2054	255	5B10	01,2473	1086
VERTDRFI	37,2231	389	XKEPCSM	E3,1624	127	2.5SR0T	01,2032	255	50FT	33,2735	879
VFLAG8IT	4742	= 86	XKERLEM	E3,1676	127	2.75SR0T	01,2035	255	50KFT	33,2733	879
VGAIN*	27,2504	778	XSMAOR	37,2477	394	20ZERO	11,2274	= 1132	50SECS	32,3577	838
VINTEBIT	4751	= 87	X1INPUT	E7,1607	= 157	2RNDEND	40,3173	447	=====		
VLAUNS	E5,1462	= 143	=====			2VEXHUST	E7,1741	= 779	6.55POT	01,2175	258
VPO	0000	= 937	YNB1	E7,1467	= 164	20SFC*17	31,3731	826	6.75POT	01,2200	258
VPDVL	6572	1016	=====			22.3ENT	27,2211	604	63/64+1	7725	1093
VRECTLEM	E3,1634	127	ZERODR	11,2274	= 1096	26SFC5	36,3742	770	=====		
VSTORE	6442	1012	ZEROO	23,2423	= 1152	27T030	43,3657	1286	700EC	32,3300	832
VV/SC	7626	1040									

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ERASABLE & EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
0000	81	CPHIFLAG	0010	1143	DVECTR	0017	83	NJETSE1G	0030	84	NOUPEFLAG	0041	85	LOSCMFLG
0000	108	A	0010	1143	SINNODI	0017	108	BRUPT	0030	108	TIME5	0041	108	PIPAZ
0000	151	UNX/2	0010	1197	ALPHA	0020	83	OIDFLAG	0030	109	CHAN30	0042	85	STEERSW
0000	250	COSTALIN	0010	1198	COGAMIN	0020	108	CYR	0030	937	V3	0042	108	Q-RHCCTR
0000	501	UR	0010	1199	MIN	0020	139	COSTH	0030	982	TIMEP	0042	109	LVSQUARE
0000	937	VPO	0011	82	RNRBSW	0020	933	CSUN	0030	1197	XI	0042	140	RCNORM
0000	1143	504RPR	0011	108	LRUPT	0020	982	STMP	0030	1199	COSE	0042	1143	SDB
0000	1243	RATT	0011	109	DSALMOUT	0020	1197	ROOTMU	0030	1262	TFFRTALF	0042	1197	KEPCI
0001	81	JSWITCH	0012	82	LOKONSW	0020	1262	NRTERM	0031	84	TRACKFLG	0042	1262	TFFX
0001	108	L	0012	108	GRUPT	0020	1268	RAPD	0031	108	TIME6	0043	85	CYCLESW
0001	109	LCHAN	0012	109	CHAN12	0021	83	FRAOFLAG	0031	109	CHAN31	0043	108	P-RHCCTR
0001	250	AGSUPOAT	0012	1197	XMAX	0021	108	SR	0032	108	COUX	0044	85	IMPULSW
0002	81	MIDFLAG	0012	1262	TFFDELQ	0022	108	CYL	0032	109	CHAN32	0044	108	R-RHCCTR
0002	108	Q	0013	82	NEEOLFLG	0022	139	SINTH	0032	670	OEELELO	0044	109	LV
0002	109	QCHAN	0013	108	SAMPTIME	0022	165	PROJ	0032	1143	8VECTR	0044	1153	NORMZI
0002	250	RENDEZVU	0013	109	CHAN13	0022	603	UYVECTPR	0032	1197	S(XI)	0044	1197	KEPC2
0003	81	MOONFLAG	0014	82	FREEFLAG	0022	933	CMOCN	0032	1243	MU(P)	0044	1262	TFFTEM
0003	108	EBANK	0014	109	CHAN14	0022	937	V2	0032	1243	TVEC	0045	85	XOELVFLG
0003	109	HISCALAR	0014	151	UNZ/2	0022	1143	504AZ	0032	1262	TFFALFA	0045	108	INLINK
0003	251	OR8MANUV	0014	603	RLMUNIT	0022	1197	1/ROOTMU	0033	84	SLOPESW	0046	85	ETPIFLAG
0004	108	FBANK	0014	603	UXVECTPR	0022	1243	COSPHI/2	0033	108	CDUY	0046	85	PTMNSW
0004	109	LOSCALAR	0014	937	V1	0022	1262	RTERM	0033	109	CHAN33	0046	108	RNRAD
0004	251	OESASCNT	0014	1197	XMIN	0023	108	FDOF	0034	84	GUESSW	0046	109	X1
0005	108	Z	0014	1198	OCOGA	0024	83	R61FLAG	0034	108	CDUZ	0047	85	FINALFLG
0005	109	CHAN5	0014	1199	DELINDEP	0024	108	TIME2	0034	109	DNTM1	0047	108	GYROCMO
0005	251	LUNRSALN	0014	1243	TAT	0024	139	THFTA	0034	1197	XSQC(XI)	0047	109	X2
0006	82	P25FLAG	0014	1262	RMAG1	0024	165	UNLR/2	0034	1262	TFFNP	0050	85	AVFLAG
0006	108	BBANK	0015	82	RIOFLAG	0024	165	UNLRB/2	0035	108	COUI	0050	108	COUXCMD
0006	109	CHAN6	0015	108	ZRUPT	0024	531	PHI	0035	109	ONTM2	0050	109	S1
0006	151	UNY/2	0015	109	MNKEYIN	0024	1143	AVECTR	0036	84	ORIFTFLG	0050	1143	RPREXIT
0006	501	URP	0016	82	OLDESFLG	0024	1143	MMATRIX	0036	108	COUS	0050	1199	TWEEKIT
0006	937	VO	0016	108	BANKRUPT	0024	1197	X	0036	937	OPO	0051	86	PFRATFLG
0006	1143	504F	0016	109	NAVKEYIN	0024	1243	UZ	0036	1197	T	0051	108	COUYCMD
0006	1243	VATT	0016	933	CEARTH	0024	1243	VATT1	0036	1199	DEP	0051	109	S2
0006	1294	88	0016	936	CSS	0024	1262	TFFVSQ	0036	1262	TFF/RTMU	0051	1134	SETREX
0007	82	IMUSE	0016	1143	TIMSUBM	0025	108	TIME1	0037	84	SRCHOPTN	0051	1143	EARTHMX
0007	109	SUPERBNK	0016	1143	504LPL	0026	83	VEHUPFLG	0037	108	PIPAZ	0052	86	CALCMAN3
0007	208	ERASZERO	0016	1197	1/MU	0026	108	TIME3	0040	84	ACMOOFLG	0052	108	COUZCMO
0007	208	SPARE	0016	1198	COGAMAX	0026	139	POA	0040	108	PIPAY	0052	109	QPRFT
0007	208	UNKNOWN	0016	1199	MAX	0026	139	ZPRIME	0040	139	STARM	0053	86	CALCMAN2
0010	82	RNDVZFLG	0016	1243	RATT1	0026	982	CTMP	0040	937	DPI	0053	108	COUTCMD
0010	108	ARUPT	0016	1243	URPV	0026	1199	ITERCTR	0040	1143	COB	0054	86	NODDFLAG
0010	109	QUITO	0016	1262	CDELF/2	0026	1262	TFF1/ALF	0040	1197	R1	0054	108	COUSCMO
0010	1133	GAMRP	0016	1262	TFFQ1	0027	83	UPOATFLG	0040	1243	TOEC1	0055	109	THRUST
0010	1143	CVECTR	0016	1268	RPFR	0027	108	TIME4	0040	1262	NRMAG	0056	86	GLOKFAIL

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
0056	109	LEMMOM	0071	87	VINTFLAG	0113	112	LASTXCMD	0124	114	DXCRIT
0057	86	REFSMFLG	0071	111	RUPTRREG2	0114	112	BLANKPET	0124	1498	1/ATEM2
0057	109	OUTLINK	0071	1294	TEMPG2	0114	112	DSFXIT	0125	112	MIXTEMP
0060	86	LUNAFILG	0072	87	D6OR9FLG	0114	112	EXITFM	0125	112	SIGNRET
0060	109	ALTM	0072	111	RUPTRFG3	0114	112	INT815+	0125	114	DXCRIT+1
0061	86	NOR29FLG	0072	1294	TEMPP2	0114	1498	DBVAL2	0126	91	NDRRMDN
0061	111	EXECITEM1	0073	88	DIMOFILG	0115	90	SNUFFER	0126	114	RDDTPS
0061	111	ITEMPI	0073	111	OSRUPTM	0115	112	DECRET	0127	91	SOLNSW
0061	111	WAITEXIT	0073	111	KEYTEMP1	0115	112	INT8IT15	0127	114	RODTPS+1
0061	152	ISTEMP	0073	111	RUPTRREG4	0115	112	WDRET	0127	1498	1/ACOSTT
0061	1294	TEMPG	0073	1294	TEMPBBCN	0115	112	WRDPET	0130	91	MGLVFLAG
0061	1408	COSMG	0074	81	FLAGWR00	0115	112	21/22PEG	0130	112	BUF
0062	86	VFLAG	0074	88	MRKIDFLG	0115	1498	DBVAL3	0130	113	INDEXLOC
0062	111	EXECTEM2	0074	111	STATE	0116	90	NOTHROTL	0130	113	SWWORD
0062	111	ITEMP2	0075	83	FLAGWRD1	0116	112	ADDPW0	0130	137	1*WCR*T
0062	111	WAITBANK	0075	88	PRIDDFLG	0116	1498	DPIFIER	0131	91	RENEWFLG
0062	1294	TEMPP	0076	84	FLAGWR02	0117	90	R77FLAG	0131	113	SW8IT
0063	87	READRFLG	0076	88	NRMIOFLG	0117	112	CHAP	0131	137	H*GHCRT*
0063	87	RO4FLAG	0077	86	FLAGWRD3	0117	112	DECONT	0131	1498	ZITEM
0063	111	ITEMP3	0077	88	PDSPFLG	0117	112	ERCNT	0132	91	S32.1F1
0063	111	NEWPRIO	0100	88	FLAGWRD4	0117	112	POLISH	0132	114	RETRDDT
0063	111	RUPTRSTOR	0100	88	MWAITFLG	0117	112	UPDATRET	0132	1498	ZSTEM
0063	111	WAITAOR	0101	88	NWAITFLG	0117	114	PWRPTR	0133	91	S32.1F2
0063	152	OINDX	0101	89	FLAGWRD5	0117	1498	ACCRETN	0133	113	8UF2
0063	1294	TEMPNM	0102	88	MRKNVFLG	0120	90	RNGSCFLG	0134	91	S32.1F3A
0063	1472	NZACCDOT	0102	91	FLAGWRD6	0120	112	FIXLOC	0135	91	S32.1F3B
0064	87	PRECIFLG	0103	88	NRMNVFLG	0121	90	DMENFLG	0135	113	DMPNTEMP
0064	111	ITEMP4	0103	93	FLAGWRD7	0121	112	QVFIND	0135	113	MPTEMP
0064	111	LDCCTR	0104	89	PRDNVFLG	0122	90	COMPUTER	0135	1498	UDB1
0064	111	WAITITEMP	0104	94	FLAGWR08	0122	112	OECTEM	0136	92	FIRSTFLG
0064	1294	TEMPBB	0105	89	PINBREFLG	0122	112	DISTEM	0136	113	DOTINC
0065	87	CULTFLAG	0105	96	FLAGWR09	0122	112	NDUNTEM	0136	113	DVSIGN
0065	111	ITEMP5	0106	89	MRUPFLG	0122	112	SGNDN	0136	113	ENTRET
0065	111	NEWLOC	0106	98	FLGWRD10	0122	112	VBUFE	0136	113	ESCAPE
0065	1294	TEMPSW	0106	98	RASFLAG	0122	1498	ACCSW	0136	419	ENTFXIT
0066	87	OR8WFLAG	0107	89	NRUPTRFLG	0123	90	ENGONFLG	0136	1498	UOB2
0066	111	ITEMP6	0107	99	FLGWRD11	0123	112	HITEMIN	0137	92	GMBDRVSW
0066	1294	TEMPSW2	0110	89	MKOVFLAG	0123	112	NVTEMP	0137	113	DOTRET
0066	1470	CHNL12	0110	101	FLGWR012	0123	112	SFTEMP1	0137	113	DVNDORMCT
0066	1472	QRNDXER	0110	101	RADMODES	0123	112	SGNOFF	0137	113	ESCAPE2
0067	87	STATEFLG	0111	103	DAP80DLS	0123	1498	1/ATEM1	0137	113	INREL
0067	111	NEWJCB	0111	103	FLGWR013	0124	90	3AXISFLG	0137	113	WDCNT
0070	87	INTYPLG	0112	89	XDSPFLG	0124	112	CODE	0137	1498	UOB4
0070	111	RUPTRREG1	0112	112	LASTXCMD	0124	112	LOTFMIN	0140	92	2PHASFLG
0070	1294	TEMPPR	0113	89	OSKYFLAG	0124	112	SFTEMP2	0140	113	OSPMITEM
									0147	93	AUXFLAG

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0147	113	NNTYPTM	0161	1489	SCRATCHY	0221	97	QUITFLAG	0314	115	R22DISP	0660	116	VAC5USE
0147	114	OERCOF-3	0161	1498	ARET	0223	97	M101FLAG	0314	115	TIME25AV	0661	116	VAC5
0147	1498	AXOSTEM	0162	94	V37FLAG	0224	97	M10AVFLG	0315	104	AOPBSFLG	0705	1302	GOLOC
0150	93	ATTFLAG	0162	433	MPAC+6	0225	98	AVEMIDSW	0316	104	ORSELELG	0734	116	KEYTEMP2
0150	113	10A0ITEM	0162	1367	GENMASK	0227	98	INTFLAG	0316	115	SCALSAVE	0734	116	RUPTAGN
0150	114	OERCCF-2	0162	1489	SCRATCHZ	0230	98	APSFFLAG	0317	104	ACCOKFLG	0735	116	AOTCODE
0151	93	ITSWICH	0162	1498	ABSAOS	0236	99	REINTFLG	0320	104	AUTR2FLG	0735	116	STARCOOE
0151	113	10A02TEM	0163	94	AVEGFLAG	0245	99	LSBPASS	0320	115	REDOCTR	0736	116	SINCDU
0151	114	OERCCF-1	0163	115	MOOE	0250	100	VXINH	0321	104	AUTR1FLG	0736	116	SINCOUY
0151	1498	FLATEMP	0163	1366	USERPRIO	0251	100	PSTHIGAT	0321	115	CPHI	0736	116	STARALGN
0152	93	MANUFLAG	0163	1498	SIGNAOS	0252	100	NOLRREAD	0321	115	THETAD	0740	116	SINCOUZ
0152	114	OERCCFN	0164	94	UPLOCKFL	0253	100	XORFLG	0322	115	CHETA	0742	116	SINCDUX
0152	114	10AD3TEM	0164	115	LOC	0254	100	LRIMH	0323	115	CPST	0744	116	COSCDU
0152	1498	Z3TEM	0164	1366	COPINOEX	0255	100	VELOATA	0324	115	OELV	0744	116	COSCDUY
0153	93	IGNFLAG	0164	1498	-SIGNAOS	0256	100	READLP	0324	115	OELVX	0746	116	COSCOUZ
0153	114	DERCCF+1	0165	94	VERIFLAG	0257	100	READVEL	0326	115	OELVY	0750	116	COSCOUX
0153	114	RUTMXTEM	0165	115	BANKSET	0260	100	RNGEOATA	0330	115	OELVZ	0752	116	-PHASE1
0154	93	ASTNFLAG	0165	1366	MPAC2SAV	0261	101	SCALBAD	0332	115	ONLSTAOR	0753	117	PHASE1
0154	115	MPAC	0165	1498	HOLD	0262	101	VFLSHFLG	0332	115	ONLSTCOO	0754	117	-PHASE2
0154	1216	STALTEM	0166	94	V82EMFLG	0263	101	HFLSHFLG	0333	115	DUMPCNT	0755	117	PHASE2
0154	1302	TEMPPHS	0166	115	PUSHLOC	0264	101	COESFLAG	0334	115	LDATALST	0756	117	-PHASE3
0154	1367	FACEREG	0167	94	TFFSW	0265	101	REMDFLAG	0334	989	CTLIST	0757	117	PHASE3
0154	1498	UV	0167	115	PRIORITY	0266	101	RCOUOFLG	0335	115	DNTMGOTO	0760	117	-PHASE4
0155	93	SWANDISP	0170	95	RPQFLAG	0267	101	ANTENFLG	0336	115	DUMPLC	0761	117	PHASE4
0155	1302	TEMP2G	0172	95	NEWIFLG	0270	101	REPOSMCN	0336	115	TMINDEX	0762	117	-PHASE5
0155	1367	PLAYTEML	0173	36	MOONOTH	0271	102	DESIGFLG	0336	989	DNECADR	0763	117	PHASE5
0156	93	NORMSW	0173	95	CMOONFLG	0272	102	ALTSCLAE	0337	115	ONQ	0764	117	-PHASE6
0156	1302	POINTER	0174	36	MOONTHIS	0273	102	LRVELEFL	0337	989	SUBLIST	0765	117	PHASE6
0157	93	RVSF	0174	95	LMOONFLG	0274	102	RCOUFAIL	0340	115	DNTMBUFF	0766	117	COUSPOT
0157	114	TERMITMP	0175	95	FLUNDISP	0275	102	LRPOSFLG	0366	116	RESTREG	0766	117	COUSPOTY
0157	1302	TEMPSWCH	0176	95	P39/79SW	0276	102	LRALTFLG	0367	116	NVWORO	0770	117	COUSPOTZ
0157	1366	COPMPAC	0177	95	SURFFLAG	0277	102	RRQATAFL	0370	116	MARKNV	0772	117	COUSPOTX
0157	1367	PLAYTEM3	0200	95	INFINFLG	0300	102	RRRSFLG	0371	116	NVSAVE	0774	117	MINDEX
0157	1489	DOCKTEMP	0201	95	ORDERSW	0301	102	AUTOMOOF	0372	116	CADRFLSH	0775	117	MMNUMBER
0157	1498	ANET	0202	96	APSESW	0302	103	TUPNDFL	0373	116	CAORMARK	0776	117	DSPCNT
0157	1498	FUNTEM	0203	96	COGAFLAG	0303	103	PULSEFLG	0374	116	TEMPFLSH	0777	117	OSPCOUNT
0160	94	V67FLAG	0205	96	INITALGN	0304	103	USEQRELG	0375	116	FAILREG	1000	117	OECBRNCH
0160	1366	TEMPCR2	0206	96	360SW	0305	103	CSMOKFLG	0400	116	VAC1USE	1001	117	VERBREG
0160	1367	PLAYTEM4	0210	96	FLVR	0306	103	QURRCFLG	0401	116	VAC1	1002	117	NOUNREG
0160	1489	COEFCIR	0212	96	FLPC	0307	103	ACC4-2FL	0454	116	VAC2USE	1003	117	XREG
0160	1489	SCRATCHX	0213	97	FLPI	0310	103	ADRBTFLG	0455	116	VAC2	1004	117	YREG
0160	1498	1/ANET	0214	97	FLRCS	0311	103	XOVINFLG	0530	116	VAC3USE	1005	117	ZREG
0161	54	IDLEFLAG	0215	97	LETABORT	0312	104	DP1FTDFL	0531	116	VAC3	1006	117	XREGLP
0161	1366	OUTHERE	0216	97	FLAP	0313	104	RHCSCFLG	0604	116	VAC4USE	1007	117	HITEMOUT
0161	1489	MASSCTR	0220	97	FLZONEO	0314	104	ULLAGFLG	0605	116	VAC4	1007	117	YRFGLP

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
1010	117	LOTEOUT	1071	119	MARKBAN	1164	120	TEMPR60	1306	122	RADCADR	1375	124	SKEEP5
1010	117	ZPEGLP	1071	1366	MARKELAG	1165	120	PRIOTIME	1307	122	ATTCADR	1376	124	SKEEP6
1011	117	MODPEG	1072	119	EBANKTEM	1166	120	UPVERBSV	1311	122	ATTTPRIO	1377	124	SKEEP7
1012	118	DSPLCK	1072	1366	SAVEFLAG	1167	120	ERUF2	1312	122	MARKSTAT	E3,1400	125	LST1
1013	118	REQRET	1073	119	MARK2PAC	1167	120	INTWAK10	1313	122	DSRUPTSW	E3,1410	125	LST2
1014	118	LOADSTAT	1074	119	RISAVE	1167	120	UPTEMP	1314	122	LGYRO	E3,1432	125	RS88Q
1015	118	CLPASS	1075	119	1/PIPADT	1167	1221	INTWAKUQ	1315	122	RRRET	E3,1434	125	LONGEXIT
1016	118	NOUT	1076	119	TEMK	1170	120	COMPNUMB	1316	122	RDES	E3,1436	125	PHSNAME1
1017	118	NOUNCAOR	1077	119	SQ	1171	120	UPOLDMCD	1317	122	RRINDEX	E3,1437	125	PHS881
1020	118	MONSAVE	1100	119	SAMPLIM	1172	120	UPVERB	1320	122	WIXA	E3,1440	125	PHSNAME2
1021	118	MONSAVE1	1101	119	RRTARGET	1173	120	UPCOUNT	1321	122	WIXB	E3,1441	125	PHS882
1022	118	MONSAVE2	1101	119	RSUBC	1174	120	UPBUEE	1322	122	ZIXA	E3,1442	125	PHSNAME3
1023	118	DSPTAB	1101	119	SAMPLSUM	1220	121	RN	1323	122	ZIXB	E3,1443	125	PHS883
1037	118	NVQTEM	1101	587	RRLOSVEC	1226	121	VN	1324	122	AGSWORD	E3,1444	125	PHSNAME4
1040	118	NV8NKTEM	1101	615	LOSSM	1234	121	PIPTIME	1325	123	RATFINDX	E3,1445	125	PHS884
1041	118	VERBSAVE	1105	119	TIMEHOLD	1236	121	GDT/2	1326	123	DELAYLOC	E3,1446	125	PHSNAME5
1042	118	CAOPSTOR	1107	119	MODEA	1244	121	MAS	1331	123	LEMMASS	E3,1447	125	PHS885
1043	118	OSPLIST	1107	119	TANG	1244	121	WEIGHT/G	1332	123	CSMMASS	E3,1450	125	PHSNAME6
1044	118	EXTVBACT	1111	119	MODEB	1246	121	ABDELV	1333	123	ONRRANGE	E3,1451	125	PHS886
1045	118	OSPTM1	1111	119	NSAMP	1247	121	PGUIOE	1334	123	ONRRDOT	E3,1452	125	PBIASX
1045	118	NORMTEM1	1113	119	OESRET	1251	121	DVTHRUSH	1335	123	ONINDEX	E3,1452	125	PIPIABIAS
1045	958	CUSOR	1113	119	OLDATAGD	1252	121	AVEGEXIT	1336	123	ONLRVELX	E3,1453	125	PIPASCE
1046	958	SPIRAL	1114	119	DESCOUNT	1252	121	AVGEXIT	1337	123	ONLRVELY	E3,1453	125	PIPASCEX
1050	118	CSPTM2	1115	120	TDEC	1254	121	TEMX	1340	123	ONLRVELZ	E3,1454	125	PBIASY
1051	118	DSPTFMX	1117	120	COLREG	1255	121	TEMY	1341	123	ONLRALT	E3,1455	125	PIPASCFY
1051	118	OPTIONX	1120	120	LAT	1256	121	TEMZ	1342	123	BALLEKIT	E3,1456	125	PBIASZ
1052	958	POSCODE	1122	120	LONG	1257	121	PIPAGE	1343	123	DAPDATRI	E3,1457	125	PIPASCEZ
1053	118	TBASE1	1124	120	ALT	1257	123	W.IND	1344	123	TEVENT	E3,1460	125	NBDX
1054	118	PHSPPT1	1126	120	VV	1260	121	OUTROUTE	1346	123	DB	E3,1461	125	NBDY
1055	118	TBASE2	1134	120	ZV	1260	123	W.IND1	1346	1498	DBVAL1	E3,1462	125	NBDZ
1056	118	PHSPRT2	1142	120	P40/RET	1262	121	CH5MASK	1347	123	AZ	E3,1463	126	ADIAAX
1056	829	PIPCTR	1143	120	GENRET	1263	121	CH6MASK	1350	123	EL	E3,1464	126	ADIAAY
1057	118	TBASE3	1144	120	OPTION1	1264	121	OTHETASM	1351	123	ENO-UE	E3,1465	126	ADIAZ
1060	118	PHSPRT3	1145	120	OPTION2	1272	121	SPNDX	1357	124	SELEERAS	E3,1466	126	ADSRAX
1060	247	MMTEMP	1146	120	OPTION3	1273	121	RCSFLAGS	1357	124	SFAIL	E3,1467	126	ADSPAY
1061	118	TBASE4	1147	120	LONGCAOP	1274	121	T5ADP	1360	124	ERESTORE	E3,1470	126	ADSRAX
1061	247	BASETEMP	1151	120	LONGBASE	1276	122	PVALVEST	1361	124	SELFRET	E3,1471	126	COMMAND
1062	118	PHSPPT4	1153	120	LONGTIMF	1277	122	DELPEROR	1362	124	SMOOF	E3,1471	126	GCOMP
1063	118	TBASE5	1155	120	COUTEMPX	1300	122	DELQEPOR	1363	124	ALMCAOR	E3,1474	126	CDUINO
1064	118	PHSPRT5	1156	120	CDUTEMPX	1301	122	DELREPOR	1365	124	ERCOUNT	E3,1477	126	GCOMPSPW
1065	118	TBASE6	1157	120	COUTEMPZ	1302	122	IMODES30	1366	124	SCOUNT	E3,1500	126	DIFEQNT
1066	118	PHSPRT6	1160	120	PIPATMPX	1303	122	IMODES33	1371	124	SKEEP1	E3,1501	126	UPSVFLAG
1067	119	NVWORD1	1161	120	PIPATMPY	1304	122	IMUCADR	1372	124	SKEEP2	E3,1502	126	RRECT
1070	119	EBANKSAV	1162	120	PIPATMPZ	1304	122	MODECAOR	1373	124	SKEEP3	E3,1510	126	VRECT
1070	1366	DSPFLG	1163	120	OISPOEX	1305	122	OPTCADR	1374	124	SKEEP4	E3,1516	126	TET

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E3,1520	126	DELTA V	E3,1760	615	LOSVD74	E4,1516	131	STATEXIT	E4,1626	132	DELVDV	E4,1712	135	HBEAMNB
F3,1526	126	TNUV	E3,1766	128	MLOSV	E4,1517	130	HAPDX	E4,1634	132	EOL	E4,1712	136	RDOOT
F3,1534	126	RCV	E3,1766	615	SAVECOUT	E4,1517	131	BASEOTV	E4,1634	132	GSAV	E4,1714	132	RACT2
E3,1542	126	VCV	E3,1770	128	RANGEVAR	E4,1521	130	HPERX	E4,1634	132	KEL	E4,1714	133	ULOS
E3,1550	126	TC	E3,1772	128	RATEVAR	E4,1521	130	RPSV	E4,1634	132	MFI	E4,1714	136	YOOT
E3,1552	126	XKEP	E3,1774	128	RVARMIN	E4,1527	130	XKEPNEW	E4,1634	132	MFS	E4,1716	136	ZOOT
F3,1552	140	XPREV	E3,1775	128	VVARMIN	E4,1531	130	VECTAB	E4,1634	132	VZBEAMNB	E4,1720	136	GEFF
F3,1554	126	RRECTCSM	E3,1776	128	END-E3	F4,1537	130	VACX	E4,1642	132	F02	E4,1722	133	HAPD
F3,1554	126	RRECTOTH	E4,1400	129	AMEMORY	E4,1537	131	BASEQTP	E4,1642	132	VYBEAMNB	E4,1722	133	NOMTPI
E3,1562	126	VRECTCSM	E4,1400	129	WRENDPOS	E4,1537	131	VR2FLAGS	E4,1642	132	YNBSAV	E4,1722	133	RTSRI/MU
E3,1570	127	T-OTHER	E4,1400	133	TRANSMI	E4,1540	131	TFF	F4,1650	132	VXBEAMNB	E4,1722	136	G(CSM)
E3,1570	127	TETCSM	E4,1401	129	WRENDVEL	E4,1541	130	VACY	E4,1650	132	ZNBSAV	E4,1724	133	HPER
E3,1570	127	TETOTHER	E4,1402	129	WSHAFT	E4,1542	131	-TPER	E4,1656	132	LRVTIME	E4,1724	133	RTMU
E3,1572	127	OELTACSM	F4,1403	129	WTRUN	E4,1543	130	VACZ	F4,1656	132	TITOT2	E4,1726	134	RINIT
E3,1600	127	NUVCSM	E4,1404	129	RMAX	E4,1545	130	XNBPIP	F4,1656	133	+MGA	F4,1730	136	WM
F3,1606	127	RCVCSM	E4,1405	129	VMAX	E4,1553	130	YNBPIP	E4,1656	135	AT	E4,1734	134	VINIT
E3,1614	127	VCVCSM	E4,1406	129	WSURFPOS	E4,1561	130	ZNBPIP	F4,1660	132	LRXCDU	E4,1736	136	/LANO/
E3,1622	127	TCCSM	E4,1407	129	WSURFVEL	F4,1567	130	VONE'	E4,1660	132	T2TDT3	E4,1740	135	LRXCDDUL
E3,1624	127	XKEPCSM	E4,1410	129	SHAFIVAR	F4,1567	131	BASETHP	E4,1660	135	VE	E4,1740	136	Y
E3,1626	127	RRECTHIS	E4,1411	129	TRUNVAR	F4,1574	130	VECTA3NO	E4,1661	132	LRVCOU	E4,1741	135	LRVCOUOL
E3,1626	127	RRECTLEM	E4,1412	129	504LM	E4,1576	131	XMODULO	E4,1662	132	ELEV	F4,1742	134	VIPRIME
E3,1634	127	VRECTLEM	E4,1420	129	AGSK	E4,1600	131	TMODULO	E4,1662	132	LRZCDU	E4,1742	135	LRZCOUOL
E3,1642	127	TETLEM	E4,1422	129	RLS	E4,1602	131	EPSILONT	E4,1662	135	TTO	E4,1742	136	DROOT
E3,1642	127	TETTHIS	E4,1422	133	ALFOK	E4,1604	131	HPERMIN	E4,1663	132	PIPTEM	E4,1743	135	LRVTIMOL
E3,1644	127	DELTALEM	E4,1430	129	PBODY	E4,1604	131	RANGE	E4,1664	132	UP1	E4,1744	136	OYDOT
E3,1652	127	NUVLEM	E4,1431	130	ALPHAV	F4,1604	131	WWPOS	F4,1664	133	UNRM	E4,1746	136	OZOOT
E3,1660	127	RCVLEM	E4,1437	130	BFTAV	E4,1604	133	AGSRUFF	E4,1664	135	TBUP	E4,1750	134	FOAIX
E3,1666	127	VCVLEM	E4,1445	130	PHIV	E4,1604	134	ALPHASE	E4,1666	135	RDOOTD	E4,1750	136	PCONS
E3,1674	127	TCLEM	E4,1453	130	PSIV	E4,1604	134	PITCHANG	E4,1666	135	VHORIZ	E4,1751	134	FDAIY
F3,1676	127	XKEPLEM	E4,1461	130	FV	E4,1604	134	RR-AZ	E4,1670	135	ACG	E4,1752	134	FDAIZ
E3,1700	127	X789	E4,1467	130	ALPHAM	E4,1604	134	RSTACK	E4,1670	135	YOOTD	E4,1752	136	YCONS
E3,1706	127	TEPHM	E4,1471	130	BETAM	F4,1606	131	RPAOTEM	E4,1672	132	OELVEET1	E4,1753	135	DELVTPF
E3,1706	128	TIMSUBO	F4,1473	130	TAU.	E4,1606	131	RRAE	E4,1672	135	ZDOTD	E4,1754	136	PRATE
E3,1711	127	AZO	E4,1475	130	DT/2	E4,1606	131	WWVEL	E4,1674	135	/R/MAG	E4,1755	135	LMPOS
E3,1713	127	-AYO	E4,1477	130	H	F4,1606	134	BETASB	E4,1676	135	XLING	E4,1755	135	RTSTDEX
E3,1715	127	AXO	E4,1501	130	GMOOE	F4,1606	134	RR-FLEV	E4,1676	135	LAXIS	F4,1756	135	RTSTMAX
E3,1717	127	R-OTHER	E4,1502	130	IRETURN	F4,1606	134	YAWANG	F4,1700	132	DELVEET2	E4,1756	136	YRATF
F3,1717	136	R(CSM)	E4,1503	130	NORMGAM	E4,1610	131	RTHETA	E4,1704	135	ANGTFM	F4,1757	135	RTSTRASE
E3,1725	127	V-OTHER	E4,1504	130	RPQV	E4,1610	131	TSTART82	E4,1704	136	ZAXIS1	E4,1760	135	RSTKLOC
E3,1725	136	V(CSM)	E4,1504	131	BASETHV	E4,1610	134	RLM	E4,1706	132	RACT1	E4,1760	135	RTSTLOC
F3,1733	127	REFSMMAT	E4,1512	130	KEPRTN	E4,1612	131	RONE	E4,1706	133	OELTAR	E4,1760	136	ATY
F3,1755	127	ACTCENT	E4,1512	130	ORIGEX	E4,1612	134	RPASS36	E4,1706	133	DVLOS	E4,1761	135	RSAMPOT
E3,1757	128	LS21X	E4,1513	130	RQVV	E4,1620	131	VONE	E4,1706	133	TINTSDI	E4,1762	135	RFALLCNT
E3,1760	128	LOSVEL	E4,1513	131	BASETIME	E4,1620	134	UNP36	E4,1710	133	DELTTIME	E4,1762	136	ATR
F3,1760	128	VSURC	E4,1515	131	ORIG	E4,1621	133	AGSRUFFE	F4,1712	133	TARGETIME	E4,1763	135	END-E4

ERASABLE & EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
E4,1763	135	LMVEL	E5,1441	142	TEMP	E5,1504	143	DRIFTI	E5,1664	141	TRIPA	E5,1735	140	CSTH-RHO
E4,1764	136	ATP	E5,1442	142	COUPEAOI	E5,1505	138	ABTVINJ2	E5,1667	141	TEMPVAR	E5,1736	138	GCTR
E4,1766	136	YAW	E5,1442	142	NOBITS	E5,1507	138	CG	E5,1670	140	TOESIRED	E5,1737	138	OGC
E4,1770	136	PITCH	E5,1442	143	DRIFTI	E5,1510	143	VLAUN	E5,1672	138	YDC	E5,1737	140	P
E5,1400	137	TLANO	E5,1443	142	COULIMIT	E5,1512	143	ACCWO	E5,1672	138	YNB	E5,1741	138	IGC
E5,1400	137	W	E5,1443	142	CHAN	E5,1520	143	POSNV	E5,1672	140	GEOMSGN	E5,1741	140	R1A
E5,1400	142	AZIMUTH	E5,1444	142	LOS1	E5,1522	143	DPIPAY	E5,1673	140	UN	E5,1743	138	MGC
E5,1402	137	RBREG	E5,1444	143	ALX1S	E5,1526	143	DPIPAZ	E5,1700	138	ZDC	E5,1743	140	VVEC
E5,1402	142	LATITUDE	E5,1445	143	CMPX1	E5,1530	143	ALTIM	E5,1700	138	ZNB	E5,1745	139	QMIN
E5,1402	826	RDG	E5,1446	137	AAPEG	E5,1531	138	RANGEDSP	E5,1701	140	VTAPGTAG	E5,1746	139	QMAJ
E5,1404	142	FPVECTOR	E5,1446	143	ALK	E5,1531	143	ALTIMS	E5,1702	140	VTARGET	E5,1747	139	OGCT
E5,1410	137	V8RFG	E5,1452	142	LOS2	E5,1532	143	ALOK	E5,1706	138	LANDLAT	E5,1751	140	ECC
E5,1410	826	VDG	E5,1452	143	THETAN	E5,1533	138	OUTOFFLN	E5,1706	138	STAPAO	E5,1753	140	RTNPRM
E5,1412	142	LENGHOT	E5,1454	137	VAPFG*	E5,1534	142	MASKREG	E5,1706	139	CULTPIX	E5,1754	140	SGNPDOT
E5,1413	142	LOSVEC	E5,1456	137	AAPEG*	E5,1535	138	P6OVSAVE	E5,1706	139	GACC	E5,1755	139	BESTI
E5,1414	142	NDXCIR	E5,1460	137	JAPEG*	E5,1536	142	CDJNDX	E5,1706	139	VEARTH	E5,1755	140	RDESIREO
E5,1415	142	PIPIINDEX	E5,1460	142	CALCDIR	E5,1537	142	PESULTCT	E5,1706	139	XSCI	E5,1756	139	BESTJ
E5,1416	137	ABRFG	E5,1460	143	FILDELV	E5,1542	142	COUNTPL	E5,1706	141	VAPIANCE	E5,1756	141	TDPDS
E5,1416	142	POSITION	E5,1461	142	COUFLAG	E5,1543	138	RGU	E5,1710	138	LANDLONG	E5,1757	139	STAPINO
E5,1416	826	ADG	E5,1462	137	VIGN	E5,1543	142	COUANG	E5,1710	140	RTNAPSF	E5,1757	140	DELDEP
E5,1417	142	QPLACE	E5,1462	142	GYTOBETQ	E5,1550	143	DELM	E5,1710	140	RTNLAMB	E5,1757	140	TERRLAM8
E5,1420	142	QPLACES	E5,1462	143	INTVEC	E5,1560	143	WPLATI	E5,1710	140	RTNTR	E5,1760	139	STARSAY1
E5,1421	142	SOUTHDR	E5,1462	143	VLAUNS	E5,1562	143	GEOCOMPS	E5,1710	140	RTNTT	E5,1761	140	DEPRFV
E5,1424	137	V8RFG*	E5,1463	142	OPTNREG	E5,1563	143	ERCOMP	E5,1711	140	U2	E5,1761	140	TPREV
E5,1424	826	VDG2TTF	E5,1464	137	RIGNX	E5,1571	143	ZERQNDX	E5,1711	141	GRP2SVQ	E5,1763	140	FPSILONL
E5,1426	137	ABRFG*	E5,1464	142	SAVE	E5,1572	143	ISECXT	E5,1712	138	LANDALT	E5,1764	141	TDVEL
E5,1426	826	ADG2TTF	E5,1464	143	WPLATO	E5,1573	143	ASECXT	E5,1712	141	OMEGAM1	E5,1765	140	COGA
E5,1430	137	JBRFG*	E5,1466	137	RIGNZ	E5,1574	143	PEPFDLAY	E5,1714	139	GOUT	E5,1765	140	INDEP
E5,1430	142	TEMPTIME	E5,1467	142	SFCNSTL	E5,1576	143	OVFLDWCX	E5,1714	139	VSUN	E5,1766	139	STARSAY2
E5,1430	826	JOG2TTF	E5,1470	137	KIGNX/B4	E5,1642	137	FNDW	E5,1714	139	YSCI	E5,1772	141	EGRESS
E5,1432	137	RAPEG	E5,1470	142	TIMER	E5,1642	138	XSM	E5,1714	139	ZSCI	E5,1773	141	ORIGIN
E5,1432	142	TMARK	E5,1470	143	INTY	E5,1642	140	DELX	E5,1717	140	MAGVEC2	E5,1773	141	P30FXIT
E5,1434	142	COUTIME1	E5,1472	137	KIGNY/B8	E5,1642	141	ZI	E5,1717	140	R2	E5,1774	139	TALIGN
E5,1434	142	GENPL	E5,1472	142	DATAPL	E5,1644	138	-COSB	E5,1720	141	OMEGAM2	E5,1774	143	END-F5
E5,1434	142	ROSP	E5,1472	143	ANGZ	E5,1644	140	DELT	E5,1721	140	URI	E6,1400	144	HIASCENT
E5,1434	143	AINLA	E5,1474	137	KIGNV/B4	E5,1646	138	SINB	E5,1722	139	VEC1	E6,1401	144	ROLLTIME
E5,1434	143	WANGO	E5,1474	143	INTZ	E5,1646	140	URRECT	E5,1722	139	VMOON	E6,1402	144	PITTIME
E5,1436	142	COUTIMEF	E5,1476	137	LOWCRIT	E5,1650	138	YSM	E5,1726	141	OMEGAM3	E6,1403	144	OKTRAP
E5,1436	143	WANGI	E5,1476	143	ANGY	E5,1654	140	PVFC	E5,1727	140	SNTH	E6,1404	144	DKOMEGAN
E5,1440	137	VAPFG	E5,1477	137	HIGHCRIT	E5,1654	140	RIVEC	E5,1730	138	STAP	E6,1405	144	DKKAOSN
E5,1440	142	COUDANG	E5,1500	137	OELQFIX	E5,1656	138	ZSM	E5,1730	139	SAX	E6,1406	144	LMTRAP
E5,1440	142	TEMPAOD	E5,1500	143	ANGX	E5,1662	140	R2VEC	E5,1730	139	VEC2	E6,1407	144	LMOMEGAN
E5,1440	143	TORQNDX	E5,1502	138	IBRKPNP	E5,1664	138	XOC	E5,1731	140	CSTH	E6,1410	144	LKKAOSN
E5,1440	143	WANGT	E5,1502	143	DRIFTO	E5,1664	138	XNB	E5,1733	140	I-CSTH	E6,1411	144	DKDB
E5,1441	142	COUPEAOF	E5,1503	138	ABTVINJ1	E5,1664	141	DELTA	E5,1734	141	HOLDW	E6,1412	144	M11

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
E6,1413	144	M21	E6,1462	145	PERROR	E6,1535	148	SKIPV	E6,1643	149	OMEGARD	E6,1723	151	VEQTEMP
E6,1414	144	M31	E6,1463	145	NXT6ADR	E6,1536	148	SKIPV	E6,1644	150	MIS	E6,1731	150	CAM
E6,1415	144	M22	E6,1464	145	T6NEXT	E6,1537	148	ACSO	E6,1644	151	ECDUW	E6,1731	150	TM
E6,1416	144	M32	E6,1466	145	T6FURTHA	E6,1541	148	ACSR	E6,1644	151	ECDUWUSR	E6,1733	150	AM
E6,1417	144	OMEGAP	E6,1470	145	NEXTP	E6,1543	148	ACSU	E6,1645	151	QCDUWUSR	E6,1735	145	TEMP31
E6,1420	144	OMEGAQ	E6,1471	145	NEXTU	E6,1544	148	ACSV	E6,1646	151	NDXCDOU	E6,1735	146	ABSFDDTP
E6,1421	144	OMEGAR	E6,1472	145	NEXTV	E6,1545	148	AOSQTERM	E6,1647	151	FLAGOODW	E6,1735	146	ABSTJ
E6,1422	144	ALPHAQ	E6,1473	145	-2JETLIM	E6,1546	148	AOSRTEPM	E6,1650	151	FLPAUTNO	E6,1735	146	ROTEMP1
E6,1423	144	ALPHAR	E6,1474	145	-RATEDB	E6,1547	149	ACCSWU	E6,1651	151	UNFC/2	E6,1735	147	GTSTEMPS
E6,1424	144	OMEGAU	E6,1474	145	TARGETDB	E6,1547	149	BLOCKTCP	E6,1657	151	UNWC/2	E6,1735	147	K2THETA
E6,1424	145	URATEDIF	E6,1475	145	RETJADR	E6,1550	149	ACCSWV	E6,1665	151	UNFV/2	E6,1735	148	EDOTSQ
E6,1425	144	EDDTP	E6,1476	146	AXISCTR	E6,1551	149B	1/ANFTP	E6,1665	151	UNFVX/2	E6,1735	151	DAPTEMP1
E6,1425	144	OMEGAV	E6,1476	146	SAVESR	E6,1553	149B	1/ACOSTP	E6,1666	150	COF	E6,1736	146	ROTEMP2
E6,1425	145	VRATEDIF	E6,1477	146	SENSETYP	E6,1555	149	FLAT	E6,1667	151	UNFVY/2	E6,1736	148	ROTSENSE
E6,1425	149	EDOT	E6,1500	147	NEGUQ	E6,1556	149	ZONE3LIM	E6,1671	151	UNFVZ/2	E6,1736	151	DAPTEMP2
E6,1426	144	TRAPEDP	E6,1501	149	ALLOWGTS	E6,1557	149B	PACCFUN	E6,1673	151	-DELGMB	E6,1737	146	POLYTEMP
E6,1427	144	TRAPEDQ	E6,1502	147	NEGUR	E6,1561	149B	PDB1	E6,1674	150	BCDU	E6,1737	147	A2CNTRAL
E6,1430	144	TRAPEDR	E6,1503	147	KQ	E6,1562	149B	PDB2	E6,1677	150	KSPNDX	E6,1737	147	SHTFLAG
E6,1431	144	NPTRAPS	E6,1504	147	KQ2	E6,1563	149B	PDB4	E6,1700	150	KDPNDX	E6,1737	148	FIRFFCT
E6,1432	144	NQTRAPS	E6,1505	147	KRDAP	E6,1564	149B	PDB3	E6,1701	150	KV1	E6,1737	151	DAPTEMP3
E6,1433	144	NRTTRAPS	E6,1506	147	KR2	E6,1565	149B	PAXDIST	E6,1701	150	K1	E6,1740	146	TEMPNUM
E6,1434	144	EDDTQ	E6,1507	147	ACCDQITQ	E6,1567	149	1/ANET1	E6,1701	150	MFISYM	E6,1740	147	ININDEX
E6,1434	144	QRATEDIF	E6,1510	147	QACCDOT	E6,1570	149	1/ANET2	E6,1701	150	NCDU	E6,1740	148	TTOAXIS
E6,1435	144	EDDTR	E6,1511	147	ACCDOTR	E6,1573	149	1/ACOST	E6,1701	150	P21	E6,1740	151	DAPTEMP4
E6,1435	145	RRATEDIF	E6,1512	147	RACCDOT	E6,1575	149	ACCFCTZ1	E6,1701	150	TMF1	E6,1741	146	NUMBER T
E6,1436	145	OLDXFORP	E6,1513	148	DOWNTORK	E6,1576	149	ACCFCTZ5	E6,1701	150	TMIS	E6,1741	147	KCENTRAL
E6,1437	145	OLDYFORP	E6,1513	148	POSTORKP	E6,1601	149	FIREDB	E6,1703	150	D21	E6,1741	147	OMEGA.K
E6,1440	145	OLDZFORQ	E6,1514	148	NEGOTKTP	E6,1603	149	COASTDB	E6,1704	150	NEXTIME	E6,1741	151	DAPTEMP5
E6,1441	145	CH31TEMP	E6,1515	148	PDSORKU	E6,1605	149	AXISDIST	E6,1705	150	G21	E6,1742	146	ROTINDEX
E6,1442	145	STIKSENS	E6,1516	148	NEGORKU	E6,1627	149	CDTROLER	E6,1705	150	TTEMP	E6,1742	147	K2CNTRAL
E6,1443	145	TCP	E6,1517	148	POSTORKV	E6,1630	149	QGIMTIMR	E6,1707	150	BIASTEMP	E6,1742	147	SCRATCH
E6,1444	145	DXERROR	E6,1520	148	NFGDRKV	E6,1631	149	INGTS	E6,1707	150	C2SQP	E6,1742	148	ADRSDFI2
E6,1446	145	DYERROR	E6,1521	148	NO.PJETS	E6,1632	149	RGIMTIMR	E6,1707	150	KV2	E6,1742	151	DAPTEMP6
E6,1446	145	QERROR	E6,1522	148	NO.UJETS	E6,1633	149	CDUXD	E6,1707	150	K2	E6,1743	147	HALFARG
E6,1446	147	QDIFF	E6,1523	148	ND.VJETS	E6,1633	151	DCDU	E6,1711	150	C2SQM	E6,1743	147	JFTRATE
E6,1450	145	DZERROR	E6,1524	148	TJP	E6,1634	149	CDUYD	E6,1713	150	C2PP	E6,1743	147	WCENTRAL
E6,1450	145	RERROR	E6,1525	148	IJU	E6,1635	149	CDUZD	E6,1715	150	C2MP	E6,1743	148	HOLDO
E6,1450	147	RDIFF	E6,1525	149	TJETU	E6,1636	149	DELCDUX	E6,1715	150	KV3	E6,1743	151	DAPTRG1
E6,1452	145	PLAST	E6,1526	148	TJV	E6,1636	151	DELDCOU	E6,1715	150	K3	E6,1744	147	ACFNTRAL
E6,1453	145	QLAST	E6,1527	148	L.PVT-CG	E6,1637	149	DELCDUY	E6,1715	150	NGE	E6,1744	147	JETRATFQ
E6,1454	145	RLAST	E6,1530	148	1JACC	E6,1637	151	DELDCDU1	E6,1717	150	C1PP	E6,1744	148	ADRSDFI1
E6,1455	145	TCQR	E6,1531	148	1JACCO	E6,1640	149	DELDCDU2	E6,1721	150	C1MP	E6,1744	151	DAPTRFG2
E6,1456	145	OLDPMIN	E6,1532	148	1JACCR	E6,1640	151	DELDCDU2	E6,1723	150	BRATE	E6,1745	147	OEL
E6,1457	145	OLDQRMIN	E6,1533	148	1JACCU	E6,1641	149	OMEGAPD	E6,1723	150	CDFSKEW	E6,1745	147	JETRATER
E6,1460	145	SAVEHAND	E6,1534	148	1JACCV	E6,1642	149	OMEGAQD	E6,1723	150	IG	E6,1745	148	HH

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
E6,1745	151	DAPTREG3	E7,1431	154	DELVS LV	E7,1516	162	R	E7,1571	156	TDEC2	E7,1620	163	ZSCREF
E6,1746	146	DPSBURN	E7,1437	154	TIG	E7,1516	162	UNITG0BL	E7,1571	164	TP10LD	E7,1620	165	WCHPHASE
E6,1746	147	QRCNTR	E7,1441	154	RTARG	E7,1517	156	RPASS2	E7,1573	156	DELEL	E7,1621	165	ELPASSO
E6,1746	152	DAPTREG4	E7,1447	154	DELLT4	E7,1517	156	RPPREC	E7,1573	156	DELVMID	E7,1622	165	TP1P
E6,1747	145	UERROR	E7,1451	154	TEI	E7,1522	160	RVECTOR	E7,1573	156	DELVTPI	E7,1624	165	VGU
E6,1747	147	FUNCTION	E7,1451	154	TTOGD	E7,1524	162	DELVREF	E7,1573	156	DVPREV	E7,1626	157	TPASS4
E6,1747	152	DAPTREG5	E7,1453	154	WHICH	E7,1524	162	V	E7,1573	156	KT	E7,1626	159	TINT
E6,1750	145	VERROR	E7,1454	154	LOSCOUNT	E7,1525	156	VPASS2	E7,1573	164	/AFC/	E7,1626	163	END-ALIG
E6,1750	149	F	E7,1455	154	AIG	E7,1525	156	VPPREC	E7,1575	156	DIFFALT	E7,1626	163	RSURL
E6,1750	152	DAPTREG6	E7,1456	154	AMG	E7,1532	162	HCAIC	E7,1576	162	VIS	E7,1626	167	END-E7.3
E6,1751	152	DAPARUPT	E7,1457	154	AOG	E7,1533	156	RAC73	E7,1577	156	POSTCSI	E7,1626	167	RCO
E6,1752	152	DAPLRUPT	E7,1460	154	MARKCTR	E7,1534	162	UNIT/R/	E7,1601	156	HAEPAL	E7,1630	157	QTEMP
E6,1753	152	DAPBQRPT	E7,1460	154	TRKMKCNT	E7,1541	156	UNVEC	E7,1601	156	POSTCDH	E7,1630	167	YCO
E6,1755	152	DAPZRUPT	E7,1461	154	NORMEX	E7,1541	156	VACT3	E7,1603	156	DELTEED	E7,1631	157	TCSI
E6,1757	152	AK	E7,1462	154	QSAVED	E7,1542	162	RNI	E7,1603	156	LOOPCT	E7,1632	165	LAND
E6,1760	152	AK1	E7,1463	154	RTRN	E7,1542	164	LANDTEMP	E7,1603	156	POSTTPI	E7,1632	167	1/DV1
E6,1761	152	AK2	E7,1464	154	NN	E7,1542	164	OURTEMPS	E7,1604	162	XSCREF	E7,1633	157	TTPI
E6,1762	152	EDRIVEV	E7,1466	154	SUBFXIT	E7,1544	160	DELTAQ	E7,1604	162	XSMO	E7,1634	163	UCSM
E6,1763	152	EDRIVEV	E7,1467	155	E7OVERLA	E7,1546	160	MARKCNTR	E7,1604	164	PIEPSET	E7,1634	167	1/DV2
E6,1764	152	EDRIVEZ	E7,1467	155	WHOCARES	E7,1547	156	RPASS3	E7,1605	156	GAMPREV	E7,1635	157	TTPIO
E6,1765	152	DELVEET3	E7,1467	156	VACT1	E7,1547	160	XYMARK	E7,1605	157	INTIME	E7,1636	167	1/DV3
E6,1773	152	ICDH	E7,1467	159	RTARG1	E7,1550	160	MKDEX	E7,1605	164	RTNHOLD	E7,1637	157	RTIG
E6,1775	152	RTX1	E7,1467	160	TX789	E7,1550	162	VNI	E7,1606	164	FWEIGHT	E7,1640	165	TTE/8
E6,1776	152	END-E6	E7,1467	162	ABVEL	E7,1550	164	TTF/RTMP	E7,1607	156	DELTV	E7,1640	167	XRANGE
E6,1776	152	RTX2	E7,1467	164	XNB1	E7,1551	160	PLANVEC	E7,1607	156	DELTEE	E7,1642	163	NEWVFL
E7,1400	153	ATIGINC	E7,1467	164	YNB1	E7,1552	164	ELINCR	E7,1607	156	TSTRT	E7,1642	165	ELINCR1
E7,1402	153	PTIGINC	E7,1467	164	ZNB1	E7,1554	164	AZINCR	E7,1607	157	XINPUT	E7,1642	165	VDGVERT
E7,1404	153	AQTAZ	E7,1471	162	DDOTDISP	E7,1555	156	VPASS3	E7,1610	164	PIE	E7,1642	167	APQ
E7,1407	153	AOTEL	E7,1473	162	TTFDISP	E7,1556	162	PIPTIME1	E7,1611	156	CSIALRM	E7,1642	837	TGO1
E7,1412	153	LRALPHA	E7,1475	156	RAPREC	E7,1556	164	KFEP-2	E7,1611	156	TITER	E7,1643	165	AZINCR1
E7,1413	153	LRBETA1	E7,1475	156	RPASS1	E7,1557	160	TSIGHT	E7,1612	162	YSCREF	E7,1644	165	NIGNLOOP
E7,1414	153	LRALPHA2	E7,1475	160	GAMMA	E7,1560	162	GDT1/2	E7,1612	162	YSMD	E7,1644	165	RODCONT
E7,1415	153	LRBETA2	E7,1475	162	SAVET-30	E7,1560	164	FCODD	E7,1612	164	PSEUDO55	E7,1644	165	ZFRLINA
E7,1416	153	LRHMAX	E7,1477	162	DELVCTL	E7,1560	164	TABLITE	E7,1613	156	VERBNOUN	E7,1644	167	ENGQEDT
E7,1417	153	LRVMAX	E7,1477	162	VGBODY	E7,1562	164	FP	E7,1613	164	EC	E7,1645	157	VTIG
E7,1420	153	LRWH	E7,1500	160	OMEGA	E7,1563	156	VACT4	E7,1614	156	RDOVT	E7,1645	165	FLVIRA
E7,1421	153	LRHVZ	E7,1503	156	VAPREC	E7,1563	157	VTPRIME	E7,1614	157	ITCTR	E7,1645	165	NGUIDSUB
E7,1422	153	LRWVY	E7,1503	156	VPASS1	E7,1566	162	MASS1	E7,1615	164	TTHROT	E7,1645	165	WCHVERT
E7,1423	153	LRWVX	E7,1503	159	VPASS4	E7,1566	836	CADPSAVE	E7,1616	156	CENTANG	E7,1645	167	VGVECT
E7,1424	153	ZOOMTIME	E7,1505	162	DVTOTAL	E7,1566	856	1/DVD	E7,1616	164	FCOLD	E7,1646	165	LRADRET
E7,1425	153	TENDBRAK	E7,1507	162	G0BLTIME	E7,1566	865	DVCNTR1	E7,1617	164	E2DPS	E7,1647	165	VSELECT
E7,1426	153	TENDAPPR	E7,1511	156	VACT2	E7,1567	836	MMSAVE	E7,1617	164	OURPERMS	E7,1650	163	NEWPOS
E7,1427	153	RPCRTIME	E7,1511	162	ABDYCONV	E7,1570	162	RIS	E7,1617	164	WCHPHOLD	E7,1650	165	VMEAS
E7,1430	153	RPCRTOGW	E7,1513	162	DVCNTR	E7,1571	156	DELVCSI	E7,1620	157	DELVIMU	E7,1652	165	HMEAS
E7,1431	154	DELVLVC	E7,1514	162	TGO	E7,1571	156	SECMAX	E7,1620	162	ZSMD	E7,1653	157	DELVSIN

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
E7,1653	167	TXO	E7,1700	166	TRAKLATV	E7,1741	158	VFX	4350	1280	-MAXADRS	4737	55	HIRTHROT
E7,1654	165	GNUR	E7,1701	159	VXRCM	E7,1741	166	RUNIT	4355	233	OCT30000	4737	81	MIDFLBIT
E7,1654	165	GNUV	E7,1701	166	TRAKFWDV	E7,1741	779	2VFXHUST	4355	1094	BIT13-14	4737	83	ERADFBIT
E7,1654	165	LRADREIT	E7,1702	160	E3	E7,1743	158	IRCTUPN1	4355	1094	PRI030	4737	84	ACMODBIT
E7,1654	165	VN2	E7,1702	160	MY	E7,1743	161	R65CNTR	4356	474	B12-1	4737	86	REFSMBIT
E7,1655	167	END-E7.5	E7,1702	166	VHY	E7,1743	166	LASTLADW	4357	1280	SBBITS	4737	88	NRMIDBIT
E7,1656	163	LNCHTM	E7,1703	166	VHZ	E7,1744	160	N49FLAG	4360	1094	OCT23	4737	90	SNUFFBIT
E7,1660	163	TRANSTM	E7,1704	158	VGPREV	E7,1744	161	RDOTMSAV	4361	394	DEC17	4737	91	S32BIT3A
E7,1661	157	DELVSAB	E7,1704	158	VGFIG	E7,1744	167	END-E7.0	4361	892	170MS	4737	93	IGNFLBIT
E7,1661	157	VGDISP	E7,1704	166	VVECT	E7,1744	167	END-E7.4	4362	1094	OCT25	4737	95	NEWIBIT
E7,1662	163	NCSMVEL	E7,1707	159	LOSDESRO	E7,1745	167	FND-E7.1	4362	1384	UP21	4737	98	APSFBLBIT
E7,1662	165	DELTAH	E7,1707	166	ALTRATE	E7,1746	161	RDDTM	4363	1094	TEN	4737	101	RCDUOIBIT
E7,1663	157	QIEMPI	E7,1710	160	MZ	E7,1750	161	TANGNB	4512	478	ENDPINBF	4737	103	CSMDOCKD
E7,1663	157	RGEFXT	E7,1710	166	ALTSAVE	E7,1752	161	MKTIME	4616	536	ENDPMDDF	4737	232	OCT10000
E7,1663	157	SAVQR52	E7,1712	166	LADQSAVE	E7,1754	161	RM	4733	1499	1/.03	4737	800	FEXTRA
E7,1664	157	COZY4	E7,1712	829	PIPCTRI	E7,1756	161	P21TIME	4734	1090	LIMITS	4737	1094	PRI010
E7,1664	165	FUELNEED	E7,1713	158	VG	E7,1760	161	SCAXIS	4735	81	CPHIBIT	4737	1094	QUARTER
E7,1664	165	FUNNYDSP	E7,1713	166	DT	E7,1766	161	POINTVSM	4735	83	NJETSBIT	4737	1279	SBIT13
E7,1664	165	TREDES	E7,1714	166	DALTRATE	E7,1774	167	END-E7.2	4735	84	DRETBIT	4740	81	MOONBIT
E7,1665	165	LOOKANGL	E7,1715	159	UXVECT	E7,1777	167	END-E7	4735	88	MRKIDBIT	4740	85	LOSCMBIT
E7,1666	157	XXXALT	E7,1715	166	QAXIS	4000	27	FFTAG1	4735	89	DSKYFBIT	4740	86	LUNABIT
E7,1666	165	FOURPERM	E7,1715	166	UHYP	4000	27	FFTAG10	4735	91	S32BIT1	4740	88	PDSPFBIT
E7,1666	165	LRLCTR	E7,1716	160	SCALSHFT	4000	27	FFTAG11	4735	93	ITSWBIT	4740	90	NOTHRBIT
E7,1667	165	LRRCTR	E7,1717	160	RXZ	4000	27	FFTAG12	4735	95	RPQFLBIT	4740	91	S32BIT3B
E7,1670	157	END-IN/M	E7,1721	158	VRPREV	4000	27	FFTAG13	4735	99	LRBYBIT	4740	93	ASTNBIT
E7,1670	158	BDT	E7,1721	160	ULC	4000	27	FFTAG2	4735	101	CDSESBIT	4740	95	CMOONBIT
E7,1670	159	ERADM	E7,1723	159	UYVECT	4000	27	FFTAG3	4735	103	PULSES	4740	96	FLPCBIT
E7,1670	166	LRMCTR	E7,1723	166	UHZP	4000	27	FFTAG4	4735	1094	NEGMAX	4740	100	VXINHBIT
E7,1671	166	LRSCTR	E7,1727	158	INIT	4000	27	FFTAG7	4735	1094	VLOADCOD	4740	101	ANTENBIT
E7,1672	159	INCORPEX	E7,1727	160	SINTHETA	4000	27	FFTAG8	4735	1279	SBIT15	4740	103	OURRCBIT
E7,1672	166	STILBADH	E7,1731	158	INITPREV	4000	27	FFTAG9	4736	81	JSKCHBIT	4740	826	TIFSCALE
E7,1673	159	RLMSRCH	E7,1731	159	DATAGOOD	4000	27	RADARFF	4736	83	DIDFLBIT	4740	1094	PRI04
E7,1673	160	IGRET	E7,1731	161	RRTRUN	4060	169	UPRPTBB	4736	84	SRCHOBIT	4740	1279	SBIT12
E7,1673	160	LGRET	E7,1731	166	DELVS	4101	1094	OCT60000	4736	86	GLOKFBIT	4741	58	MINCSM
E7,1673	160	RDOT	E7,1732	159	OMEGAD	4144	1366	VERBMAK	4736	88	PRIODBIT	4741	85	STEERBIT
E7,1673	166	STILBADV	E7,1732	159	OMEGDISP	4201	465	PINSUPBT	4736	91	S32BIT2	4741	86	NR29FBIT
E7,1674	160	EO	E7,1733	158	F	4242	224	VQON34	4736	93	MANUFBIT	4741	88	MWATBIT
E7,1674	160	MX	E7,1733	161	RSSHAF	4242	752	VB97DEX	4736	96	FLVRBIT	4741	90	R77FLBIT
E7,1674	166	LATVMEIR	E7,1734	159	NSRCHPNT	4303	469	ENDPLFF	4736	98	INTFLBIT	4741	92	FIRSTBIT
E7,1675	166	FORVMEIR	E7,1735	158	MDOT	4317	1068	FOURTEEN	4736	101	REMODBIT	4741	93	SWANDBIT
E7,1676	158	UT	E7,1735	159	SAVLEMV	4317	1068	OCT16	4736	103	USEQRJTS	4741	95	LMOONBIT
E7,1676	160	E1	E7,1735	161	LRS22.1X	4320	1090	OCT11	4736	1094	HALF	4741	97	FLPIBIT
E7,1676	166	LATVEL	E7,1736	161	RRBORST	4320	1094	NINE	4736	1094	POS1/2	4741	100	PSTHIBIT
E7,1677	166	FORVEL	E7,1737	158	TDECAY	4350	1005	FBANKMSK	4736	1094	PRI020	4741	101	REPOSBIT
E7,1700	160	E2	E7,1737	166	ALTBITS	4350	1094	BANKMASK	4736	1279	SBIT14	4741	103	ACC4OR2X

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DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
4741	145	ORBIT	4744	100	LRINHRIT	4747	100	RFADVRIT	4752	87	D6QR9BIT	4757	1368	OCIT
4741	1094	EBANK4	4744	102	LRVELBIT	4747	102	LRALTBIT	4752	91	MGLVFBIT	4760	1094	NOUICON
4741	1094	PR102	4744	104	ORIFTBIT	4747	104	AORBSYST	4752	93	AUXFLBIT	4761	950	PRFMSTAQ
4741	1094	2K	4744	1279	SBIT8	4747	623	HLITE	4752	94	V82EMBIT	4761	1068	THIRTEEN
4741	1279	SBIT11	4744	1325	IMUSEFLG	4747	752	CNTDNDEX	4752	96	INITABIT	4764	1091	OEC27
4742	83	R61FLBIT	4744	1499	J0125RS	4747	756	OC720	4752	97	MIDAVBIT	4765	1091	OEC29
4742	85	CYCLEBIT	4745	82	RNDVZBIT	4747	758	LSLIM	4752	101	VFLSHBIT	4766	294	250MS+1
4742	86	VFLAGBIT	4745	83	UPDATBIT	4747	821	+AZBIT	4752	102	AUTOMBIT	4766	1502	RATELIM1
4742	88	NWAITBIT	4745	85	ETPIBIT	4747	1279	SBIT5	4752	104	AUTRATE2	4767	1502	RATEDB1
4742	90	RNGSCBIT	4745	85	OPTNBIT	4747	1407	CALLGMBL	4752	753	BLANKDEX	4771	319	MIXCON
4742	92	GMBORBIT	4745	87	CULTBIT	4750	82	NEEOLBIT	4752	821	+ELBIT	4771	1280	CNTRCON
4742	93	NORMSBIT	4745	89	PRONVBIT	4750	86	PFRATBIT	4752	1094	TWO	4771	1325	BITS486
4742	95	FLUNDBIT	4745	90	ENGONBIT	4750	87	INTYPBIT	4752	1279	S+2	4774	1329	OCT62
4742	97	FLRC SBIT	4745	92	POUTBIT	4750	89	NRUPTBIT	4752	1279	SBIT2	4775	1094	OCT120
4742	100	NOLRRBIT	4745	94	IOLEFBIT	4750	91	NORRMBIT	4752	1382	UP72	4776	1094	OCT140
4742	102	DESIGBIT	4745	95	INFINBIT	4750	94	UPLQCBIT	4753	82	OLDESBIT	4777	394	1SECH
4742	103	AORBITRAN	4745	99	REINTBIT	4750	96	COGAFBIT	4753	86	NODDBIT	4777	770	SEC01
4742	145	PBIT	4745	100	VELOABIT	4750	100	RNGEDBIT	4753	88	DIMOBIT	5006	928	V805N09
4742	1094	PR101	4745	102	RCDUFBIT	4750	102	RRDATABT	4753	89	XDSPBIT	5007	238	STAPTEB
4742	1279	SBIT10	4745	104	RHCSCALE	4750	104	OBSELECT	4753	91	RENDWBIT	5007	1094	ERANK3
4743	82	P25FLBIT	4745	1091	SUPER100	4750	247	OCT00010	4753	93	ATTFLBIT	5007	1280	ERASCON6
4743	85	IMPULBIT	4745	1279	SBIT7	4750	826	TSCALINV	4753	94	TEFSWBIT	5007	1423	QGIMBITS
4743	87	RFAORBIT	4746	82	RRNBBIT	4750	1094	EIGHT	4753	96	360SWBIT	5011	36	FRAS10
4743	87	RO4FLBIT	4746	84	NOUPFBIT	4750	1279	SBIT4	4753	98	AVEMDBIT	5012	1280	S10BITS
4743	88	MRKNVBIT	4746	85	FINALBIT	4750	1414	DSPLYALT	4753	101	HFLSHBIT	5014	606	NR29&RDR
4743	90	DMENFBIT	4746	87	ORBWFBIT	4751	82	FREFFBIT	4753	103	TURNONBT	5014	1427	BITS9,11
4743	92	2PHA SBIT	4746	89	PINBRBIT	4751	84	SLPPEBIT	4753	104	AUTRATE1	5015	1094	FRANK6
4743	94	RVS WBIT	4746	90	3AXLSBIT	4751	86	CALC3BIT	4753	224	LAGSLIST	5020	906	BITSET
4743	95	P39SWBIT	4746	92	REDFLBIT	4751	87	VINTFBIT	4753	821	-FLBIT	5020	1280	SBNK03
4743	97	LETABBIT	4746	94	V37FLBIT	4751	89	MKJVRIT	4753	1094	ONE	5020	1423	RGIMBITS
4743	100	XORFLBIT	4746	95	ORDERBIT	4751	91	SOLNSBIT	4753	1279	S+1	5024	1294	OCT14000
4743	102	ALTSCBIT	4746	97	FLZONBIT	4751	92	NARGBIT	4753	1279	SBIT1	5025	196	OCT15000
4743	103	XOVINHBIT	4746	100	READLBIT	4751	94	VERIFBIT	4753	1382	UP71	5026	196	33RDMSK
4743	1279	SBIT9	4746	102	LRPOSBIT	4751	97	MIDIFBIT	4754	1280	S-ZERO	5026	238	IM33INIT
4743	1303	SPSCOE	4746	104	ULLAGER	4751	101	SCABBIT	4755	250	DNLADPOO	5155	1378	ODALARM
4744	82	IMUSERBIT	4746	821	-AZBIT	4751	102	RRR SBIT	4755	950	P51ZERO	5270	196	GLOCKKOK
4744	83	VEHUPBIT	4746	1279	SBIT6	4751	104	ACCSOKAY	4755	1279	S+ZERO	5270	204	EN00APT4
4744	85	XDELVRIT	4747	82	LDKONBIT	4751	623	VLITE	4755	1382	UP70	5270	205	RCSMONE
4744	87	PRECIBIT	4747	84	TRACKBIT	4751	1094	FOUR	4756	238	NUMGRPS	5464	1367	LINUS
4744	89	NRMNVBIT	4747	85	AVFLBIT	4751	1279	S+4	4756	950	S+1FIVE	5472	278	TERMEXTV
4744	90	COMPTBIT	4747	87	STATERBIT	4751	1279	SBIT3	4756	1279	S+5	5472	279	ENOEXTVB
4744	92	MUNFLBIT	4747	89	MRUPTBIT	4752	36	DFLAYNUM	4756	1384	UPDTPHAS	5472	1366	ENDEXT
4744	94	V67FLBIT	4747	94	AVEGEBIT	4752	82	RIOFLBIT	4757	457	DSPMSK	5644	1378	ABORT
4744	95	SURFFBIT	4747	96	APSESBIT	4752	84	GUESSBIT	4757	1094	LOW3	5660	247	NEG7
4744	97	FLAPBIT	4747	97	QUITBIT	4752	86	CALC2BIT	4757	1280	S+7	5660	1280	S-7

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5742	196	120MS	01,2016	258	6.2SPOT	05,2157	217	LMLSAL05	11,2000	28	ORBITAL1	20,2000	30	DAPS3
5742	752	VB990EX	01,2513	1089	SW/	05,2157	219	LMAGSIO5	11,2266	36	LOUNITZ	20,2000	30	LOADDAP
5742	1325	BITS384	04,2000	27	CONICS1	05,2170	215	LMOSAS06	11,2270	36	LOUNITY	20,2000	30	RODTRAP
5742	1478	TWELVE	04,2000	27	E/PROG	05,2170	217	LMLSAL06	11,2272	36	LODPHALF	21,2000	30	DAPS4
6000	27	FFTAG5	04,2000	27	KEYRUPT	05,2172	208	NOMONLST	11,2272	36	LOUNITX	21,2000	30	F2DPS*21
6000	27	FFTAG6	04,2000	27	PINBALL4	05,2172	211	LMCSTAOL	11,2272	1096	HALFDP	21,2000	30	R10
6001	756	?	04,2000	27	R02	05,2224	214	LMREND06	11,2272	1131	DP1/2	21,2000	30	R11
6010	224	VOON25	04,2000	27	R36LM	05,2224	216	LMOSAS09	11,2272	1143	1B1	22,2000	31	KALCMON1
6073	1302	OCT177	04,2000	27	UPDATE2	05,2224	217	LMLSAL08	11,2274	36	LO6ZEROS	22,2000	31	KALCMON2
6106	1094	VLOAD*	04,2000	27	VERB37	05,2226	217	LMLSAL09	11,2274	1096	ZERDDP	22,2000	31	RENDEF
6111	1280	S-4	04,2037	460	MODROUTB	05,2232	213	LMREND0L	11,2274	1132	20ZERO	22,2000	31	R30LOC
6241	1054	SIX	04,2757	36	LOOP1/4	05,2276	217	LMLSAL07	11,2274	1181	KEPZFRO	22,2744	377	LOC SKIRT
6241	1279	S-6	04,2762	1181	BEE19	05,2303	215	LMDSASDL	11,2274	1242	DPZERO	22,3541	36	DELRSPL
6244	574	BIN3	04,2766	1181	BEE22	05,2357	217	LMLSALDL	11,2305	36	RMM	22,3541	726	SPLRET
6244	1054	LOW2	04,3322	1382	UPPART2	05,2407	208	AGSLIST	11,2305	1197	LDPOSMAX	23,2000	31	ADOPERI
6244	1094	THREE	04,3441	1384	UPSTORE	05,2407	208	UPDNLIST	11,2307	36	RME	23,2000	31	EXTVB1
6244	1279	S+3	04,3503	1385	UPPART3	05,2407	219	LMAGSIOI	11,3701	1242	DQUARTER	23,2000	31	INFLIGHT
6244	1382	UP73	04,3632	1387	UPOUT	06,2000	28	IMUCOMP	11,3701	1242	POS1/4	23,2000	31	INTPRET1
6470	1094	OCT30002	04,3633	1384	UPOUT4	06,2000	28	RCSMONT	11,3717	1242	2/3	23,2000	31	MEASINC
6740	1020	Q+2	05,2000	28	AOTMARK2	06,2000	28	T4RUP	12,2000	28	CONICS	23,2000	31	MEASINC1
6741	1288	TCQ	05,2000	28	OWNTEL M	06,2703	195	ICOUFAIL	13,2000	29	INITINT	23,2000	31	POWFLITE
7662	1094	OCT10001	05,2000	28	EPHEM1	06,2703	195	IMUFAIL	13,2000	29	LATLONG	23,2000	31	POWFLIT1
7715	801	2.PG.FRT	05,2000	28	FRANORES	06,3132	203	DAPT4S	13,2000	29	LEMGEOM	23,2000	31	R61
7715	1435	25/32	05,2066	209	LMORBMOL	06,3132	204	NORRGMON	13,2000	29	ORBITAL2	23,2000	31	R62
7721	1094	B12T14	05,2127	211	LMCSTA01	06,3156	206	RCSMONT	13,2000	29	P76LOC	23,2065	497	R62DISP
7726	170	100MRUPT	05,2127	213	LMREND01	06,3242	207	5FAILTAB	13,2661	36	ATOPOTH	23,2275	1277	RPAD1
7726	1408	MS100	05,2127	217	LMLSAL01	06,3252	207	6FAILTAB	13,2734	36	ATOPTHIS	23,2413	36	HIOPI/4
7730	174	20MRUPT	05,2136	211	LMCSTA02	07,2000	28	AOTMARK1	13,2747	36	MOVATHIS	23,2413	1277	TFF1/4
7737	543	-45DEGSR	05,2136	213	LMREND02	07,2000	28	MODDESW	13,3043	36	OTHPREC	23,2415	36	HIUNITZ
7737	1366	PINMASK	05,2136	215	LMDSAS02	07,3163	1325	IMUFIN20	13,3057	36	THISPREC	23,2415	36	NB1N82
7740	539	-BIT12	05,2136	217	LMLSAL02	07,3665	1324	OPTSTAIL	14,2000	30	P5OS1	23,2415	36	THISAXIS
7740	989	MINB12	05,2136	219	LMAGSIO2	10,2000	28	OISPLAYS	14,2000	30	STARTAB	23,2417	36	HIUNITZ
7744	1280	S-3	05,2145	211	LMCSTA03	10,2000	28	MIOGIM	14,2347	932	S50	23,2421	36	HIDPHALF
7745	1280	S-2	05,2145	213	LMREND03	10,2000	28	PHASFTAB	14,2452	934	R56	23,2421	36	HIUNITX
7745	1302	MINUS2	05,2145	215	LMDSAS03	10,2000	28	RTRCODES	14,3121	942	R54	23,2421	603	COS60DEG
7746	1094	MINUS1	05,2145	217	LMLSAL03	10,2005	701	MIDGIM1	15,2000	30	EPHEM	23,2421	1095	OPHALF
7746	1094	NEG1	05,2145	219	LMAGSIO3	10,2206	1366	G0XDSP	15,2000	30	P5OS	23,2423	36	HI6ZEROS
7746	1280	S-1	05,2154	211	LMCSTA04	10,2212	1366	G0XDSPF	15,2533	266	OP1/12	23,2423	604	ZFRO/SP
00,2000	27	OLAYJOB	05,2154	214	LMREND04	10,2226	1366	G0XDSPR	15,3663	980	LUNPOS	23,2423	1152	ZFROO
01,2000	27	LOADDAP1	05,2154	215	LMDSAS04	10,2231	1366	G0XDSPFR	16,2000	30	DAPS1	23,2423	1277	TFFZEROS
01,2000	27	RESTART	05,2154	217	LMLSAL04	10,2723	1366	G0AGIN	16,3555	1434	INDXYZ	24,2000	31	PLANTIN
01,2000	254	PROTTAB	05,2154	219	LMAGSIO4	10,2743	1366	G0PLAY	17,2000	30	DAPS2	24,2000	31	P2OS
01,2001	254	CADRTAB	05,2157	211	LMCSTA05	11,2000	28	INTPRET2	17,2616	1446	ATTSTEER	24,2022	504	PROG22
01,2016	254	2.2SPOT	05,2157	214	LMREND05	11,2000	28	INTVEL	17,3041	1439	14MS	25,2000	31	P2OS1
01,2016	255	3.2SPOT	05,2157	215	LMDSAS05	11,2000	28	ORBITAL	17,3664	1501	RATELIM2	25,2000	31	P2OS2

ERASABLE & EQUALS CROSS-REFERENCE TABLE SHOWING DEFINITION, PAGE OF DEFINITION, AND SYMBOL

DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL	DEF	PAGE	SYMBOL
25,2000	31	RADARUPT	30,2000	33	FCDUW	33,2000	33	R29/SERV	36,2144	741	PL2SPOT	40,3532	1288	DSPMMJOB
25,2000	31	RRLEADIN	30,2000	33	LOWSUPER	33,2000	33	SERVICES	36,2144	741	P42SPOT	40,3672	484	ENOPINS1
25,2000	31	R29S1	30,2000	33	P12	33,2731	879	ALTCRIT	36,2147	741	P63SPOT	41,2000	35	PINBALL2
26,2000	31	BAWLINGS	30,3027	856	T2A	33,3200	856	100CS	36,3006	753	V99RECYC	41,2616	430	ENDRTOUT
26,2000	31	MANUVER	30,3740	924	OAZMAX	33,3475	889	ENDVOAT	37,2000	35	IMUSUPER	41,3230	444	ENDROUTIN
26,2000	31	MANUVER1	30,3742	924	DELERLIM	34,2000	33	ASCEILT	37,2000	35	IMU2	41,3731	482	ENDPINS2
26,2000	31	PLANIINI	31,2000	33	ETHROT	34,2000	33	CSI/CDHI	37,2000	35	IMU4	42,2000	35	PINBALL3
26,2000	31	P20S3	31,2000	33	F2DPS*31	34,2000	33	P30S1	37,2000	35	P05P06	42,2000	35	SBAND
26,3405	604	JOBDOVER	31,2000	33	VB67	34,2000	33	R12STUFF	37,2000	35	R31	42,3602	449	ENDHMSS
27,2000	32	ASENT1	32,2000	33	ABORTS	34,2000	33	STBLEDRB	37,2000	35	SERV1	43,2000	35	EXTVERBS
27,2000	32	P40S1	32,2000	33	FLOGSUB	35,2000	33	CSI/CDH	37,3533	960	PIPSRINE	43,2000	35	SELFCHEC
27,2000	32	T0F-FF	32,2000	33	F2DPS*32	35,2000	34	GL1	40,2000	35	PINBALL1	43,2002	479	PINTEST
27,2000	32	T0F-FF1	32,2000	33	LRS22	35,2000	34	P30S	40,2000	35	PINSUPER	43,2226	284	OPTCOARV
27,2000	32	VECP1	32,2000	33	P20S4	35,2000	34	P40S2	40,2000	35	SELSUPR	43,3053	303	V74
27,3162	852	SETXFLAG	32,2000	33	R47	36,2000	35	P40S	40,3322	456	ENDECVN	43,3106	305	GOSHOSUM
27,3725	1276	ICDANZIG	32,2000	33	SERV2	36,2054	770	ACADNR5	40,3503	463	ENDREIDS	43,3746	1381	CKMMOMRE
30,2000	33	ASENT	32,3707	865	OUTGOAVE	36,2103	756	SERVCAOR	40,3532	470	ENOSUB1			

SUMMARY OF SYMBOL TABLE LISTINGS

4868 DEFINED NORMALLY

2110 DEFINED BY EQUALS

TOTAL: 6578

MEMDRY TYPE & AVAILABILITY DISPLAY

0000 TD	0057	SPECIAL OR NONEXISTENT MEMORY	13,3754 TO 13,3777	AVAILABLE SWITCHABLE FIXED MEMORY
	0060	AVAILABLE ERASABLE MEMORY	14,2000 TO 14,3713	RESERVED SWITCHABLE FIXED MEMORY
			14,3714 TO 14,3777	AVAILABLE SWITCHABLE FIXED MEMORY
0061 TO	1350	RESERVED FRASABLE MEMORY	15,2000 TO 16,3757	RESERVED SWITCHABLE FIXED MEMORY
1351 TO	1356	AVAILABLE ERASABLE MEMORY	16,3760 TO 16,3777	AVAILABLE SWITCHABLE FIXED MEMORY
1357 TO	1377	RESERVED ERASABLE MEMORY	17,2000 TO 17,3765	RESERVED SWITCHABLE FIXED MEMORY
			17,3766 TO 17,3777	AVAILABLE SWITCHABLE FIXED MEMORY
E3,1400 TO E3,1775		RESERVED SWITCHABLE ERASABLE MEMDRY	20,2000 TO 20,3664	RESERVED SWITCHABLE FIXED MEMORY
E3,1776 TO E3,1777		AVAILABLE SWITCHABLE ERASABLE MEMORY	20,3665 TO 20,3777	AVAILABLE SWITCHABLE FIXED MEMORY
E4,1400 TO E4,1762		RESERVED SWITCHABLE ERASABLE MEMDRY	21,2000 TO 21,3775	RESERVED SWITCHABLE FIXED MEMORY
E4,1763 TO E4,1777		AVAILABLE SWITCHABLE ERASABLE MEMORY	21,3776 TO 21,3777	AVAILABLE SWITCHABLE FIXED MEMORY
E5,1400 TO E5,1641		RESERVED SWITCHABLE ERASABLE MEMORY	22,2000 TO 22,3733	RESERVED SWITCHABLE FIXED MEMORY
E5,1642 TO E5,1777		AVAILABLE SWITCHABLE ERASABLE MEMORY	22,3734 TO 22,3777	AVAILABLE SWITCHABLE FIXED MEMDRY
E6,1400 TO E6,1776		RESERVED SWITCHABLE ERASABLE MEMORY	23,2000 TO 23,3725	RESERVED SWITCHABLE FIXED MEMDRY
	E6,1777	AVAILABLE SWITCHABLE ERASABLE MEMORY	23,3726 TO 23,3777	AVAILABLE SWITCHABLE FIXED MEMORY
E7,1400 TO E7,1743		RESERVED SWITCHABLE ERASABLE MEMDRY	24,2000 TO 24,3735	RESERVED SWITCHABLE FIXED MEMORY
E7,1744 TO E7,1777		AVAILABLE SWITCHABLE ERASABLE MEMORY	24,3736 TO 24,3777	AVAILABLE SWITCHABLE FIXED MEMORY
			25,2000 TO 25,3673	RESERVED SWITCHABLE FIXED MEMORY
4000 TO	5770	RESERVED FIXED MEMDRY	25,3674 TO 25,3777	AVAILABLE SWITCHABLE FIXED MEMORY
5771 TO	5777	AVAILABLE FIXED MEMDRY	26,2000 TO 26,3724	RESERVED SWITCHABLE FIXED MEMORY
6000 TO	7757	RESERVED FIXED MEMORY	26,3725 TO 26,3777	AVAILABLE SWITCHABLE FIXED MEMORY
7760 TO	7777	AVAILABLE FIXED MEMORY	27,2000 TO 27,3746	RESERVED SWITCHABLE FIXED MEMORY
			27,3747 TO 27,3777	AVAILABLE SWITCHABLE FIXED MEMORY
00,2000 TO 00,3776		RESERVED SWITCHABLE FIXED MEMORY	30,2000 TO 30,3750	RESERVED SWITCHABLE FIXED MEMORY
	00,3777	AVAILABLE SWITCHABLE FIXED MEMORY	30,3751 TO 30,3777	AVAILABLE SWITCHABLE FIXED MEMORY
01,2000 TO 01,3775		RESERVED SWITCHABLE FIXED MEMORY	31,2000 TO 31,3772	RESERVED SWITCHABLE FIXED MEMORY
01,3776 TO 01,3777		AVAILABLE SWITCHABLE FIXED MEMORY	31,3773 TO 31,3777	AVAILABLE SWITCHABLE FIXED MEMORY
			32,2000 TO 32,3770	RESERVED SWITCHABLE FIXED MEMORY
02,2000 TO 03,3777		SPECIAL OR NONEXISTENT MEMDRY	32,3771 TO 32,3777	AVAILABLE SWITCHABLE FIXED MEMORY
			33,2000 TO 33,3757	RESERVED SWITCHABLE FIXED MEMORY
04,2000 TO 04,3714		RESERVED SWITCHABLE FIXED MEMORY	33,3760 TO 33,3777	AVAILABLE SWITCHABLE FIXED MEMORY
04,3715 TO 04,3777		AVAILABLE SWITCHABLE FIXED MEMDRY	34,2000 TO 34,3762	RESERVED SWITCHABLE FIXED MEMORY
05,2000 TO 05,3707		RESERVED SWITCHABLE FIXED MEMORY	34,3763 TO 34,3777	AVAILABLE SWITCHABLE FIXED MEMORY
05,3710 TO 05,3777		AVAILABLE SWITCHABLE FIXED MEMORY	35,2000 TO 35,3740	RESERVED SWITCHABLE FIXED MEMORY
06,2000 TO 06,3717		RESERVED SWITCHABLE FIXED MEMDRY	35,3741 TO 35,3777	AVAILABLE SWITCHABLE FIXED MEMORY
06,3720 TO 06,3777		AVAILABLE SWITCHABLE FIXED MEMORY	36,2000 TO 36,3752	RESERVED SWITCHABLE FIXED MEMORY
07,2000 TO 07,3750		RESERVED SWITCHABLE FIXED MEMDRY	36,3753 TO 36,3777	AVAILABLE SWITCHABLE FIXED MEMDRY
07,3751 TO 07,3777		AVAILABLE SWITCHABLE FIXED MEMORY	37,2000 TO 37,3762	RESERVED SWITCHABLE FIXED MEMORY
10,2000 TO 10,3751		RESERVED SWITCHABLE FIXED MEMORY	37,3763 TO 37,3777	AVAILABLE SWITCHABLE FIXED MEMORY
10,3752 TO 10,3777		AVAILABLE SWITCHABLE FIXED MEMDRY	40,2000 TO 40,3674	RESERVED SWITCHABLE FIXED MEMORY
11,2000 TO 11,3724		RESERVED SWITCHABLE FIXED MEMORY	40,3675 TO 40,3777	AVAILABLE SWITCHABLE FIXED MEMORY
11,3725 TO 11,3777		AVAILABLE SWITCHABLE FIXED MEMORY	41,2000 TO 41,3733	RESERVED SWITCHABLE FIXED MEMORY
12,2000 TO 12,3743		RESERVED SWITCHABLE FIXED MEMORY	41,3734 TO 41,3777	AVAILABLE SWITCHABLE FIXED MEMDRY
12,3744 TO 12,3777		AVAILABLE SWITCHABLE FIXED MEMORY	42,2000 TO 42,3770	RESERVED SWITCHABLE FIXED MEMORY
13,2000 TO 13,3753		RESERVED SWITCHABLE FIXED MEMORY	42,3771 TO 42,3777	AVAILABLE SWITCHABLE FIXED MEMORY

MEMORY TYPE & AVAILABILITY DISPLAY

43,2000 TO 43,3762 RESERVED SWITCHABLE FIXED MEMORY
43,3763 TO 43,3777AVAILABLE SWITCHABLE FIXED MEMORY

44,2000 TO 57,3777SPECIAL OR NONEXISTENT MEMORY

60,2000 TO 67,3777AVAILABLE SWITCHABLE FIXED MEMORY

70,2000 TO 73,3777SPECIAL OR NONEXISTENT MEMORY

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH:TOTAL:CUMUL

BANKSUM	REF	0	LAST	27	0	0	0
00/DELAY	REF	1	LAST	27	72	72	72
00/INTFR	REF	1	LAST	1371	31	31	103
				TO 1082:	974	974	1077
01/EXEC	REF	1	LAST	1101	280	280	1357
01/INTER	REF	1	LAST	1082	157	157	1514
01/RSRQU	REF	3	LAST	1301	55	168	1682
01/RSTAB	REF	1	LAST	254	129	129	1811
01/R03	REF	2	LAST	308	94	96	1907
01/WAIT	REF	2	LAST	1126	44	189	2096
02/ALARM	REF	2	LAST	1376	72	109	2205
02/BANK	REF	1	LAST	993	76	76	2281
02/DAPT6	REF	1	LAST	1399	18	18	2299
02/DSPLA	REF	1	LAST	1348	16	16	2315
02/EXEC	REF	2	LAST	1111	6	65	2380
02/EXTVB	REF	1	LAST	1374	4	4	2384
02/FCONS	REF	1	LAST	1090	64	64	2448
02/FLAG	REF	1	LAST	1369	32	32	2480
02/IMODE	REF	1	LAST	1303	5	5	2485
02/INTER	REF	1	LAST	1097	32	32	2517
02/PHASE	REF	1	LAST	1292	71	71	2588
02/PIN	REF	6	LAST	477	37	246	2834
02/P07	REF	1	LAST	394	18	18	2852
02/RRSUB	REF	1	LAST	531	68	68	2920
02/RSRQU	REF	2	LAST	1300	10	17	2937
02/RPUTS	REF	1	LAST	168	54	54	2991
02/TRAN	REF	1	LAST	1373	15	15	3006
02/T4RPT	REF	1	LAST	170	12	12	3018
02/WAIT	REF	2	LAST	1124	24	78	3096
03/DAP	REF	1	LAST	1453	2	2	3098
03/FCONS	REF	1	LAST	1092	32	32	3130
03/INTER	REF	3	LAST	1009	732	952	4082
03/KILL	REF	1	LAST	757	7	7	4089
03/PHASE	REF	1	LAST	1296	4	4	4093
03/P00	REF	1	LAST	239	8	8	4101
03/P20	REF	1	LAST	604	5	5	4106
03/P40	REF	1	LAST	55	1	1	4107
03/R24	REF	1	LAST	526	9	9	4116
04/CONIC	REF	3	LAST	1183	65	110	4226
04/INTIN	REF	1	LAST	1221	54	54	4280

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH:TOTAL:CUMUL

04/KEYUP	REF	1	LAST	1332	69	69	4349
04/LT-LG	RFF	1	LAST	60	4	4	4353
04/PIN	REF	2	LAST	477	7	16	4369
04/P00	REF	1	LAST	239	327	327	4696
04/P07	REF	2	LAST	385	5	32	4728
04/P27	REF	1	LAST	1382	248	248	4976
04/R02	REF	1	LAST	1326	17	17	4993
04/R36	REF	1	LAST	710	93	93	5086
05/DLIST	RFF	1	LAST	208	242	242	5328
05/DPROG	REF	1	LAST	986	173	173	5501
05/EPHEM	RFF	2	LAST	982	0	52	5553
05/MARK	RFF	1	LAST	264	32	32	5585
05/START	RFF	2	LAST	226	465	466	6051
05/ICOMP	REF	1	LAST	339	282	282	6333
06/T4RCS	RFF	1	LAST	206	69	69	6402
06/T4RPT	RFF	2	LAST	171	612	622	7024
07/COAS	REF	1	LAST	261	16	16	7040
07/IMODE	REF	1	LAST	1304	559	559	7599
07/MARK	REF	3	LAST	266	286	391	7990
07/P59	REF	1	LAST	276	32	32	8022
10/DSPLA	REF	3	LAST	1376	9	686	8708
10/MIDG	REF	1	LAST	701	57	57	8765
10/PHASE	REF	2	LAST	1294	66	75	8840
10/RT8	RFF	1	LAST	1390	181	181	9021
11/ICONS	REF	1	LAST	1096	19	19	9040
11/INTIV	PFF	1	LAST	695	182	182	9222
11/ORBIT	REF	1	LAST	1223	801	801	10023
12/CONIC	RFF	3	LAST	1185	481	993	11016
13/GEOM	REF	1	LAST	334	79	79	11095
13/INTIN	REF	4	LAST	1217	134	625	11720
13/LT-LG	REF	1	LAST	1128	155	155	11875
13/ORBIT	REF	1	LAST	61	20	20	11895
13/P76	RFF	1	LAST	717	98	98	11993
14/INFELT	REF	1	LAST	945	41	41	12034
14/LOSAM	RFF	2	LAST	932	67	75	12109
14/P51	REF	1	LAST	947	124	124	12233
14/R50	REF	1	LAST	944	61	61	12294
14/R51	REF	1	LAST	938	136	136	12430
14/R52	RFF	1	LAST	953	65	65	12495
14/R54	REF	1	LAST	943	41	41	12536

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH:TOTAL:CUMUL

14/R55	REF	1	LAST	942 TO	943:	27	27	12563
14/R56	REF	1	LAST	934 TO	938:	132	132	12695
14/STARS	REF	1	LAST	63 TO	67:	223	223	12918
14/S52.1	REF	1	LAST	951 TO	952:	26	26	12944

14/S52.3	REF	1	LAST	952 TO	953:	18	18	12962
15/EPHEM	REF	1	LAST	980 TO	982:	74	74	13036
15/P51	REF	1	LAST	959 TO	962:	64	64	13100
15/P52	REF	1	LAST	926 TO	932:	153	153	13253

15/P57	REF	2	LAST	965 TO	980:	402	531	13784
15/R59	REF	2	LAST	955 TO	959:	159	199	13983
16/DAP	REF	1	LAST	1465 TO	1467:	60	60	14043
16/DAPID	REF	1	LAST	1405 TO	1409:	136	136	14179

16/DAPP	REF	1	LAST	1416 TO	1436:	780	780	14959
17/DAP8U	REF	1	LAST	1501 TO	1501:	51	51	15010
17/DAPQR	REF	1	LAST	1436 TO	1453:	612	612	15622
17/DAPTJ	REF	1	LAST	1455 TO	1465:	313	313	15935

17/DAPT6	REF	2	LAST	1400 TO	1401:	5	35	15970
20/DAPAO	REF	4	LAST	1490 TO	1501:	336	655	16625
20/DAPIF	REF	1	LAST	1401 TO	1405:	67	67	16692
20/F2DPS	REF	1	LAST	821 TO	822:	6	6	16698

20/NEEDL	REF	1	LAST	1409 TO	1416:	145	145	16843
20/R03	REF	1	LAST	307 TO	308:	73	73	16916
21/DAPGT	REF	1	LAST	1467 TO	1480:	357	357	17273
21/F2DPS	REF	1	LAST	819 TO	821:	60	60	17333

21/P70	REF	2	LAST	837 TO	837:	16	86	17419
21/R10	REF	2	LAST	897 TO	909:	467	473	17892
21/R11	REF	1	LAST	829 TO	830:	52	52	17944
21/SERV	REF	1	LAST	873 TO	874:	20	20	17964

22/INCOR	REF	1	LAST	1152 TO	1169:	50	50	18014
22/KALC	REF	1	LAST	364 TO	383:	670	670	18684
22/R30	REF	2	LAST	721 TO	728:	199	203	18887
22/SR30S	REF	1	LAST	728 TO	732:	62	62	18949

23/EXTV8	REF	1	LAST	286 TO	286:	33	33	18982
23/GEQM	REF	1	LAST	338 TO	339:	20	20	19002
23/ICONS	REF	1	LAST	1095 TO	1096:	16	16	19018
23/INCOR	REF	2	LAST	1148 TO	1152:	196	334	19352

23/INFLT	REF	1	LAST	1244 TO	1254:	186	186	19538
23/PFRAP	REF	1	LAST	704 TO	710:	78	78	19616
23/POWFL	REF	1	LAST	1254 TO	1265:	176	176	19792
23/R61	REF	1	LAST	528 TO	531:	125	125	19917

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH:TOTAL:CUMUL

23/R62	REF	1	LAST	497 TO	498:	11	11	19928
24/LPS20	REF	1	LAST	576 TO	577:	47	47	19975
24/LUROT	REF	2	LAST	1135 TO	1141:	151	169	20144
24/P20	REF	2	LAST	507 TO	513:	231	261	20405

24/P21	REF	1	LAST	665 TO	670:	66	66	20471
24/P22	REF	2	LAST	519 TO	520:	5	5	20476
24/P25	REF	1	LAST	514 TO	516:	40	40	20516
24/R21	REF	1	LAST	520 TO	523:	70	70	20586

24/R22	REF	1	LAST	516 TO	519:	141	141	20727
24/R23	REF	1	LAST	523 TO	525:	41	41	20768
24/R24	REF	2	LAST	526 TO	528:	18	41	20809
24/R29	REF	2	LAST	616 TO	619:	69	87	20896

25/LPS20	REF	1	LAST	577 TO	580:	12	12	20908
25/RLEAD	REF	1	LAST	502 TO	504:	47	47	20955
25/RRUPT	REF	3	LAST	622 TO	624:	50	262	21217
25/PSUB	REF	2	LAST	572 TO	576:	60	626	21843

26/BALL	REF	1	LAST	490 TO	494:	50	50	21893
26/LRS24	REF	1	LAST	598 TO	603:	170	170	22063
26/LSR22	REF	1	LAST	586 TO	598:	525	525	22588
26/LUROT	REF	1	LAST	1141 TO	1144:	35	35	22623

26/R06	REF	1	LAST	486 TO	490:	99	99	22722
26/R63	REF	1	LAST	352 TO	364:	65	65	22787
27/KILL	REF	1	LAST	757 TO	760:	38	38	22825
27/P40	REF	2	LAST	760 TO	762:	83	93	22918

27/RTEST	REF	1	LAST	603 TO	604:	37	37	22955
27/S40.1	REF	1	LAST	772 TO	776:	101	101	23056
27/S40.2	REF	1	LAST	776 TO	777:	28	28	23084
27/S40.6	REF	1	LAST	785 TO	788:	40	40	23124

27/S40.8	REF	1	LAST	777 TO	780:	66	66	23190
27/S40.9	REF	2	LAST	783 TO	785:	97	99	23289
27/S41.1	REF	1	LAST	788 TO	789:	4	4	23293
27/TFF	REF	2	LAST	1265 TO	1279:	266	268	23561

27/VECPT	REF	1	LAST	494 TO	497:	130	130	23691
27/40.13	REF	1	LAST	780 TO	783:	105	105	23796
30/ASENT	REF	2	LAST	846 TO	858:	496	498	24294
30/FCDUW	REF	1	LAST	909 TO	926:	441	441	24735

30/P12	REF	2	LAST	839 TO	844:	197	201	24936
31/EXTVB	REF	1	LAST	619 TO	622:	113	113	25049
31/F2DPS	REF	5	LAST	822 TO	829:	149	686	25735
31/P6567	REF	1	LAST	795 TO	797:	45	45	25780

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH: TOTAL: CUMUL

ROUTINE: COUNT DATA FOR ROUTINE'S LAST REACH: TOTAL: CUMUL

31/R13	REF	1	LAST	804	TO	805:	41	41	25821
31/THROT	REF	3	LAST	797	TO	802:	126	131	25952
32/F2DPS	REF	1	LAST	55	TO	56:	1	1	25953
32/LRS22	REF	2	LAST	580	TO	586:	122	126	26079

35/P40	REF	1	LAST	755	TO	756:	23	23	29956
36/P40	REF	5	LAST	766	TO	772:	150	765	30721
36/P41	REF	1	LAST	762	TO	764:	78	78	30799
36/P42	REF	1	LAST	764	TO	765:	22	22	30821

32/P20	REF	1	LAST	505	TO	507:	103	103	26182
32/P63	REF	1	LAST	789	TO	795:	181	181	26363
32/P70	REF	3	LAST	837	TO	839:	30	228	26591
32/P29	REF	1	LAST	611	TO	616:	149	149	26740

36/P47	REF	1	LAST	765	TO	766:	52	52	30873
37/P05	REF	1	LAST	1330	TO	1332:	32	32	30905
37/P06	REF	1	LAST	1329	TO	1330:	47	47	30952
37/P07	REF	3	LAST	396	TO	411:	267	587	31539

32/R47	REF	1	LAST	221	TO	226:	138	138	26878
32/SERV	REF	2	LAST	894	TO	894:	14	69	26947
33/R29	REF	1	LAST	606	TO	610:	97	97	27044
33/SERV	REF	8	LAST	894	TO	897:	66	914	27958

37/R31	REF	1	LAST	712	TO	717:	177	177	31716
37/SERV	REF	3	LAST	870	TO	873:	73	165	31881
40/EXTV8	REF	1	LAST	314	TO	319:	63	63	31944
40/PIN	REF	10	LAST	483	TO	486:	57	891	32835

34/ASENT	REF	1	LAST	844	TO	846:	48	48	28006
34/CSI	REF	1	LAST	642	TO	660:	650	650	28656
34/P3879	REF	1	LAST	732	TO	739:	230	230	28886
34/SERV	REF	1	LAST	893	TO	894:	33	33	28919

41/PIN	REF	8	LAST	480	TO	483:	78	985	33820
42/EXTV8	REF	2	LAST	302	TO	303:	23	38	33858
42/NOUNS	REF	1	LAST	319	TO	334:	593	593	34451
42/PIN	REF	2	LAST	447	TO	450:	92	238	34689

34/S305	REF	1	LAST	626	TO	631:	47	47	28966
35/P30	REF	1	LAST	624	TO	626:	23	23	28989
35/P31	REF	1	LAST	662	TO	665:	61	61	29050
35/P3272	REF	1	LAST	631	TO	637:	91	91	29141

42/R05	REF	2	LAST	498	TO	502:	116	118	34807
42/R33	REF	1	LAST	290	TO	291:	27	27	34834
43/EXTV8	REF	6	LAST	312	TO	314:	56	484	35318
43/PHASE	REF	1	LAST	1288	TO	1288:	14	14	35332

35/P3373	REF	1	LAST	637	TO	642:	140	140	29281
35/P3474	REF	1	LAST	670	TO	675:	110	110	29391
35/P3575	REF	2	LAST	675	TO	695:	528	542	29933

43/P27	REF	1	LAST	1331	TO	1382:	22	22	35354
43/R0477	REF	1	LAST	291	TO	295:	188	188	35542
43/SELF	REF	1	LAST	1279	TO	1288:	314	314	35856

PARAGRAPHS GENERATED FOR THIS ASSEMBLY; ADDRESS LIMITS AND THE MANUFACTURING LOCATION CODE ARE SHOWN FOR EACH

4000	TC	4377	PARAGRAPH # 010	ROPE MODULE 1, SIDE A, SENSE LINE SET 5 (WIRES 65- 80)
4400	TC	4777	PARAGRAPH # 011	ROPE MODULE 1, SIDE B, SENSE LINE SET 5 (WIRES 65- 80)
5000	TC	5377	PARAGRAPH # 012	ROPE MODULE 1, SIDE A, SENSE LINE SET 6 (WIRES 81- 96)
5400	TC	5777	PARAGRAPH # 013	ROPE MODULE 1, SIDE B, SENSE LINE SET 6 (WIRES 81- 96)
6000	TC	6377	PARAGRAPH # 014	ROPE MODULE 1, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
6400	TC	6777	PARAGRAPH # 015	ROPE MODULE 1, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
7000	TC	7377	PARAGRAPH # 016	ROPE MODULE 1, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
7400	TC	7777	PARAGRAPH # 017	ROPE MODULE 1, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
00,2000	TC	00,2377	PARAGRAPH # 020	ROPE MODULE 1, SIDE A, SENSE LINE SET 1 (WIRES 1- 16)
00,2400	TC	00,2777	PARAGRAPH # 021	ROPE MODULE 1, SIDE B, SENSE LINE SET 1 (WIRES 1- 16)
00,3000	TC	00,3377	PARAGRAPH # 022	ROPE MODULE 1, SIDE A, SENSE LINE SET 2 (WIRES 17- 32)
00,3400	TC	00,3777	PARAGRAPH # 023	ROPE MODULE 1, SIDE B, SENSE LINE SET 2 (WIRES 17- 32)
01,2000	TC	01,2377	PARAGRAPH # 024	ROPE MODULE 1, SIDE A, SENSE LINE SET 3 (WIRES 33- 48)
01,2400	TC	01,2777	PARAGRAPH # 025	ROPE MODULE 1, SIDE B, SENSE LINE SET 3 (WIRES 33- 48)
01,3000	TC	01,3377	PARAGRAPH # 026	ROPE MODULE 1, SIDE A, SENSE LINE SET 4 (WIRES 49- 64)
01,3400	TC	01,3777	PARAGRAPH # 027	ROPE MODULE 1, SIDE B, SENSE LINE SET 4 (WIRES 49- 64)
04,2000	TC	04,2377	PARAGRAPH # 040	ROPE MODULE 1, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
04,2400	TC	04,2777	PARAGRAPH # 041	ROPE MODULE 1, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
04,3000	TC	04,3377	PARAGRAPH # 042	ROPE MODULE 1, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
04,3400	TC	04,3777	PARAGRAPH # 043	ROPE MODULE 1, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
05,2000	TC	05,2377	PARAGRAPH # 044	ROPE MODULE 1, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
05,2400	TC	05,2777	PARAGRAPH # 045	ROPE MODULE 1, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
05,3000	TC	05,3377	PARAGRAPH # 046	ROPE MODULE 1, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
05,3400	TC	05,3777	PARAGRAPH # 047	ROPE MODULE 1, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
06,2000	TC	06,2377	PARAGRAPH # 050	ROPE MODULE 2, SIDE A, SENSE LINE SET 1 (WIRES 1- 16)
06,2400	TC	06,2777	PARAGRAPH # 051	ROPE MODULE 2, SIDE B, SENSE LINE SET 1 (WIRES 1- 16)
06,3000	TC	06,3377	PARAGRAPH # 052	ROPE MODULE 2, SIDE A, SENSE LINE SET 2 (WIRES 17- 32)
06,3400	TC	06,3777	PARAGRAPH # 053	ROPE MODULE 2, SIDE B, SENSE LINE SET 2 (WIRES 17- 32)
07,2000	TC	07,2377	PARAGRAPH # 054	ROPE MODULE 2, SIDE A, SENSE LINE SET 3 (WIRES 33- 48)
07,2400	TC	07,2777	PARAGRAPH # 055	ROPE MODULE 2, SIDE B, SENSE LINE SET 3 (WIRES 33- 48)
07,3000	TC	07,3377	PARAGRAPH # 056	ROPE MODULE 2, SIDE A, SENSE LINE SET 4 (WIRES 49- 64)
07,3400	TC	07,3777	PARAGRAPH # 057	ROPE MODULE 2, SIDE B, SENSE LINE SET 4 (WIRES 49- 64)
10,2000	TC	10,2377	PARAGRAPH # 060	ROPE MODULE 2, SIDE A, SENSE LINE SET 5 (WIRES 65- 80)
10,2400	TC	10,2777	PARAGRAPH # 061	ROPE MODULE 2, SIDE B, SENSE LINE SET 5 (WIRES 65- 80)
10,3000	TC	10,3377	PARAGRAPH # 062	ROPE MODULE 2, SIDE A, SENSE LINE SET 6 (WIRES 81- 96)
10,3400	TC	10,3777	PARAGRAPH # 063	ROPE MODULE 2, SIDE B, SENSE LINE SET 6 (WIRES 81- 96)
11,2000	TC	11,2377	PARAGRAPH # 064	ROPE MODULE 2, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
11,2400	TC	11,2777	PARAGRAPH # 065	ROPE MODULE 2, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
11,3000	TC	11,3377	PARAGRAPH # 066	ROPE MODULE 2, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
11,3400	TC	11,3777	PARAGRAPH # 067	ROPE MODULE 2, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
12,2000	TC	12,2377	PARAGRAPH # 070	ROPE MODULE 2, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
12,2400	TC	12,2777	PARAGRAPH # 071	ROPE MODULE 2, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
12,3000	TC	12,3377	PARAGRAPH # 072	ROPE MODULE 2, SIDE A, SENSE LINE SET 10 (WIRES 145-160)

PARAGRAPHS GENERATED FOR THIS ASSEMBLY; ADDRESS LIMITS AND THE MANUFACTURING LOCATION CODE ARE SHOWN FOR EACH

12,3400	TC 12,3777	PARAGRAPH # 073	RDPE MODULE 2, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
13,2000	TC 13,2377	PARAGRAPH # 074	RDPE MODULE 2, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
13,2400	TC 13,2777	PARAGRAPH # 075	RDPE MODULE 2, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
13,3000	TC 13,3377	PARAGRAPH # 076	RDPE MODULE 2, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
13,3400	TC 13,3777	PARAGRAPH # 077	RDPE MODULE 2, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
14,2000	TC 14,2377	PARAGRAPH # 100	RDPE MODULE 3, SIDE A, SENSE LINE SET 1 (WIRES 1-16)
14,2400	TC 14,2777	PARAGRAPH # 101	RDPE MODULE 3, SIDE B, SENSE LINE SET 1 (WIRES 1-16)
14,3000	TC 14,3377	PARAGRAPH # 102	RDPE MODULE 3, SIDE A, SENSE LINE SET 2 (WIRES 17-32)
14,3400	TC 14,3777	PARAGRAPH # 103	RDPE MODULE 3, SIDE B, SENSE LINE SET 2 (WIRES 17-32)
15,2000	TC 15,2377	PARAGRAPH # 104	RDPE MODULE 3, SIDE A, SENSE LINE SET 3 (WIRES 33-48)
15,2400	TC 15,2777	PARAGRAPH # 105	RDPE MODULE 3, SIDE B, SENSE LINE SET 3 (WIRES 33-48)
15,3000	TC 15,3377	PARAGRAPH # 106	RDPE MODULE 3, SIDE A, SENSE LINE SET 4 (WIRES 49-64)
15,3400	TC 15,3777	PARAGRAPH # 107	RDPE MODULE 3, SIDE B, SENSE LINE SET 4 (WIRES 49-64)
16,2000	TC 16,2377	PARAGRAPH # 110	RDPE MODULE 3, SIDE A, SENSE LINE SET 5 (WIRES 65-80)
16,2400	TC 16,2777	PARAGRAPH # 111	RDPE MODULE 3, SIDE B, SENSE LINE SET 5 (WIRES 65-80)
16,3000	TC 16,3377	PARAGRAPH # 112	RDPE MODULE 3, SIDE A, SENSE LINE SET 6 (WIRES 81-96)
16,3400	TC 16,3777	PARAGRAPH # 113	RDPE MODULE 3, SIDE B, SENSE LINE SET 6 (WIRES 81-96)
17,2000	TC 17,2377	PARAGRAPH # 114	RDPE MODULE 3, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
17,2400	TC 17,2777	PARAGRAPH # 115	RDPE MODULE 3, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
17,3000	TC 17,3377	PARAGRAPH # 116	RDPE MODULE 3, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
17,3400	TC 17,3777	PARAGRAPH # 117	RDPE MODULE 3, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
20,2000	TC 20,2377	PARAGRAPH # 120	RDPE MODULE 3, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
20,2400	TC 20,2777	PARAGRAPH # 121	RDPE MODULE 3, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
20,3000	TC 20,3377	PARAGRAPH # 122	RDPE MODULE 3, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
20,3400	TC 20,3777	PARAGRAPH # 123	RDPE MODULE 3, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
21,2000	TC 21,2377	PARAGRAPH # 124	RDPE MODULE 3, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
21,2400	TC 21,2777	PARAGRAPH # 125	RDPE MODULE 3, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
21,3000	TC 21,3377	PARAGRAPH # 126	RDPE MODULE 3, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
21,3400	TC 21,3777	PARAGRAPH # 127	RDPE MODULE 3, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
22,2000	TC 22,2377	PARAGRAPH # 130	RDPE MODULE 4, SIDE A, SENSE LINE SET 1 (WIRES 1-16)
22,2400	TC 22,2777	PARAGRAPH # 131	RDPE MODULE 4, SIDE B, SENSE LINE SET 1 (WIRES 1-16)
22,3000	TC 22,3377	PARAGRAPH # 132	RDPE MODULE 4, SIDE A, SENSE LINE SET 2 (WIRES 17-32)
22,3400	TC 22,3777	PARAGRAPH # 133	RDPE MODULE 4, SIDE B, SENSE LINE SET 2 (WIRES 17-32)
23,2000	TC 23,2377	PARAGRAPH # 134	RDPE MODULE 4, SIDE A, SENSE LINE SET 3 (WIRES 33-48)
23,2400	TC 23,2777	PARAGRAPH # 135	RDPE MODULE 4, SIDE B, SENSE LINE SET 3 (WIRES 33-48)
23,3000	TC 23,3377	PARAGRAPH # 136	RDPE MODULE 4, SIDE A, SENSE LINE SET 4 (WIRES 49-64)
23,3400	TC 23,3777	PARAGRAPH # 137	RDPE MODULE 4, SIDE B, SENSE LINE SET 4 (WIRES 49-64)
24,2000	TC 24,2377	PARAGRAPH # 140	RDPE MODULE 4, SIDE A, SENSE LINE SET 5 (WIRES 65-80)
24,2400	TC 24,2777	PARAGRAPH # 141	RDPE MODULE 4, SIDE B, SENSE LINE SET 5 (WIRES 65-80)
24,3000	TC 24,3377	PARAGRAPH # 142	RDPE MODULE 4, SIDE A, SENSE LINE SET 6 (WIRES 81-96)
24,3400	TC 24,3777	PARAGRAPH # 143	RDPE MODULE 4, SIDE B, SENSE LINE SET 6 (WIRES 81-96)
25,2000	TC 25,2377	PARAGRAPH # 144	RDPE MODULE 4, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
25,2400	TC 25,2777	PARAGRAPH # 145	RDPE MODULE 4, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
25,3000	TC 25,3377	PARAGRAPH # 146	RDPE MODULE 4, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
25,3400	TC 25,3777	PARAGRAPH # 147	RDPE MODULE 4, SIDE B, SENSE LINE SET 8 (WIRES 113-128)

PARAGRAPHS GENERATED FOR THIS ASSEMBLY; ADDRESS LIMITS AND THE MANUFACTURING LOCATION CODE ARE SHOWN FOR EACH

26,2000	TC 26,2377	PARAGRAPH # 150	ROPE MODULE 4, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
26,2400	TC 26,2777	PARAGRAPH # 151	ROPE MODULE 4, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
26,3000	TC 26,3377	PARAGRAPH # 152	ROPE MODULE 4, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
26,3400	TC 26,3777	PARAGRAPH # 153	ROPE MODULE 4, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
27,2000	TC 27,2377	PARAGRAPH # 154	ROPE MODULE 4, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
27,2400	TC 27,2777	PARAGRAPH # 155	ROPE MODULE 4, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
27,3000	TC 27,3377	PARAGRAPH # 156	ROPE MODULE 4, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
27,3400	TC 27,3777	PARAGRAPH # 157	ROPE MODULE 4, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
30,2000	TC 30,2377	PARAGRAPH # 160	ROPE MODULE 5, SIDE A, SENSE LINE SET 1 (WIRES 1-16)
30,2400	TC 30,2777	PARAGRAPH # 161	ROPE MODULE 5, SIDE B, SENSE LINE SET 1 (WIRES 1-16)
30,3000	TC 30,3377	PARAGRAPH # 162	ROPE MODULE 5, SIDE A, SENSE LINE SET 2 (WIRES 17-32)
30,3400	TC 30,3777	PARAGRAPH # 163	ROPE MODULE 5, SIDE B, SENSE LINE SET 2 (WIRES 17-32)
31,2000	TC 31,2377	PARAGRAPH # 164	ROPE MODULE 5, SIDE A, SENSE LINE SET 3 (WIRES 33-48)
31,2400	TC 31,2777	PARAGRAPH # 165	ROPE MODULE 5, SIDE B, SENSE LINE SET 3 (WIRES 33-48)
31,3000	TC 31,3377	PARAGRAPH # 166	ROPE MODULE 5, SIDE A, SENSE LINE SET 4 (WIRES 49-64)
31,3400	TC 31,3777	PARAGRAPH # 167	ROPE MODULE 5, SIDE B, SENSE LINE SET 4 (WIRES 49-64)
32,2000	TC 32,2377	PARAGRAPH # 170	ROPE MODULE 5, SIDE A, SENSE LINE SET 5 (WIRES 65-80)
32,2400	TC 32,2777	PARAGRAPH # 171	ROPE MODULE 5, SIDE B, SENSE LINE SET 5 (WIRES 65-80)
32,3000	TC 32,3377	PARAGRAPH # 172	ROPE MODULE 5, SIDE A, SENSE LINE SET 6 (WIRES 81-96)
32,3400	TC 32,3777	PARAGRAPH # 173	ROPE MODULE 5, SIDE B, SENSE LINE SET 6 (WIRES 81-96)
33,2000	TC 33,2377	PARAGRAPH # 174	ROPE MODULE 5, SIDE A, SENSE LINE SET 7 (WIRES 97-112)
33,2400	TC 33,2777	PARAGRAPH # 175	ROPE MODULE 5, SIDE B, SENSE LINE SET 7 (WIRES 97-112)
33,3000	TC 33,3377	PARAGRAPH # 176	ROPE MODULE 5, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
33,3400	TC 33,3777	PARAGRAPH # 177	ROPE MODULE 5, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
34,2000	TC 34,2377	PARAGRAPH # 200	ROPE MODULE 5, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
34,2400	TC 34,2777	PARAGRAPH # 201	ROPE MODULE 5, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
34,3000	TC 34,3377	PARAGRAPH # 202	ROPE MODULE 5, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
34,3400	TC 34,3777	PARAGRAPH # 203	ROPE MODULE 5, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
35,2000	TC 35,2377	PARAGRAPH # 204	ROPE MODULE 5, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
35,2400	TC 35,2777	PARAGRAPH # 205	ROPE MODULE 5, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
35,3000	TC 35,3377	PARAGRAPH # 206	ROPE MODULE 5, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
35,3400	TC 35,3777	PARAGRAPH # 207	ROPE MODULE 5, SIDE B, SENSE LINE SET 12 (WIRES 177-192)
36,2000	TC 36,2377	PARAGRAPH # 210	ROPE MODULE 6, SIDE A, SENSE LINE SET 1 (WIRES 1-16)
36,2400	TC 36,2777	PARAGRAPH # 211	ROPE MODULE 6, SIDE B, SENSE LINE SET 1 (WIRES 1-16)
36,3000	TC 36,3377	PARAGRAPH # 212	ROPE MODULE 6, SIDE A, SENSE LINE SET 2 (WIRES 17-32)
36,3400	TC 36,3777	PARAGRAPH # 213	ROPE MODULE 6, SIDE B, SENSE LINE SET 2 (WIRES 17-32)
37,2000	TC 37,2377	PARAGRAPH # 214	ROPE MODULE 6, SIDE A, SENSE LINE SET 3 (WIRES 33-48)
37,2400	TC 37,2777	PARAGRAPH # 215	ROPE MODULE 6, SIDE B, SENSE LINE SET 3 (WIRES 33-48)
37,3000	TC 37,3377	PARAGRAPH # 216	ROPE MODULE 6, SIDE A, SENSE LINE SET 4 (WIRES 49-64)
37,3400	TC 37,3777	PARAGRAPH # 217	ROPE MODULE 6, SIDE B, SENSE LINE SET 4 (WIRES 49-64)
40,2000	TC 40,2377	PARAGRAPH # 220	ROPE MODULE 6, SIDE A, SENSE LINE SET 5 (WIRES 65-80)
40,2400	TC 40,2777	PARAGRAPH # 221	ROPE MODULE 6, SIDE B, SENSE LINE SET 5 (WIRES 65-80)
40,3000	TC 40,3377	PARAGRAPH # 222	ROPE MODULE 6, SIDE A, SENSE LINE SET 6 (WIRES 81-96)
40,3400	TC 40,3777	PARAGRAPH # 223	ROPE MODULE 6, SIDE B, SENSE LINE SET 6 (WIRES 81-96)
41,2000	TC 41,2377	PARAGRAPH # 224	ROPE MODULE 6, SIDE A, SENSE LINE SET 7 (WIRES 97-112)

PARAGRAPHS GENERATED FOR THIS ASSEMBLY; ADDRESS LIMITS AND THE MANUFACTURING LOCATION CODE ARE SHOWN FOR EACH

41,2400	TC 41,2777	PARAGRAPH # 225	ROPE MODULE 6, SIDE 8, SENSE LINE SET 7 (WIRES 97-112)
41,3000	TC 41,3377	PARAGRAPH # 226	ROPE MODULE 6, SIDE A, SENSE LINE SET 8 (WIRES 113-128)
41,3400	TC 41,3777	PARAGRAPH # 227	ROPE MODULE 6, SIDE B, SENSE LINE SET 8 (WIRES 113-128)
42,2000	TC 42,2377	PARAGRAPH # 230	ROPE MODULE 6, SIDE A, SENSE LINE SET 9 (WIRES 129-144)
42,2400	TC 42,2777	PARAGRAPH # 231	ROPE MODULE 6, SIDE B, SENSE LINE SET 9 (WIRES 129-144)
42,3000	TC 42,3377	PARAGRAPH # 232	ROPE MODULE 6, SIDE A, SENSE LINE SET 10 (WIRES 145-160)
42,3400	TC 42,3777	PARAGRAPH # 233	ROPE MODULE 6, SIDE B, SENSE LINE SET 10 (WIRES 145-160)
43,2000	TC 43,2377	PARAGRAPH # 234	ROPE MODULE 6, SIDE A, SENSE LINE SET 11 (WIRES 161-176)
43,2400	TC 43,2777	PARAGRAPH # 235	ROPE MODULE 6, SIDE B, SENSE LINE SET 11 (WIRES 161-176)
43,3000	TC 43,3377	PARAGRAPH # 236	ROPE MODULE 6, SIDE A, SENSE LINE SET 12 (WIRES 177-192)
43,3400	TC 43,3777	PARAGRAPH # 237	ROPE MODULE 6, SIDE B, SENSE LINE SET 12 (WIRES 177-192)

OCTAL LISTING FOR PARAGRAPH # 010, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

4000	0004 0	34054 1	56006 1	12667 0	52011 0	00006 1	34056 0	52006 0
4010	52011 0	00006 1	31275 0	52006 0	52011 0	34057 1	56006 1	13404 0
4020	52011 0	34064 1	56006 1	12000 1	52011 0	34060 0	56006 1	13215 0
4030	52011 0	34061 1	56006 1	12332 0	52011 0	34060 0	56006 1	13240 0
4040	52011 0	34062 1	56006 1	13430 1	52011 0	34063 0	56006 1	13150 1
4050	52011 0	34065 0	56006 1	12006 1	C: 12103 0	C: 02036 0	C: 36106 0	C: 02103 1
4060	C: 10100 1	C: 16107 0	C: 12100 0	C: 52100 1	C: 14106 0	C: 04207 1	C: 04025 1	C: 10003 0
4070	C: 14031 0	C: 20033 0	C: 24017 1	C: 30036 1	C: 34034 1	C: 40023 1	C: 44035 1	C: 50037 0
4100	C: 54000 0	C: 60000 1	00004 0	00006 1	00004 0	54001 1	00006 1	06004 0
4110	00006 1	14115 1	00006 1	00004 0	54001 1	44733 0	60001 0	00006 1
4120	14103 0	00006 1	00003 1	00002 0	34144 1	71022 1	00006 1	14131 0
4130	04132 0	31020 1	54023 1	30023 0	04616 1	C: 62337 1	34755 1	55013 0
4140	31022 0	04255 1	04143 0	05155 0	C: 37600 0	04364 1	41041 1	55013 0
4150	04616 1	C: 62337 1	04635 0	C: 62002 1	22007 0	54123 0	34736 1	71021 1
4160	61012 0	10000 0	00002 0	34753 1	60002 0	55037 0	23022 0	04204 0
4170	34201 0	56006 1	00006 1	04007 1	55040 0	34201 0	00006 1	01007 1
4200	02000 0	C: 62101 0	53040 0	05165 0	34735 1	55021 1	00002 0	22002 0
4210	04220 0	04224 1	30001 0	75012 0	60004 0	55042 1	05133 0	05155 0
4220	11042 1	04227 1	00002 0	04227 1	11043 0	04227 1	00002 0	05652 0
4230	C: 01206 1	34201 0	00006 1	01007 1	34242 1	55013 0	44360 1	54777 1
4240	04635 0	C: 61446 0	C: 00042 1	34201 0	00006 1	01007 1	34254 0	55013 0
4250	44360 1	54777 1	04635 0	C: 61440 0	C: 00041 1	74757 1	54123 0	34736 1
4260	71021 1	61012 0	10000 0	00002 0	24002 0	10123 0	14270 1	00002 0
4270	22002 0	34302 1	56006 1	00006 1	04007 1	52131 0	34201 0	00006 1
4300	01007 1	03503 1	C: 60101 1	55017 1	54003 0	74357 0	65007 0	54145 0
4310	00002 0	31017 0	14304 0	54003 0	74357 0	65007 0	00002 0	C: 00016 0
4320	C: 00011 1	C: 00004 0	54020 1	40020 1	40020 1	40020 1	40020 1	56020 0
4330	00002 0	54022 0	40022 0	40022 0	40022 0	40022 0	56022 1	00002 0
4340	60000 1	60000 1	60000 1	60000 1	60000 1	00002 0	C: 00037 0	C: 01740 0
4350	C: 76000 0	05072 1	05203 0	05261 1	05105 0	C: 30000 1	C: 03777 0	C: 00377 1
4360	C: 00023 0	C: 00021 1	C: 00025 0	C: 00012 1	34745 0	00006 1	05011 1	00002 0
4370	44745 1	00006 1	03011 1	00002 0	34747 1	00006 1	05011 1	00002 0

OCTAL LISTING FOR PARAGRAPH # 011, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "3" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

4400	00006 1	30025 0	52014 0	00002 0	00006 1	30156 0	20156 1	60154 1
4410	26154 0	54007 1	00002 0	54162 0	00002 0	54135 1	10000 0	30135 0
4420	17307 0	14417 0	44755 0	54154 0	54155 1	54156 1	00002 0	34746 0
4430	00006 1	05011 1	00002 0	44746 1	00006 1	03011 1	00002 0	44444 0
4440	60002 0	60004 0	04635 0	C: 10604 1	C: 02003 0	22007 0	54123 0	34736 1
4450	71021 1	61012 0	10000 0	14455 0	14164 1	24002 0	14437 1	56002 0
4460	54144 1	44736 0	00004 0	71021 1	55021 1	11043 0	04470 0	04473 0
4470	34755 1	57043 1	05137 1	00003 1	44747 0	00006 1	03011 1	34755 1
4500	55012 1	00144 0	56002 0	54144 1	11043 0	04507 1	04473 0	34755 1
4510	55012 1	00144 0	00006 1	64515 1	14516 0	40000 0	50002 0	60000 1
4520	00006 1	66740 1	16736 1	00006 1	50002 0	50000 1	30001 0	24002 0
4530	52062 1	22002 0	34740 0	70110 0	10000 0	14550 1	30061 0	04512 0
4540	C: 66161 1	00001 0	34562 1	60062 0	04512 0	C: 64420 0	00001 0	04560 0
4550	34563 0	60062 0	04512 0	C: 65673 0	00001 0	30061 0	04512 0	C: 51615 1
4560	50001 0	00001 0	C: 00765 0	C: 16450 1	34753 1	71303 1	10000 0	00002 0
4570	34744 1	54001 1	34615 1	70110 0	00006 1	14601 0	34750 1	70110 0
4600	10000 0	30001 0	61036 0	70001 1	00006 1	16741 1	31036 0	00006 1
4610	06001 0	74733 0	64735 1	55036 1	00002 0	C: 10102 0	52134 0	50002 0
4620	30000 1	24002 0	54001 1	22004 0	75012 0	56002 0	52134 0	50002 0
4630	02000 0	56134 1	56004 0	56134 1	00133 0	56002 0	50000 1	30000 1
4640	54004 1	75012 0	56002 0	50002 0	12000 1	35012 1	70133 1	60134 1
4650	00002 0	54135 1	56004 0	00006 1	04007 1	56135 0	75012 0	56001 0
4660	00004 0	00006 1	01007 1	50001 0	32000 0	56135 0	00006 1	01007 1
4670	00003 1	54004 1	30135 0	00002 0	52073 1	50002 0	30000 1	24002 0
4700	54901 1	22904 0	75012 0	56002 0	52073 1	50002 0	02000 0	56073 0
4710	56004 0	56073 0	00072 1	54164 0	34744 1	54023 1	30006 1	54165 1
4720	50002 0	30000 1	54004 1	75012 0	56002 0	56164 1	14643 0	00006 1
4730	01007 1	00002 0	C: 37777 1	C: 37777 1	C: 57777 1	C: 40000 0	C: 20000 0	C: 10000 0
4740	C: 04000 0	C: 02000 0	C: 01000 0	C: 00400 0	C: 00200 0	C: 00100 0	C: 00040 0	C: 00020 0
4750	C: 00010 0	C: 00004 0	C: 00002 0	C: 00001 0	C: 77777 0	C: 00000 1	C: 00005 1	C: 00007 0
4760	C: 00013 0	C: 00015 0	C: 00017 1	C: 00030 1	C: 00033 1	C: 00035 1	C: 00032 0	C: 00045 0
4770	C: 00046 0	C: 00050 1	C: 00055 1	C: 00060 1	C: 00062 0	C: 00120 1	C: 00140 1	C: 00144 0

OCTAL LISTING FOR PARAGRAPH # 012, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "3" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

5000	C: 00310 0	C: 00401 1	C: 00454 1	C: 00620 0	C: 00777 0	C: 01124 1	C: 01211 1	C: 01400 1
5010	C: 01426 0	C: 01776 0	C: 01777 1	C: 02177 1	C: 02400 1	C: 03000 1	C: 03400 0	C: 05000 1
5020	C: 06000 1	C: 07000 0	C: 11000 1	C: 13000 0	C: 14000 1	C: 15000 0	C: 16000 0	C: 17000 1
5030	C: 17770 1	C: 21000 1	64736 1	55076 0	15036 0	41076 0	60000 1	55076 0
5040	15051 1	57076 1	51076 1	64734 0	40000 0	61076 1	55076 0	15051 1
5050	15067 1	00006 1	71076 0	55077 1	00006 1	75005 0	67735 1	00006 1
5060	71077 1	67716 0	00006 1	71076 0	20001 1	55076 0	00002 0	50000 1
5070	44734 1	00002 0	00004 0	65164 1	54063 0	00006 1	50002 0	30001 0
5100	52066 0	35163 0	56004 0	54061 1	12622 1	00004 0	54063 0	00006 1
5110	50002 0	30001 0	52066 0	35163 0	56004 0	12576 0	56002 0	67745 0
5120	56002 0	15112 1	22002 0	35163 0	56006 1	12703 0	40164 0	54001 1
5130	35163 0	54006 0	12702 1	54164 0	35163 0	54004 1	12773 1	00004 0
5140	54065 0	44752 1	26002 1	35163 0	56004 0	13020 1	00004 0	54063 0
5150	35163 0	56006 1	54165 1	30002 0	13067 1	35163 0	54004 1	13100 1
5160	30061 0	54004 1	16740 0	C: 02576 1	C: 00110 1	56001 0	00006 1	01007 1
5170	54006 0	00001 0	C: 77677 1	00004 0	54001 1	34733 1	26002 1	30006 1
5200	00006 1	04007 1	56001 0	00004 0	56002 0	54061 1	00006 1	50061 0
5210	30001 0	54063 0	35220 1	56006 1	13226 0	52062 1	64735 0	52006 1
5220	C: 02063 0	50002 0	30000 1	24002 0	56002 0	54063 0	30006 1	00006 1
5230	04007 1	54001 1	35235 0	54061 1	15212 1	15257 0	C: 72537 0	C: 73714 1
5240	10076 1	15261 0	15261 0	15244 1	11304 0	15256 1	15251 0	15256 1
5250	15256 1	37722 1	05072 1	C: 03555 1	C: 14063 1	15261 0	05221 0	C: 00764 1
5260	05240 1	10734 0	35220 1	54006 0	13411 1	30016 0	00006 1	01007 1
5270	00006 1	22012 1	30016 0	56006 1	52011 0	00003 1	50017 1	53154 1
5300	00006 1	50002 0	30001 0	53150 0	00006 1	35310 0	52006 0	C: 03447 0
5310	C: 02063 0	50002 0	30000 1	24002 0	55011 1	35320 0	22006 1	14640 0
5320	C: 20071 0	50002 0	40000 0	61011 0	00006 1	16740 0	16736 1	00004 0
5330	50002 0	30000 1	24002 0	54072 0	74757 1	60000 1	54071 0	30072 1
5340	75030 0	00006 1	74740 1	56072 1	74735 0	54066 0	50002 0	30000 1
5350	24002 0	54065 0	15363 0	00004 0	50002 0	30000 1	24002 0	00004 0
5360	54065 0	34753 1	54066 0	00006 1	35367 0	52006 0	C: 02102 0	C: 20103 1
5370	22073 0	22006 1	22073 0	75024 0	10000 0	17747 0	30062 0	74745 1

OCTAL LISTING FOR PARAGRAPH # 013, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

5400	10000 0	15423 0	50061 0	31052 1	54070 1	30062 0	74744 0	10000 0
5410	15427 1	30002 0	54063 0	30006 1	00006 1	04007 1	54064 1	35422 0
5420	22073 0	52006 0	C: 02170 0	50002 0	30000 1	24002 0	15404 0	00006 1
5430	50002 0	30001 0	52064 1	34752 0	26002 1	15417 1	22706 0	22006 1
5440	50000 1	30001 0	22006 1	22706 0	13576 1	22706 0	22006 1	22706 0
5450	00006 1	50000 1	30001 0	22706 0	22006 1	22706 0	13704 0	34755 1
5460	54032 1	54033 0	54034 1	00002 0	54162 0	40160 1	70162 0	50161 1
5470	26160 1	00002 0	04635 0	C: 20204 0	34755 1	55044 1	00004 0	44753 0
5500	70100 1	54100 1	00003 1	00002 0	30002 0	05522 1	40000 0	00006 1
5510	04001 1	50061 0	54074 0	22063 1	00003 1	00001 0	30002 0	05522 1
5520	70001 1	15511 0	64753 1	00004 0	54063 0	34762 0	54061 1	50063 1
5530	27777 0	54001 1	34755 1	00006 1	10061 1	52062 1	50061 0	30074 1
5540	54001 1	50062 0	44735 0	00002 0	00004 0	54061 1	50002 0	60000 1
5550	50000 1	30000 1	54001 1	30061 0	50002 0	60001 0	50000 1	22000 1
5560	10061 1	15545 1	16740 0	44747 0	71044 1	55044 1	05155 0	00004 0
5570	30002 0	55363 1	50002 0	30000 1	54001 1	30006 1	00006 1	04007 1
5600	55364 0	30002 0	54061 1	10375 1	15607 1	22375 0	15621 0	10376 1
5610	15613 1	22376 0	15624 0	30377 1	74733 0	10000 0	15630 0	22377 1
5620	15624 0	41036 1	75642 0	27036 1	56061 0	00003 1	50000 1	00001 0
5630	30001 0	64735 1	54377 0	15624 0	00004 0	30002 0	55363 1	50002 0
5640	30000 1	05574 1	C: 40400 1	00004 0	34752 0	60005 1	54017 0	50017 1
5650	04635 0	C: 12766 0	00004 0	30002 0	55363 1	50002 0	30000 1	05574 1
5660	C: 77770 1	34765 1	54001 1	40000 0	52761 0	00004 0	30103 0	74746 1
5670	10000 0	15675 1	04616 1	C: 12643 0	15644 0	04635 0	C: 65711 0	00004 0
5700	30002 0	05654 0	C: 01103 1	00004 0	30002 0	05571 1	C: 00217 0	01363 0
5710	00004 0	53364 0	35734 1	54061 1	50002 0	30000 1	54001 1	15603 0
5720	00004 0	53364 0	35733 0	15713 0	00004 0	53364 0	00004 0	50002 0
5730	30000 1	54001 1	15601 1	15660 0	15642 0	00004 0	54001 1	30002 0
5740	55363 1	05575 0	C: 00014 1	01363 0	31470 0	00006 1	01006 0	00002 0
5750	31471 1	54001 1	45765 1	00006 1	02005 0	60001 0	00006 1	01005 0
5760	00002 0	31472 1	54001 1	35765 0	15753 1	C: 00314 1	C: 05766 0	C: 05767 1
5770	CKSM 77402 1	a	a	a	a	a	a	a

OCTAL LISTING FOR PARAGRAPH # 014, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

6000	C: 00464 1	34764 0	54001 1	40000 0	52761 0	04635 0	C: 10024 0	C: 00024 1
6010	C: 00031 0	46021 0	00004 0	70110 0	54110 0	44752 1	00006 1	03012 1
6020	00002 0	C: 41000 1	00006 1	36026 0	15165 1	C: 03034 0	C: 66107 1	36035 1
6030	22000 1	50002 0	30000 1	22006 1	12223 1	C: 56063 1	00003 1	00006 1
6040	22164 1	30006 1	54165 1	74735 0	54115 0	54023 1	16067 1	22006 1
6050	16041 0	00006 0	50116 1	30001 0	52155 1	34755 1	54156 1	54163 1
6060	30165 0	54006 0	10023 1	16076 1	10067 1	15126 0	24164 1	50164 1
6070	30000 1	10000 0	16361 1	C: 00177 0	54023 1	76073 1	54020 1	10020 1
6100	16246 0	16742 1	74753 0	10000 0	16145 0	50164 1	40001 1	10000 0
6110	16214 1	C: 77773 1	24164 1	54116 0	66250 0	10000 0	67742 1	16124 1
6120	30120 1	26116 0	50020 0	76272 1	00006 1	66135 0	75012 0	65012 1
6130	56116 1	60115 1	54004 1	50020 0	76272 1	74357 0	65007 0	56116 1
6140	54003 0	50920 0	76272 1	37732 0	54020 1	30120 1	54130 1	24164 1
6150	50164 1	40000 0	10000 0	24130 0	16155 1	54116 0	77741 0	00006 1
6160	16163 1	30115 1	26116 0	50130 0	40046 1	26116 0	77743 1	00006 1
6170	16203 1	77741 0	00006 1	16205 1	30116 1	54004 1	75012 0	64741 1
6200	54116 0	50020 0	36272 0	30120 1	16211 1	35007 0	56116 1	54003 0
6210	74357 0	26116 0	50020 0	36272 0	34360 0	70020 1	66221 0	10000 0
6220	16232 0	C: 77767 1	66111 0	10000 0	50000 1	46243 0	16234 0	50163 0
6230	46241 1	16234 0	50163 0	46243 0	26166 1	54116 0	50020 0	76272 1
6240	C: 00002 0	C: 00006 1	C: 00006 1	C: 00002 0	C: 00003 1	C: 00006 1	10020 1	16262 0
6250	C: 77722 0	24164 1	50164 1	30000 1	54117 1	35013 0	54004 1	70020 1
6260	50000 1	16333 0	54004 1	10020 1	50000 1	12000 1	10163 1	12017 1
6270	12017 1	12121 0	C: 00122 0	16504 1	17070 0	17654 0	17400 0	16702 0
6300	16467 0	16051 1	17623 0	16500 0	16617 0	16522 0	17333 1	16556 0
6310	16625 1	17336 1	17615 0	17573 0	17576 0	17602 0	17620 0	16750 1
6320	16746 0	17035 1	17330 1	17457 1	17424 0	17004 0	17061 0	16774 1
6330	16330 0	17571 1	17612 1	12341 1	12346 0	12351 0	12355 1	12361 0
6340	12367 0	12403 0	12412 0	12375 0	12406 0	12464 1	12471 0	12444 0
6350	12504 0	12513 0	12454 1	30165 0	54004 1	24164 1	50164 1	40000 0
6360	67746 0	54116 0	74356 1	56116 1	77721 0	00006 1	74747 0	50000 1
6370	16371 0	06421 0	16060 0	06413 1	16060 0	06416 1	16060 0	06421 0

OCTAL LISTING FOR PARAGRAPH # 015, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRFTIVE OPERATOR WORDS) OR "C" (CONSTANTS)

6400	16457 0	06421 0	16143 0	06421 0	16462 0	06421 0	16465 1	06421 0
6410	34766 1	54020 1	16251 0	50120 1	40046 1	16420 0	50120 1	40047 0
6420	26116 0	40116 0	64772 1	10000 0	30120 1	16432 0	35007 0	56116 1
6430	54003 0	74357 0	26116 0	00006 1	30155 0	50116 1	52001 1	10163 1
6440	16453 1	00002 0	00006 1	30160 0	50116 1	52003 0	00006 1	30162 1
6450	50116 1	52005 0	00002 0	30156 0	50116 1	54002 1	00002 0	37731 0
6460	54020 1	16105 1	34735 1	54020 1	16105 1	36106 0	16144 1	50116 1
6470	30002 0	54156 1	00006 1	50116 1	30001 0	52155 1	34753 1	16057 1
6500	22007 0	50116 1	30000 1	16054 1	00006 1	50116 1	30001 0	52155 1
6510	00006 1	50116 1	30003 1	52160 1	00006 1	50116 1	30005 1	52162 0
6520	44753 0	16057 1	00006 1	50116 1	30001 0	52155 1	50166 0	52001 1
6530	50163 0	36243 1	26166 1	10163 1	16551 1	16547 0	54163 1	54156 1
6540	52160 1	50166 0	51775 0	52162 0	50166 0	51777 1	16060 0	54156 1
6550	16060 0	54163 1	56156 0	50166 0	53777 0	16060 0	00006 1	50116 1
6560	30001 0	52155 1	50166 0	52001 1	50163 0	36243 1	26166 1	10163 1
6570	16607 1	16510 1	00006 1	50116 1	30003 1	52160 1	50166 0	51775 0
6600	00006 1	50116 1	30005 1	52162 0	50166 0	51777 1	16060 0	00006 1
6610	50116 1	30003 1	52160 1	30156 0	50166 0	53777 0	16514 0	24164 1
6620	50164 1	30000 1	50116 1	54000 0	16060 0	24164 1	50164 1	30000 1
6630	50116 1	60000 1	54004 1	75012 0	50000 1	32000 0	54117 1	30165 0
6640	74350 1	64350 0	60164 1	50120 1	54052 1	30117 0	77741 0	00006 1
6650	16661 1	30165 0	54006 0	30117 0	54004 1	75012 0	64741 1	54164 0
6660	16041 0	30117 0	66250 0	10000 0	30117 0	16674 0	30120 1	60117 0
6670	50000 1	30000 1	54117 1	16646 1	54003 0	74357 0	50000 1	31400 1
6700	54117 1	16646 1	50164 1	30001 0	50116 1	60000 1	54004 1	75012 0
6710	50000 1	32000 0	54117 1	16646 1	30165 0	54004 1	50164 1	30001 0
6720	54117 1	16646 1	10154 0	00002 0	16726 0	16740 0	10155 1	00002 0
6730	16732 0	16740 0	10156 1	00002 0	16736 1	16740 0	50002 0	00001 0
6740	50002 0	00002 0	30165 0	54006 0	50164 1	00001 0	34735 1	16751 0
6750	34355 0	26116 0	00006 1	50116 1	00003 1	20160 1	00006 1	16761 0
6760	07013 1	00006 1	50116 1	00005 1	20162 0	00006 1	16770 0	07010 1
6770	00006 1	50116 1	00001 0	16777 1	00006 1	50116 1	30001 0	20155 1

OCTAL LISTING FOR PARAGRAPH # 016, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALIO WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

7000	00006 1	16060 0	07016 1	16060 0	00006 1	50116 1	40001 1	16777 1
7010	54001 1	34756 1	17015 0	54001 1	36244 0	56001 0	50000 1	44734 1
7020	54130 1	00006 1	24000 1	50001 0	26155 1	54007 1	34755 1	60130 0
7030	50001 0	26154 0	54007 1	00002 0	17151 1	00006 1	50116 1	30003 1
7040	52160 1	00006 1	40001 1	20160 1	00006 1	17047 1	07013 1	00006 1
7050	50116 1	30005 1	52162 0	00006 1	40001 1	20162 0	00006 1	17061 0
7060	07010 1	00006 1	50116 1	30001 0	52155 1	00006 1	40001 1	16777 1
7070	00006 1	50116 1	30002 0	20156 1	50116 1	60000 1	60154 1	54154 0
7100	16060 0	17002 0	50002 0	30000 1	24002 0	54116 0	50116 1	30001 0
7110	54156 1	34755 1	56155 0	54135 1	00006 1	70156 1	56156 0	00006 1
7120	70154 0	20156 1	50116 1	30000 1	56135 0	00006 1	70135 1	20156 1
7130	56154 1	00006 1	70135 1	20155 1	00002 0	34755 1	54163 1	56156 0
7140	60000 1	54001 1	00002 0	60155 0	54155 1	00002 0	60154 1	54154 0
7150	00002 0	54121 1	00002 0	34752 0	54136 1	00006 1	22137 1	07106 1
7160	52160 1	52155 1	52131 0	30156 0	54132 0	30136 0	26116 0	07106 1
7170	52156 1	20132 0	60154 1	60130 0	54130 1	17177 0	54121 1	52162 0
7200	52155 1	30136 0	26116 0	07106 1	52132 0	20156 1	60154 1	60130 0
7210	54154 0	00137 1	07016 1	00137 1	00006 1	22141 0	54117 1	22140 1
7220	17231 1	50002 0	30000 1	54140 0	60000 1	60002 0	54117 1	64756 1
7230	54141 1	36272 0	54116 0	00006 1	50117 0	30004 0	52155 1	52123 0
7240	17244 0	54140 0	44752 1	26117 1	07106 1	00006 1	50117 0	30002 0
7250	20155 1	10140 0	17241 0	00141 0	34755 1	54156 1	22002 0	06722 0
7260	17264 1	17304 0	44733 0	17265 0	34733 1	54002 1	00006 1	24000 1
7270	60156 0	54156 1	34755 1	60002 0	60155 0	54155 1	34755 1	60002 0
7300	60154 1	54154 0	54155 1	00001 0	54156 1	17301 0	54135 1	00006 1
7310	70156 1	54156 1	34755 1	56155 0	17125 1	54135 1	00006 1	70155 1
7320	52155 1	00006 1	70135 1	30001 0	26154 0	00006 1	30155 0	00002 0
7330	07153 1	34755 1	16057 1	34752 0	54140 0	17341 1	44363 1	54140 0
7340	36241 0	54136 1	07531 1	07155 1	00006 1	30123 1	52155 1	52134 0
7350	00006 1	30125 1	52160 1	00006 1	30127 0	52162 0	30140 1	26116 0
7360	07155 1	52123 0	52155 1	52125 0	52160 1	52127 1	52162 0	30140 1
7370	26116 0	07155 1	52134 0	52155 1	52162 0	52125 0	52160 1	16060 0

OCTAL LISTING FOR PARAGRAPH # 017, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

7400	10163 1	17427 0	17427 0	07106 1	07137 0	52160 1	52155 1	52160 1
7410	07106 1	07137 0	52162 0	52155 1	52162 0	07106 1	07137 0	52155 1
7420	52162 0	52160 1	52155 1	16060 0	07153 1	44751 1	26116 0	00006 1
7430	30155 0	52160 1	07106 1	07137 0	34752 0	26116 0	00006 1	30160 0

7440	52155 1	52162 0	07106 1	07137 0	34752 0	26116 0	52160 1	52155 1
7450	52160 1	07106 1	07137 0	52155 1	52162 0	52155 1	16520 1	00006 1
7460	30162 1	52155 1	52123 0	07106 1	00006 1	40160 1	52155 1	52125 0
7470	07106 1	34752 0	26116 0	00006 1	40162 0	52155 1	52162 0	07106 1

7500	00006 1	30123 1	52155 1	52127 1	07106 1	34752 0	26116 0	00006 1
7510	40123 0	52155 1	20162 0	00006 1	17516 0	07010 1	07106 1	52125 0
7520	52160 1	52155 1	20160 1	00006 1	17526 0	07013 1	07106 1	52127 1
7530	16777 1	00006 1	30155 0	52123 0	00006 1	30160 0	52125 0	00006 1

7540	30162 1	52127 1	00002 0	10000 0	17550 1	00002 0	17560 1	00002 0
7550	56001 0	64736 1	64736 1	54000 0	17556 1	24001 0	56001 0	00002 0
7560	56001 0	64735 1	67746 0	54000 0	17566 1	24001 0	56001 0	40000 0
7570	00002 0	07106 1	16060 0	07106 1	07136 1	16060 0	00006 1	50116 1

7600	30001 0	17606 1	00006 1	50116 1	30001 0	52155 1	52131 0	34755 1
7610	54004 1	12353 1	30116 1	54166 1	16062 1	34755 1	54004 1	12172 0
7620	36073 0	54004 1	12214 0	10163 1	17635 1	17635 1	00006 1	50116 1
7630	30001 0	52131 0	34755 1	54004 1	12654 0	00006 1	50116 1	30003 1

7640	52160 1	00006 1	50116 1	30005 1	52162 0	44753 0	54163 1	00006 1
7650	50116 1	30001 0	52155 1	17631 0	50116 1	10000 0	16060 0	17661 0
7660	17667 0	50116 1	10001 1	16060 0	16060 0	17667 0	16060 0	00006 1
7670	40155 1	52155 1	10163 1	17704 1	17704 1	00006 1	40160 1	52160 1

7700	00006 1	40162 0	52162 0	16060 0	40156 1	54156 1	16060 0	C: 22000 1
7710	C: 23000 0	C: 24000 1	C: 25000 0	C: 26000 0	C: 27000 1	C: 31000 0	C: 31103 1	C: 32000 0
7720	C: 33000 1	C: 34000 0	C: 35000 1	C: 36000 1	C: 37000 0	C: 37401 0	C: 37766 1	C: 37774 1
7730	C: 37776 0	C: 40014 0	C: 40015 1	C: 40040 1	C: 40200 1	C: 57777 1	C: 65552 0	C: 70000 0

7740	C: 73777 1	C: 74000 1	C: 74056 1	C: 77700 0	C: 77774 0	C: 77775 1	C: 77776 1	74740 1
7750	10000 0	15423 0	15402 0	00006 1	07753 1	C: 07755 1	C: 07756 1	CKSM 62351 1
7760	a	a	a	a	a	a	a	a
7770	a	a	a	a	a	a	a	a

OCTAL LISTING FOR PARAGRAPH # 020, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

00,2000	13207 0	13530 0	13517 0	13610 1	13612 0	13174 1	12116 1	17667 0
00,2010	13232 0	13023 1	13176 0	13245 0	16353 0	13274 1	13247 1	36241 0
00,2020	70020 1	54021 0	10020 1	12101 1	C: 00024 1	50021 1	34736 1	54135 1
00,2030	10020 1	02050 0	16057 1	30135 0	00006 1	70156 1	54156 1	30135 0
00,2040	00006 1	70154 0	52155 1	30135 0	00006 1	70001 1	20156 1	16060 0
00,2050	30156 0	00006 1	70135 1	56155 0	00006 1	70135 1	56155 0	60001 0
00,2060	60000 1	54156 1	12064 0	26155 1	34755 1	54156 1	56154 1	00006 1
00,2070	70135 1	20155 1	00002 0	30135 0	00006 1	70155 1	54155 1	56001 0
00,2100	12060 1	30221 1	54135 1	00006 1	30156 0	20156 1	60154 1	60154 1
00,2110	54154 0	12113 1	54121 1	10135 1	12102 1	10020 1	07135 1	16060 0
00,2120	16060 0	34757 0	70020 1	54135 1	10020 1	12145 1	C: 00176 1	50135 0
00,2130	34736 1	54135 1	02073 1	52155 1	52160 1	52155 1	02073 1	52155 1
00,2140	52162 0	52155 1	02073 1	17417 0	54135 1	00006 1	30155 0	20155 1
00,2150	00006 1	12153 0	07016 1	00006 1	30160 0	20160 1	00006 1	12161 1
00,2160	07013 1	00006 1	30162 1	20162 0	00006 1	12167 1	07010 1	10135 1
00,2170	12144 0	16060 0	54135 1	06722 0	12176 1	12212 0	07256 1	30154 1
00,2200	12207 1	24135 0	00006 1	30156 0	20156 1	60154 1	26154 0	60000 1
00,2210	54000 1	12201 1	40135 1	16622 0	70116 0	10000 0	12224 0	34742 1
00,2220	70116 0	10000 0	07135 1	16060 0	54135 1	34744 1	00006 1	70116 0
00,2230	76244 1	50000 1	12233 0	12332 0	12342 1	12336 1	10163 1	12277 0
00,2240	12277 0	30135 0	63733 0	00006 1	62127 1	67746 0	54135 1	34755 1
00,2250	54001 1	56154 1	56155 0	02272 1	20155 1	56157 1	56160 0	02272 1
00,2260	20160 1	56161 1	56162 1	02272 1	20162 0	10135 1	54135 1	12242 0
00,2270	C: 04604 1	16060 0	60000 1	54156 1	34755 1	56001 0	00002 0	30135 0
00,2300	63733 0	00006 1	62322 0	67746 0	54135 1	34755 1	56154 1	56155 0
00,2310	54156 1	10135 1	54135 1	02300 0	C: 22650 1	34742 1	70116 0	10000 0
00,2320	07135 1	16060 0	50135 0	34736 1	54135 1	34742 1	70116 0	10000 0
00,2330	12031 0	12033 1	40135 1	62126 0	54135 1	12236 0	42126 1	60135 0
00,2340	40000 0	54135 1	10163 1	12346 0	12346 0	12145 1	40116 0	00006 1
00,2350	74746 1	54020 1	12103 0	44753 0	54136 1	54137 0	54140 0	10130 1
00,2360	12516 0	12363 1	12531 0	54156 1	07256 1	10154 0	12414 0	12371 1
00,2370	12413 1	56131 1	56130 0	56155 0	56154 1	10130 1	12422 0	12401 1

OCTAL LISTING FOR PARAGRAPH # 021, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALIO WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

00,2400	12416 1	40154 0	00006 1	62405 1	24136 0	34733 1	54154 0	02630 0
00,2410	34753 1	54121 1	06060 1	24136 0	40131 0	12402 1	00006 1	40131 0
00,2420	52131 0	24136 0	10154 0	12437 1	12426 1	12433 0	10155 1	12437 1
00,2430	16060 0	12433 0	16060 0	00006 1	40155 1	52155 1	24136 0	40154 0
00,2440	67746 0	60130 0	10000 0	12505 1	C: 60001 0	12446 1	34736 1	60000 1
00,2450	60155 0	54155 1	34755 1	64733 1	26154 0	34736 1	60000 1	60131 1
00,2460	54131 0	34755 1	64733 1	26130 1	40154 0	60130 0	10000 0	12505 1
00,2470	C: 00133 0	12405 0	54140 0	40155 1	60131 1	00006 1	62405 1	12505 1
00,2500	00006 1	24137 1	00006 1	30131 1	20131 0	30130 0	60000 1	54000 0
00,2510	12500 1	52155 1	50137 1	02565 0	54156 1	16060 0	10000 0	12422 0
00,2520	40131 0	00006 1	62422 1	34736 1	60000 1	26131 0	34755 1	54130 1
00,2530	12363 1	10000 0	12416 1	30131 1	00006 1	62416 0	44736 0	12524 1
00,2540	22021 1	00006 1	74736 0	56001 0	60021 1	56001 0	12571 1	20001 1
00,2550	20001 1	20001 1	20001 1	20001 1	20001 1	20001 1	20001 1	20001 1
00,2560	20001 1	20001 1	20001 1	20001 1	52155 1	10140 0	C: 06552 0	12642 1
00,2570	52155 1	00006 1	10130 1	52155 1	40154 0	00006 1	70131 0	60155 0
00,2600	54000 0	12606 1	00006 1	60130 0	24154 1	12610 0	00006 1	62620 1
00,2610	00006 1	60130 0	00006 1	12616 0	00006 1	62624 0	24154 1	12625 0
00,2620	00006 1	12630 1	00006 1	26154 0	60130 0	22007 0	00006 1	10130 1
00,2630	54155 1	10136 1	00002 0	00002 0	00002 0	00006 1	40155 1	52155 1
00,2640	34755 1	00002 0	40154 0	60130 0	00006 1	12647 1	12570 0	34733 1
00,2650	54154 0	40131 0	60155 0	12624 1	44753 0	54137 0	54127 1	03010 0
00,2660	52131 0	07543 1	52131 0	10130 1	12721 0	12667 0	12715 1	56131 1
00,2670	56130 0	56155 0	56154 1	00006 1	12676 0	12405 0	56160 0	56157 1
00,2700	00006 1	12703 0	12405 0	56162 1	56161 1	00006 1	12710 1	12405 0
00,2710	10130 1	12721 0	12405 0	12715 1	12405 0	00006 1	40131 0	52131 0
00,2720	24127 0	00006 1	30131 1	52134 0	12732 1	00006 1	24137 1	00006 1
00,2730	30131 1	20131 0	30130 0	60002 1	54000 0	12725 1	02750 1	52160 1
00,2740	52155 1	52160 1	02750 1	52162 0	52155 1	52162 0	02750 1	17417 0
00,2750	30127 0	54136 1	10154 0	12767 1	12756 0	12763 0	10155 1	12767 1
00,2760	00002 0	12763 0	00002 0	00006 1	40155 1	52155 1	24136 0	44753 0
00,2770	54140 0	40154 0	60133 0	10000 0	13004 1	12777 0	12405 0	54140 0

OCTAL LISTING FOR PARAGRAPH # 022, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

00,3000	40155 1	60134 1	00006 1	62405 1	52155 1	50137 1	12565 1	C: 32506 0
00,3010	56002 0	52155 1	07543 1	52155 1	52160 1	07543 1	52160 1	52162 0
00,3020	07543 1	52162 0	00000 1	03010 0	07531 1	34755 1	56121 0	54141 1
00,3030	03317 1	30141 0	56121 0	00006 1	13036 0	12405 0	00006 1	30155 0
00,3040	50120 1	52043 1	03343 0	10154 0	13051 1	54001 1	50120 1	52045 1
00,3050	12405 0	44317 1	60135 0	10000 0	40000 0	13133 1	13065 0	44761 1
00,3060	54135 1	30154 1	54001 1	34755 1	13112 1	10135 1	13074 0	42024 1
00,3070	54135 1	00006 1	30155 0	13112 1	40000 0	54135 1	40000 0	50000 1
00,3100	34736 1	54130 1	00006 1	70155 1	56130 0	00006 1	70154 0	56001 0
00,3110	60130 0	56001 0	50120 1	52045 1	44753 0	54140 0	52123 0	52155 1
00,3120	52131 0	03151 1	52125 0	52155 1	52160 1	03151 1	52127 1	52155 1
00,3130	52162 0	03151 1	17417 0	54135 1	34755 1	56123 1	56122 0	56125 1
00,3140	56124 0	56127 0	56126 1	40135 1	50000 1	34736 1	00006 1	70154 0
00,3150	13062 1	10154 0	13170 0	13155 1	13162 0	10155 1	13170 0	00002 0
00,3160	13162 0	00002 0	44755 0	54136 1	00006 1	40155 1	50135 0	12564 0
00,3170	54136 1	52155 1	50135 0	12564 0	03300 1	16060 0	10163 1	13226 0
00,3200	13226 0	03317 1	22163 0	00006 1	30155 0	50120 1	52043 1	03343 0
00,3210	10135 1	13213 0	16060 0	63733 0	00006 1	63221 0	22007 0	22116 1
00,3220	12303 1	50135 0	34735 1	54135 1	34755 1	12036 1	06722 0	16060 0
00,3230	16060 0	17667 0	44751 1	26166 1	00006 1	50000 1	30003 1	52160 1
00,3240	00006 1	50166 0	30001 0	52162 0	16520 1	03317 1	17331 0	00006 1
00,3250	30155 0	50166 0	52001 1	50163 0	36243 1	26166 1	10163 1	13272 1
00,3260	16060 0	00006 1	30160 0	50166 0	51775 0	00006 1	30162 1	50166 0
00,3270	51777 1	16060 0	30156 0	16553 0	50120 1	30052 0	54117 1	16651 1
00,3300	30155 0	00006 1	70000 0	54156 1	34755 1	56155 0	00006 1	70154 0
00,3310	20001 1	20156 1	56154 1	00006 1	70000 0	20155 1	00002 0	00006 1
00,3320	22137 1	03300 1	52160 1	52155 1	52131 0	30156 0	54132 0	03300 1
00,3330	52156 1	20132 0	60154 1	60130 0	54130 1	13337 1	54121 1	52162 0
00,3340	52155 1	03300 1	17204 1	34755 1	54135 1	10154 0	13405 1	13351 1
00,3350	13373 1	56156 0	56155 0	54154 0	34757 0	54135 1	10154 0	13405 1
00,3360	13362 1	13376 1	56155 0	54154 0	34757 0	26135 1	10154 0	13405 1
00,3370	00002 0	13376 1	13453 1	10000 0	13402 0	10155 1	34755 1	13453 1

OCTAL LISTING FOR PARAGRAPH # 023, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

00,3400	13402 0	13453 1	52165 1	05720 1	C: 01302 1	62444 1	00006 1	63456 0
00,3410	52155 1	22021 1	00006 1	74736 0	52155 1	56021 1	26155 1	32314 0
00,3420	00006 1	70154 0	62566 0	54130 1	30154 1	22007 0	00006 1	10130 1
00,3430	00006 1	74736 0	26130 1	00006 1	74736 0	52155 1	00006 1	10130 1
00,3440	54131 0	34755 1	56001 0	00006 1	10130 1	54001 1	30131 1	20155 1
00,3450	00006 1	13455 1	34733 1	54154 0	54155 1	00002 0	64737 0	00006 1
00,3460	63502 0	52155 1	22021 1	00006 1	74736 0	52155 1	56021 1	26155 1
00,3470	33007 0	00006 1	70154 0	62270 0	13423 0	00006 1	30156 0	20156 1
00,3500	60154 1	26154 0	24135 0	00006 1	30156 0	20156 1	60154 1	26154 0
00,3510	60000 1	54022 0	10022 0	10022 0	13475 0	13417 1	13470 0	06722 0
00,3520	13523 1	13526 1	13526 1	00006 1	40155 1	52155 1	34737 0	26154 0
00,3530	52155 1	20001 1	54000 0	13536 0	00006 1	40001 1	52155 1	30154 1
00,3540	60000 1	54001 1	13553 0	50000 1	34735 1	60000 1	00006 1	60154 1
00,3550	54154 0	40155 1	54155 1	00006 1	30155 0	52134 0	03300 1	07221 1
00,3560	C: 00003 1	C: 14441 0	C: 37325 1	C: 53250 0	C: 60764 1	C: 12146 1	C: 21276 1	C: 75466 1
00,3570	C: 71471 0	C: 00236 0	C: 32757 0	32470 0	07105 1	00006 1	30156 0	20156 1
00,3600	60154 1	26154 0	00006 1	30156 0	20156 1	60154 1	26154 0	16060 0
00,3610	33631 0	13613 1	33713 1	54136 1	06722 0	13625 1	13731 0	00006 1
00,3620	40155 1	52155 1	33734 1	56136 0	54137 0	44736 0	60154 1	10000 0
00,3630	13721 1	13707 0	13642 0	10155 1	34755 1	13637 1	13642 0	54155 1
00,3640	54154 0	00136 0	00006 1	40155 1	64736 1	52155 1	52134 0	03343 0
00,3650	10135 1	13714 1	52155 1	52134 0	52155 1	07221 1	C: 00006 1	C: 13240 0
00,3660	C: 23630 0	C: 74721 0	C: 47775 1	C: 02440 0	C: 20237 0	C: 75067 1	C: 70742 1	C: 03436 0
00,3670	C: 26756 1	C: 74037 0	C: 57640 1	C: 03046 0	C: 07143 0	C: 76654 1	C: 42244 0	32470 0
00,3700	07105 1	00136 0	00006 1	40155 1	64736 1	52155 1	00137 1	00006 1
00,3710	40155 1	64737 0	52155 1	16060 0	50000 1	34736 1	54135 1	02073 1
00,3720	13652 1	00006 1	13637 1	00006 1	30165 0	05724 0	C: 01301 1	34755 1
00,3730	13637 1	34737 0	13640 1	C: 77763 0	13702 0	00004 0	54002 1	34752 0
00,3740	54070 1	50000 1	31326 1	00006 1	13752 0	10070 1	13740 0	52134 0
00,3750	05710 1	C: 01104 0	33772 0	54061 1	30004 0	60070 0	54001 1	33773 1
00,3760	15211 1	04645 1	50070 0	55326 0	05133 0	34755 1	50006 1	57326 1
00,3770	05137 1	05261 1	C: 03757 1	C: 03765 0	C: 03774 0	C: 03775 1	CKSM 00034 0	a

OCTAL LISTING FOR PARAGRAPH # 024, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

01,2000	C: 76466 1	C: 76731 0	00010 0	00020 0	00010 0	00023 0	00010 0	00053 1
01,2010	00054 0	00064 0	00137 1	00155 0	00010 0	00166 0	C: 21000 1	C: 05155 0
01,2020	C: 04060 0	C: 00144 0	C: 05261 1	C: 04060 0	C: 76302 1	C: 75440 0	C: 03710 1	C: 02630 0
01,2030	C: 75173 0	C: 26063 0	C: 05000 1	C: 02613 1	C: 26063 0	C: 02734 0	C: 75502 1	C: 27710 1
01,2040	C: 14000 1	C: 02441 1	C: 50067 0	C: 10000 0	C: 02175 0	C: 54067 1	C: 26000 0	C: 02677 0
01,2050	C: 50067 0	C: 77777 0	C: 75447 1	C: 03710 1	C: 00031 0	C: 75675 1	C: 35710 1	C: 76353 0
01,2060	C: 75223 0	C: 03710 1	C: 04704 0	C: 75434 0	C: 03710 1	C: 77777 0	C: 75444 1	C: 03710 1
01,2070	C: 25000 0	C: 03257 1	C: 64067 1	C: 00062 0	C: 75237 0	C: 03710 1	C: 00764 1	C: 75410 0
01,2100	C: 03710 1	C: 76262 0	C: 74235 0	C: 03710 1	C: 12000 1	C: 03223 1	C: 74067 0	C: 00764 1
01,2110	C: 75503 0	C: 03710 1	C: 77777 0	C: 75434 0	C: 03710 1	C: 13000 0	C: 02661 1	C: 30065 1
01,2120	C: 77777 0	C: 75366 0	C: 03710 1	C: 01475 0	C: 75541 0	C: 74067 0	C: 52777 1	C: 02167 0
01,2130	C: 42067 0	C: 52777 1	C: 02172 1	C: 42067 0	C: 46777 1	C: 02024 0	C: 10067 1	C: 46777 1
01,2140	C: 05665 1	C: 04067 1	C: 52777 1	C: 02574 0	C: 74067 0	C: 22000 1	C: 02421 1	C: 66067 0
01,2150	C: 00310 0	C: 74177 0	C: 01710 0	C: 00310 0	C: 74177 0	C: 01710 0	C: 20000 0	C: 02200 1
01,2160	C: 66067 0	C: 00310 0	C: 74177 0	C: 01710 0	C: 77777 0	C: 74340 0	C: 01710 0	C: 77777 0
01,2170	C: 74375 0	C: 01710 0	C: 00144 0	C: 75055 0	C: 03710 1	C: 30000 1	C: 03522 1	C: 10063 0
01,2200	C: 17000 1	C: 03350 1	C: 74067 0	35015 0	54003 0	34745 0	70111 1	10000 0
01,2210	32334 1	62335 0	55442 0	32337 1	55474 0	34737 0	70111 1	00006 1
01,2220	12227 0	31442 1	00006 1	72336 1	55442 0	32340 1	55474 0	00003 1
01,2230	32331 1	04616 1	C: 20231 0	12241 0	12245 1	12230 0	34751 0	05464 1
01,2240	15155 1	00004 0	04674 0	C: 40123 0	15472 1	40106 1	74737 1	10000 0
01,2250	32000 0	62001 1	61331 1	00006 1	62230 1	30111 0	74737 1	00006 1
01,2260	12266 0	44741 0	61332 1	00006 1	62230 1	31332 1	61331 1	22007 0
01,2270	53245 1	00004 0	04674 0	C: 40123 0	00003 1	40106 1	74737 1	00006 1
01,2300	15472 1	32332 1	04616 1	C: 20231 0	05472 0	12312 1	12301 0	34751 0
01,2310	05464 1	15155 1	34753 1	00004 0	05203 0	C: 03106 0	C: 56066 1	15155 1
01,2320	32333 0	04616 1	C: 20237 0	05472 0	05472 0	05472 0	36007 0	05464 1
01,2330	15155 1	C: 01457 0	C: 01460 1	C: 14460 0	C: 25101 0	C: 05220 1	C: 03146 1	C: 77445 1
01,2340	C: 77622 1	02436 1	30117 0	50130 0	54046 1	16060 0	02436 1	40117 1
01,2350	02343 1	02424 1	50117 0	30000 1	12343 0	02424 1	50117 0	40000 0
01,2360	12343 0	02424 1	50130 0	30046 0	50117 0	54000 0	16060 0	02424 1
01,2370	50117 0	30000 1	50130 0	56046 0	12364 0	02424 1	50117 0	30000 1

OCTAL LISTING FOR PARAGRAPH # 025, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

01,2400	50130 0	26046 1	16060 0	02436 1	30117 0	12400 0	02424 1	50117 0
01,2410	40000 0	12400 0	02436 1	50130 0	40050 0	50130 0	60046 0	00006 1
01,2420	66060 1	50130 0	56046 0	16645 1	40117 1	64772 1	10000 0	30120 1
01,2430	12435 0	35007 0	56117 0	54003 0	74357 0	26117 1	30120 1	54130 1
01,2440	10020 1	24130 0	00002 0	00002 0	10020 1	30117 0	04621 0	10154 0
01,2450	16060 0	16645 1	16060 0	16645 1	10121 1	12457 1	16060 0	54121 1
01,2460	10020 1	12445 1	C: 00360 1	16645 1	10020 1	06722 0	16060 0	16645 1
01,2470	16060 0	10020 1	12500 1	C: 12000 1	06722 0	16060 0	16060 0	16645 1
01,2500	06722 0	16645 1	16645 1	16060 0	10020 1	16637 1	05677 1	02424 1
01,2510	50120 1	30052 0	12364 0	34762 0	70117 1	50000 1	34735 1	54131 0
01,2520	34745 0	00006 1	70117 1	54130 1	00004 0	50000 1	30074 1	54002 1
01,2530	34741 1	00006 1	70117 1	72573 0	50000 1	12536 1	30131 1	00006 1
01,2540	04002 1	12550 1	30131 1	00006 1	06002 0	12550 1	40131 0	70002 1
01,2550	50130 0	54074 0	00003 1	34737 0	00006 1	70117 1	72573 0	50000 1
01,2560	12561 0	40002 1	70131 0	10000 0	12574 1	16714 1	12574 1	05677 1
01,2570	05677 1	30002 0	12562 0	C: 00014 1	24164 1	16060 0	54061 1	10400 1
01,2600	12615 0	10454 0	12615 0	10530 0	12615 0	10604 1	12615 0	10660 0
01,2610	12615 0	22061 0	30002 0	05710 1	C: 01201 0	64752 0	22007 0	50000 1
01,2620	21777 0	26063 0	34755 1	54064 1	32631 1	54062 1	50064 0	10167 0
01,2630	12671 1	C: 00007 0	12671 1	30063 1	50064 0	54167 0	75004 1	50064 0
01,2640	54166 1	10064 1	12656 1	54121 1	30166 0	54120 0	10067 1	12656 1
01,2650	05677 1	05677 1	54067 1	52066 0	52165 1	15160 1	52066 0	50064 0
01,2660	52165 1	50067 0	40167 0	60063 1	00006 1	65160 0	30064 0	54067 1
01,2670	15160 1	33030 1	26064 1	10062 1	12625 0	22061 0	30002 0	05710 1
01,2700	C: 01202 0	22164 1	30165 0	00004 0	00006 1	04007 1	56001 0	50067 0
01,2710	52165 1	52165 1	30165 0	00006 1	01007 1	52155 1	50067 0	52155 1
01,2720	52155 1	52157 0	50067 0	52157 0	52157 0	52161 0	50067 0	52161 0
01,2730	52161 0	52163 1	50067 0	52163 1	52163 1	34755 1	56121 0	00006 1
01,2740	12743 1	40166 1	54166 1	52167 0	50067 0	52167 0	52167 0	35004 0
01,2750	70167 0	54120 0	10166 1	34755 1	12761 1	40166 1	54166 1	34753 1
01,2760	56121 0	54067 1	00003 1	52165 1	00006 1	62767 0	52006 0	40000 0
01,2770	64753 1	54164 0	16047 0	00004 0	40167 0	54167 0	36073 0	70006 0

OCTAL LISTING FOR PARAGRAPH # 026, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

01,3000	00006 1	04007 1	54165 1	44755 0	54131 0	13115 0	00004 0	10067 1
01,3010	13013 1	00003 1	13213 0	34752 0	00006 1	05011 1	52165 1	12707 1
01,3020	54061 1	34755 1	54064 1	32631 1	54062 1	50064 0	10167 0	13032 1
01,3030	C: 00014 1	13041 0	33030 1	26064 1	10062 1	13024 0	44753 0	54064 1
01,3040	15160 1	40065 0	50064 0	60164 1	00006 1	13047 0	13032 1	50064 0
01,3050	40167 0	54063 0	50064 0	54167 0	44350 1	70065 0	64741 1	56065 1
01,3060	74350 1	50064 0	60165 0	54066 0	10064 1	12656 1	12646 0	54164 0
01,3070	34755 1	54130 1	35004 0	70167 0	60063 1	54167 0	40000 0	13004 1
01,3100	00004 0	44755 0	54131 0	56167 1	75004 1	54001 1	45164 0	60001 0
01,3110	00006 1	63115 1	10001 1	50000 0	54000 0	10203 1	03166 0	05677 1
01,3120	13121 1	10217 1	03166 0	05677 1	13125 0	10233 1	03166 0	C: 67610 1
01,3130	13131 0	10247 1	03166 0	05677 1	13135 1	10263 1	03166 0	05677 1
01,3140	13141 1	10277 1	03166 0	05677 1	13145 0	10313 1	03166 0	05677 1
01,3150	13151 0	10131 0	05677 1	05677 1	13156 1	13203 1	10130 1	13161 0
01,3160	12761 1	50000 1	27777 0	63127 0	54067 1	12701 1	54132 0	60131 1
01,3170	10000 0	40132 0	13176 0	13174 1	50002 0	00002 0	54131 0	00006 1
01,3200	22130 0	50130 0	00002 0	44755 0	54067 1	00003 1	44752 1	00006 1
01,3210	03011 1	10067 1	13006 0	34752 0	13222 1	31361 1	54001 1	33221 0
01,3220	15166 1	C: 66102 1	00006 1	05011 1	52165 1	15165 1	54062 1	30002 0
01,3230	00006 1	63520 0	40026 1	64744 1	10000 0	66106 0	40000 0	63365 1
01,3240	60002 0	10000 0	61400 1	13305 0	13245 0	40002 1	64736 1	64736 1
01,3250	56026 0	64735 1	60002 0	00006 1	22007 0	57400 1	57401 0	57402 0
01,3260	57403 1	57404 0	57405 1	57406 1	57407 0	30063 1	50002 0	13270 0
01,3270	53411 0	53413 1	53415 1	53417 0	53421 0	53423 1	53425 1	53427 0
01,3300	53431 1	65236 0	00006 1	15215 0	13360 0	10000 0	61401 0	13313 1
01,3310	64753 1	03371 1	C: 00001 0	10000 0	61402 0	13321 0	64753 1	03371 1
01,3320	C: 00002 0	10000 0	61403 1	13327 0	64753 1	03371 1	C: 00003 1	10000 0
01,3330	61404 0	13335 0	64753 1	03371 1	C: 00004 0	10000 0	61405 1	13343 1
01,3340	64753 1	03371 1	C: 00005 1	10000 0	61406 1	13351 1	64753 1	03371 1
01,3350	C: 00006 1	10000 0	61407 0	13357 1	64753 1	03371 1	C: 00007 0	10000 0
01,3360	03366 1	13362 1	64753 1	03371 1	C: 00010 0	C: 40201 0	52062 1	05710 1
01,3370	C: 01203 1	54064 1	50002 0	30000 1	54002 1	34753 1	60064 0	50002 0

OCTAL LISTING FOR PARAGRAPH # 027, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

01,3400	27377 1	40064 1	50002 0	13255 1	00006 1	04007 1	54016 1	00006 1
01,3410	22012 1	34734 0	57407 0	57406 1	57405 1	57404 0	57403 1	57402 0
01,3420	57401 0	57400 1	64733 1	26026 1	54734 0	44755 0	54734 0	00006 1
01,3430	45237 0	53431 1	53427 0	53425 1	53423 1	53421 0	53417 0	53415 1
01,3440	53413 1	53411 0	56001 0	00006 1	01007 1	56001 0	52006 0	23435 1
01,3450	34752 0	26002 1	55434 1	31153 1	10000 0	13463 1	13460 1	13516 1
01,3460	31154 0	00006 1	63516 0	00006 1	43475 0	21154 1	11154 1	13506 0
01,3470	13471 1	13472 1	11153 0	13506 0	C: 00000 1	C: 20000 0	34736 1	27154 1
01,3500	05203 0	C: 03513 0	C: 02063 0	33515 0	53435 0	52006 0	34736 1	05203 0
01,3510	C: 03463 0	C: 02063 0	13503 0	53150 0	52006 0	C: 05261 1	53435 0	13521 0
01,3520	52062 1	05220 1	C: 01204 0	30161 1	60000 1	54155 1	33765 0	54157 0
01,3530	33562 0	54707 0	30154 1	75007 1	10000 0	13546 1	10154 0	10000 0
01,3540	13646 1	35024 1	05105 0	C: 02712 1	C: 20103 1	03562 0	75007 1	10000 0
01,3550	13617 0	00006 1	50155 0	31437 0	52706 1	30154 1	74757 1	67745 0
01,3560	10000 0	13731 0	04631 1	13565 0	13632 1	33771 0	54704 0	50155 0
01,3570	31054 1	10000 0	24000 1	13576 1	15436 1	13615 1	40000 0	54001 1
01,3600	50155 0	41053 1	00006 1	60025 0	10000 0	40000 0	67730 1	64753 1
01,3610	60001 0	10000 0	34755 1	13615 1	13615 1	64753 1	00704 1	33562 0
01,3620	54157 0	33766 0	54707 0	30154 1	76073 1	54154 0	00006 1	50155 0
01,3630	31437 0	52706 1	50155 0	31054 1	54704 0	00006 1	63642 1	33770 1
01,3640	56704 1	00704 1	33772 0	56704 1	40000 0	00704 1	54020 1	10020 1
01,3650	13651 1	13747 1	33562 0	54707 0	30154 1	54021 0	60021 1	50155 0
01,3660	62003 0	54156 1	00006 1	50156 0	32002 1	22706 0	10000 0	24000 1
01,3670	13743 0	24000 1	54705 1	33771 0	54704 0	30706 0	74742 0	10000 0
01,3700	13736 1	50156 0	32000 0	15445 0	53154 1	00006 1	40025 1	21154 1
01,3710	00006 1	31152 0	21154 1	11153 0	13724 1	13717 1	13612 0	11154 1
01,3720	13724 1	13722 1	13612 0	13615 1	33767 1	54704 0	00006 1	31154 0
01,3730	00704 1	33771 0	54704 0	50155 0	41054 0	15445 0	40706 1	54706 1
01,3740	50156 0	32000 0	13571 0	56705 0	50156 0	32000 0	13634 1	30157 1
01,3750	54707 0	50155 0	32002 1	60154 1	60154 1	60154 1	54156 1	13662 1
01,3760	36244 0	26156 1	33562 0	54707 0	13662 1	C: 03760 0	C: 03536 1	C: 05277 0
01,3770	C: 05105 0	C: 05203 0	C: 05072 1	C: 03773 1	C: 03774 0	CKSM 73126 0	a	a

OCTAL LISTING FOR PARAGRAPH # 040, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

04,2000	C: 00302 0	C: 17755 0	C: 00065 1	C: 01265 1	C: 22437 1	C: 16067 1	C: 15625 1	C: 21042 1
04,2010	C: 30276 1	C: 04773 0	C: 25004 1	C: 06702 1	C: 16471 1	C: 01352 1	C: 21412 0	C: 20500 0
04,2020	C: 25477 1	C: 03367 0	C: 27533 1	C: 07571 0	05516 0	C: 00311 1	05516 0	C: 00314 1
04,2030	32036 0	04616 1	C: 20351 1	12030 1	12030 1	12030 1	C: 11343 0	54775 0
04,2040	34355 0	54366 0	31302 1	74746 1	10000 0	12064 0	40775 0	62375 1
04,2050	00006 1	12370 0	64753 1	00006 1	12367 0	30775 1	00006 1	12106 0
04,2060	40076 1	74753 0	10000 0	12071 1	05567 0	C: 01520 1	04457 0	04635 0
04,2070	C: 20723 0	32474 1	54155 1	50155 0	32436 1	76073 1	40000 0	60775 1
04,2100	10000 0	10155 1	12072 1	12317 1	30155 0	54774 1	40103 1	74746 1
04,2110	10000 0	12133 0	05516 0	C: 00163 0	32363 0	55260 0	15155 1	40074 0
04,2120	74745 1	10000 0	12124 0	12131 1	40074 0	74743 1	10000 0	32364 1
04,2130	64747 1	62365 0	05357 0	34755 1	00006 1	01007 1	32362 1	54374 0
04,2140	05353 1	C: 00014 1	06036 1	I: 77624 1	C: 27412 0	I: 77776 1	05516 0	C: 00124 0
04,2150	34735 1	54107 0	05516 0	C: 00063 1	05516 0	C: 00311 1	10775 0	12305 1
04,2160	04457 1	35017 1	55056 1	06011 1	44753 0	70076 1	54076 1	34756 1
04,2170	54001 1	40000 0	52056 1	42366 1	70074 0	54074 0	34755 1	54332 1
04,2200	55324 1	04674 0	C: 75555 0	04674 0	C: 40204 0	44775 1	55072 1	70075 1
04,2210	54075 1	04674 0	C: 12652 0	10775 0	12223 1	04674 0	C: 12647 1	30775 1
04,2220	55011 1	04635 0	C: 12771 0	41011 1	62323 1	00006 1	12245 1	40775 0
04,2230	62323 1	00006 1	12245 1	67745 0	00006 1	12257 1	64756 1	00006 1
04,2240	12257 1	32321 0	70074 0	10000 0	12254 1	42366 1	70074 0	54074 0
04,2250	06011 1	00006 1	34755 1	52755 1	32361 1	54374 0	12221 0	41011 1
04,2260	66007 0	00006 1	12251 1	64756 1	00006 1	12251 1	32321 0	70074 0
04,2270	60775 1	40000 0	62324 0	00006 1	12301 0	62322 0	00006 1	12301 0
04,2300	12251 1	40075 1	74775 1	26075 1	12215 1	32321 0	70074 0	10000 0
04,2310	12313 0	05516 0	C: 00007 0	50774 0	32475 0	00004 0	12177 0	04364 1
04,2320	12066 1	C: 00500 1	C: 00305 1	C: 00076 0	C: 00124 0	00004 0	50774 0	32436 1
04,2330	55060 1	54020 1	30020 0	77724 0	55062 0	54063 0	31060 0	00006 1
04,2340	74744 0	74757 1	54001 1	50774 0	32400 1	55061 0	74350 1	26001 1
04,2350	31061 1	75012 0	64741 1	05116 1	31060 0	76073 1	05314 1	04457 0
04,2360	05155 0	C: 10330 0	C: 10145 0	C: 10117 1	C: 37667 1	C: 40072 0	C: 00700 0	36244 0
04,2370	54002 1	00006 1	32377 0	60002 0	52006 0	C: 00106 0	C: 02166 1	C: 42067 0

OCTAL LISTING FOR PARAGRAPH # 041, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

04,2400	C: 71524 1	C: 71274 0	C: 26207 0	C: 72673 0	C: 72513 0	C: 72164 1	C: 72031 0	C: 62172 1
04,2410	C: 64772 1	C: 33317 1	C: 32050 0	C: 31340 1	C: 75436 1	C: 75410 0	C: 75272 1	C: 75147 1
04,2420	C: 71517 1	C: 71271 0	C: 72667 0	C: 72511 1	C: 72162 1	C: 72027 1	C: 72414 0	C: 72000 1
04,2430	C: 50427 0	C: 50022 1	C: 51402 0	C: 50022 1	C: 60006 1	C: 77641 1	C: 27717 0	C: 27716 1
04,2440	C: 27714 0	C: 27713 1	C: 27712 0	C: 27711 0	C: 27710 1	C: 27704 1	C: 27677 1	C: 27271 0
04,2450	C: 27264 1	C: 27263 0	C: 27657 0	C: 27652 0	C: 27651 0	C: 27650 1	C: 27647 1	C: 27646 0
04,2460	C: 27643 0	C: 27642 1	C: 27641 1	C: 27640 0	C: 27637 0	C: 27636 1	C: 27631 0	C: 27626 0
04,2470	C: 27625 0	C: 27624 1	C: 27614 1	C: 27006 1	C: 00035 1	C: 00002 0	C: 00002 0	C: 00002 0
04,2500	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00004 0	C: 00004 0	C: 00005 1	C: 00000 1
04,2510	C: 00000 1	C: 00003 1	C: 00003 1	C: 00003 1	C: 00003 1	C: 00002 0	C: 00002 0	C: 00002 0
04,2520	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00005 1	C: 00002 0
04,2530	C: 00002 0	C: 00004 0	C: 00000 1	52134 0	53170 1	25167 0	30006 1	75012 0
04,2540	27170 1	51167 0	27777 0	04622 0	02550 0	02547 0	25167 0	25167 0
04,2550	53170 1	52006 0	22164 1	50001 0	30001 0	24001 0	24001 0	53170 1
04,2560	06036 1	I: 77624 1	C: 01167 0	I: 77776 1	23170 0	16040 1	05137 1	44741 0
04,2570	50064 0	26164 0	00072 1	56002 0	54154 0	00004 0	34355 0	05072 1
04,2600	C: 03532 0	C: 60101 1	00003 1	00154 1	54001 1	04220 0	04224 1	04374 0
04,2610	C: 30001 0	55043 0	05133 0	22007 0	34755 1	53052 0	32746 0	04616 1
04,2620	C: 20212 1	15472 1	12624 1	12616 0	53052 0	00006 1	12735 0	52155 1
04,2630	06036 1	I: 77634 0	C: 21670 0	C: 34041 0	C: 27043 0	I: 63375 0	C: 00007 0	C: 00001 0
04,2640	C: 02213 0	I: 63256 0	I: 53435 0	I: 77626 0	C: 61556 0	C: 00015 0	C: 34041 0	C: 27057 0
04,2650	I: 63375 0	C: 00007 0	C: 00001 0	I: 77725 1	C: 00015 0	C: 24037 0	I: 41406 0	I: 63245 1
04,2660	C: 02213 0	I: 72441 0	C: 02221 1	C: 26205 1	C: 00001 0	I: 72441 0	C: 02221 1	C: 26207 0
04,2670	C: 00007 0	I: 41456 0	I: 47235 0	C: 00001 0	C: 00023 0	I: 53552 0	I: 77656 1	C: 24001 0
04,2700	C: 00023 0	I: 74241 0	C: 00015 0	I: 77752 1	I: 53445 1	I: 77656 1	I: 50206 0	C: 00001 0
04,2710	I: 65552 0	C: 26211 1	I: 50235 0	C: 00001 0	I: 71244 0	C: 10722 1	C: 22306 1	I: 77675 0
04,2720	C: 02211 1	C: 02211 1	I: 47145 1	C: 00037 0	C: 21516 0	C: 01052 1	I: 77776 1	32747 1
04,2730	04616 1	C: 20212 1	15472 1	15472 1	12616 0	56001 0	00006 1	12742 0
04,2740	56001 0	12627 1	06036 1	I: 52034 1	C: 21462 1	C: 10633 0	C: 01420 0	C: 01532 1
04,2750	C: 00000 1	C: 04000 0	C: 00000 1	C: 00200 0	C: 00000 1	C: 00400 0	C: 00000 1	C: 10000 0
04,2760	C: 00000 1	C: 02000 0	C: 00000 1	C: 01000 0	C: 00000 1	C: 00020 0	C: 00000 1	C: 00100 0
04,2770	C: 00000 1	C: 34631 1	C: 23146 0	C: 77467 1	C: 77777 0	C: 03110 1	C: 17665 1	C: 00000 1

OCTAL LISTING FOR PARAGRAPH # 042, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

04,3000	C: 00001 0	C: 37767 0	C: 37737 0	C: 40010 1	C: 40040 1	I: 43020 1	C: 02753 1	C: 03665 1
04,3010	I: 77614 1	C: 04273 0	I: 45131 0	C: 02673 1	C: 27777 0	C: 11051 0	C: 14045 0	I: 56261 1
04,3020	C: 20606 0	C: 00045 0	C: 32766 1	C: 10005 0	C: 14017 1	C: 02720 0	I: 60316 0	C: 00047 1
04,3030	I: 41275 1	C: 00017 1	C: 00041 1	I: 77657 0	C: 21576 0	I: 44206 0	C: 10764 0	C: 16742 1
04,3040	I: 60205 0	C: 00045 0	C: 00047 1	I: 53605 1	C: 00045 0	C: 20575 1	C: 02740 0	I: 77650 1
04,3050	C: 02753 1	I: 77656 1	C: 16712 1	C: 00045 0	C: 26720 0	I: 77656 1	C: 02722 1	I: 72441 0
04,3060	C: 02712 1	I: 77725 1	C: 00045 0	C: 24041 1	C: 02722 1	I: 76435 1	C: 02712 1	I: 75214 1
04,3070	C: 03705 0	C: 11103 0	C: 02673 1	I: 40056 0	C: 11101 1	C: 16674 0	C: 00045 0	I: 43565 0
04,3100	C: 02673 1	I: 52162 0	C: 11075 0	I: 75246 0	C: 02673 1	I: 77616 0	00003 1	00006 1
04,3110	23167 0	06036 1	I: 53135 0	C: 01502 1	C: 11153 0	I: 77775 1	C: 01503 0	C: 25535 0
04,3120	C: 01511 0	I: 77624 1	C: 23362 1	I: 51535 0	C: 01502 1	I: 53025 0	C: 11164 1	C: 11134 1
04,3130	I: 43174 1	C: 00000 1	C: 00223 1	C: 11137 1	I: 43174 1	C: 00002 0	C: 00063 1	I: 50135 0
04,3140	C: 01502 1	C: 11147 0	I: 77624 1	C: 26661 1	I: 52014 0	C: 01671 0	C: 11151 1	I: 77624 1
04,3150	C: 26734 0	I: 77614 1	C: 02676 1	I: 45131 0	C: 01502 1	C: 00000 1	C: 27425 1	I: 77776 1
04,3160	05353 1	C: 04026 1	01167 0	C: 00002 0	C: 00000 1	I: 77420 1	C: 02711 1	05353 1
04,3170	C: 04022 0	06036 1	I: 77650 1	C: 02711 1	C: 00063 1	34737 0	70077 0	10000 0
04,3200	03211 0	31302 1	74743 1	00006 1	13206 1	44750 0	63214 0	05735 0
04,3210	06001 0	05504 0	C: 00007 0	14631 0	C: 00220 1	54016 1	56002 0	54012 0
04,3220	04400 1	34346 1	00006 1	02015 1	54073 1	40101 0	74735 0	26101 0
04,3230	34355 0	05072 1	C: 02077 0	C: 60101 1	30073 0	50064 0	54154 0	05270 1
04,3240	54016 1	56002 0	54012 0	04400 1	34755 1	56045 0	54073 1	34751 0
04,3250	00006 1	05011 1	34346 1	70073 1	56073 0	00006 1	74742 0	54734 0
04,3260	74346 0	63315 0	03312 1	34742 1	00006 1	70734 0	74346 0	40000 0
04,3270	03312 1	43320 1	60073 0	00006 1	13302 1	34750 1	70103 1	10000 0
04,3300	05270 1	03230 0	44750 0	70103 1	54103 1	03230 0	40103 1	74750 0
04,3310	26103 1	05270 1	60073 0	10000 0	03306 1	C: 77740 1	03306 1	00002 0
04,3320	C: 00022 1	44753 0	05353 1	C: 07026 1	C: 30000 1	C: 03633 1	C: 10102 0	34753 1
04,3330	54332 1	05311 1	C: 00033 1	51172 1	13335 0	13340 1	13343 1	13343 1
04,3340	34752 0	55170 1	13366 0	33436 0	54156 1	33437 1	04616 1	C: 20212 1
04,3350	13633 0	13345 1	03427 0	44752 1	61174 1	00006 1	63345 0	41174 0
04,3360	64362 1	00006 1	63345 0	31174 1	55170 1	25173 0	33603 1	61173 0
04,3370	54156 1	33437 1	04616 1	C: 20212 1	13633 0	13371 0	03427 0	41173 1

04,3740	მ	მ	მ	მ	მ	მ	მ	მ
04,3750	მ	მ	მ	მ	მ	მ	მ	მ
04,3760	მ	მ	მ	მ	მ	მ	მ	მ
04,3770	მ	მ	მ	მ	მ	მ	მ	მ

OCTAL LISTING FOR PARAGRAPH # 044, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "Q" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

05,2000	C: 02357 1	C: 20000 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1
05,2010	C: 00000 1	C: 16533 0	C: 30007 0	C: 77333 1	C: 56654 0	C: 00000 1	C: 00000 1	C: 06273 1
05,2020	C: 03275 1	C: 01242 1	C: 24467 1	C: 00020 0	C: 17260 0	C: 00002 0	C: 00000 1	C: 22572 1
05,2030	C: 27214 0	C: 01315 1	C: 26177 1	C: 77731 1	C: 55217 0	C: 16455 1	C: 04475 0	C: 10637 1
05,2040	C: 04312 0	C: 01215 0	C: 26351 1	C: 01070 1	C: 35243 1	C: 11126 1	C: 14467 1	C: 02245 0
05,2050	C: 06475 1	C: 00163 0	C: 32331 1	C: 03476 1	C: 03302 0	C: 02000 0	C: 00000 1	C: 00256 0
05,2060	C: 25374 0	C: 77525 0	C: 53143 1	C: 00131 1	C: 26730 1	C: 77340 0	C: 32127 1	C: 24340 0
05,2070	C: 03447 0	C: 13441 1	C: 02262 0	C: 01344 0	C: 25733 1	C: 03631 0	C: 12272 0	C: 13704 0
05,2100	C: 01340 1	C: 03626 0	C: 32136 1	C: 00024 1	C: 32145 0	C: 24340 0	C: 32154 0	C: 07115 0
05,2110	C: 00007 0	C: 03373 0	C: 12300 1	C: 03633 1	C: 13365 0	C: 01333 0	C: 05336 1	C: 03575 0
05,2120	C: 01331 1	C: 01302 1	C: 03437 1	C: 32157 0	C: 32170 0	C: 00007 0	C: 74263 0	C: 76056 0
05,2130	C: 01723 0	C: 01725 0	C: 01727 1	C: 01731 0	C: 01570 1	C: 76060 0	C: 04320 1	C: 01432 0
05,2140	C: 07017 0	C: 07233 1	C: 04032 1	C: 24074 1	C: 52754 0	C: 76555 0	C: 01224 1	C: 01226 0
05,2150	C: 01230 1	C: 01232 0	C: 01234 0	C: 76557 1	C: 07241 1	C: 10372 0	C: 77667 0	C: 07017 0
05,2160	C: 07233 1	C: 04032 1	C: 03022 1	C: 03113 1	C: 34011 0	C: 34013 1	C: 34030 0	C: 43745 0
05,2170	C: 03556 1	C: 67453 1	C: 32127 1	C: 24340 0	C: 02020 1	C: 02774 1	C: 07115 0	C: 01333 0
05,2200	C: 01344 0	C: 25733 1	C: 00735 0	C: 13704 0	C: 05336 1	C: 32224 1	C: 32136 1	C: 00024 1
05,2210	C: 32145 0	C: 24340 0	C: 32154 0	C: 32226 0	C: 05336 1	C: 04036 0	C: 00112 0	C: 01331 1
05,2220	C: 01302 1	C: 03437 1	C: 32157 0	C: 52754 0	C: 05700 0	C: 77665 1	C: 12737 1	C: 02755 1
05,2230	C: 12760 0	C: 65011 1	C: 32127 1	C: 24340 0	C: 32276 0	C: 14340 0	C: 03447 0	C: 13441 1
05,2240	C: 13431 0	C: 03631 0	C: 12272 0	C: 00007 0	C: 03626 0	C: 32224 1	C: 32136 1	C: 00024 1
05,2250	C: 32145 0	C: 24340 0	C: 32154 0	C: 07115 0	C: 00007 0	C: 03373 0	C: 12300 1	C: 03633 1
05,2260	C: 13365 0	C: 02262 0	C: 04036 0	C: 00112 0	C: 01331 1	C: 01302 1	C: 03437 1	C: 32157 0
05,2270	C: 02306 0	C: 03616 0	C: 03464 1	C: 03575 0	C: 02353 0	C: 77770 1	C: 74322 1	C: 03457 1
05,2300	C: 03750 0	C: 03752 1	C: 76444 1	C: 32341 0	C: 32355 0	C: 01344 0	C: 13251 0	C: 13645 1
05,2310	C: 03640 0	C: 03662 0	C: 12022 1	C: 00007 0	C: 32224 1	C: 32136 1	C: 00024 1	C: 32145 0
05,2320	C: 24340 0	C: 32154 0	C: 07115 0	C: 12543 0	C: 13624 0	C: 13632 1	C: 02256 1	C: 02400 1
05,2330	C: 03613 0	C: 00112 0	C: 01331 1	C: 01302 1	C: 03437 1	C: 32157 0	C: 32170 0	C: 03612 1
05,2340	C: 74326 0	C: 75435 1	C: 03647 1	C: 02343 1	C: 03650 1	C: 03752 1	C: 03652 0	C: 03754 1
05,2350	C: 03455 0	C: 03457 1	C: 03750 0	C: 03752 1	C: 75437 0	C: 24340 0	C: 57423 0	C: 32127 1
05,2360	C: 24340 0	C: 32276 0	C: 14340 0	C: 02774 1	C: 25733 1	C: 26242 1	C: 32224 1	C: 32136 1
05,2370	C: 00024 1	C: 32145 0	C: 24340 0	C: 32154 0	C: 32226 0	C: 12234 1	C: 02020 1	C: 00112 0

OCTAL LISTING FOR PARAGRAPH # 045, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

05,2400	C: 01331 1	C: 01302 1	C: 03437 1	C: 32157 0	C: 32170 0	C: 00007 0	C: 77770 1	C: 12204 1
05,2410	C: 02220 0	C: 12205 0	C: 02221 1	C: 12212 0	C: 02220 0	C: 12213 1	C: 02221 1	C: 25170 0
05,2420	C: 25204 0	C: 32136 1	C: 00024 1	C: 32145 0	C: 24340 0	C: 32154 0	C: 07115 0	C: 00007 0
05,2430	C: 00007 0	C: 02020 1	C: 25174 1	C: 15210 0	C: 01331 1	C: 01302 1	C: 00007 0	C: 32157 0
05,2440	C: 52754 0	C: 02172 1	C: 02407 0	C: 02232 0	C: 02066 0	C: 02303 0	C: 02357 1	00004 0
05,2450	03100 0	12456 0	34736 1	05105 0	C: 77777 0	C: 77777 0	31036 0	74771 0
05,2460	64735 1	55036 1	34740 0	54333 0	34755 1	55365 1	54375 1	54376 1
05,2470	54377 0	54320 1	44644 1	55313 0	34736 1	00006 1	01011 0	44755 0
05,2500	54055 0	34751 0	55273 1	34355 0	54366 0	34755 1	55246 1	54371 0
05,2510	55072 1	55262 1	55263 0	55276 1	55360 1	55362 0	54332 1	55324 1
05,2520	55501 0	00006 1	01005 0	00006 1	01006 0	00006 1	01012 0	00006 1
05,2530	01013 1	00006 1	01014 0	41036 1	74771 0	10000 0	02542 0	34771 1
05,2540	00006 1	05012 1	02643 1	44755 0	55011 1	33350 1	55302 0	33062 0
05,2550	55346 0	34751 0	55325 0	33056 1	54111 1	35015 0	54003 0	33053 1
05,2560	55442 0	33054 0	55474 0	32000 0	55400 0	33057 0	55403 0	55406 0
05,2570	33060 1	55405 0	55410 1	34755 1	55407 1	34363 0	55404 1	34744 1
05,2600	55411 0	35026 0	64746 0	55303 1	00006 1	33355 1	52075 1	33356 1
05,2610	54076 1	34737 0	70077 0	63357 0	54077 0	00006 1	33361 0	52101 0
05,2620	00006 1	33363 1	52103 1	34744 1	64740 0	64741 1	70104 0	63364 0
05,2630	54104 0	33365 1	54105 1	34737 0	70106 1	63366 1	54106 1	33367 0
05,2640	54107 0	04635 0	C: 03205 0	00004 0	00006 1	34755 1	52755 1	00006 1
05,2650	34755 1	52761 0	00006 1	34755 1	52753 1	00006 1	34755 1	52757 0
05,2660	00006 1	34755 1	52763 1	00006 1	34755 1	52765 1	00002 0	24320 0
05,2670	22002 0	00006 1	04007 1	53433 0	31036 0	74750 0	00006 1	12703 0
05,2700	64746 0	00006 1	05012 1	03100 0	34350 0	71360 1	00006 1	12711 0
05,2710	12501 0	41360 1	00006 1	12730 0	61377 0	00006 1	12720 1	12501 0
05,2720	31374 0	54003 0	00006 1	31376 1	51377 0	52001 1	34755 1	55360 1
05,2730	12731 1	03063 1	44736 0	70106 1	54106 1	33352 0	71036 1	64735 1
05,2740	57036 0	33336 1	71302 0	63351 0	55302 0	31324 0	54332 1	34750 1
05,2750	00006 1	05014 1	40101 0	74745 1	10000 0	12762 1	34737 0	00006 1
05,2760	05011 1	12776 1	34736 1	00006 1	05011 1	12776 1	00004 0	03115 1
05,2770	12772 0	03137 1	03063 1	43061 1	70106 1	54106 1	34756 1	54161 0

OCTAL LISTING FOR PARAGRAPH # 046, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

05,3000	60000 1	00006 1	50000 1	30753 0	00006 1	06001 0	10000 0	13047 0
05,3010	13047 0	13047 0	10161 0	12777 0	54162 0	05315 0	00004 0	44736 0
05,3020	70075 1	54075 1	34756 1	54161 0	60000 1	50000 1	10753 1	13031 1
05,3030	13036 0	54154 0	24154 1	24162 1	33055 1	04622 0	10161 0	13023 1
05,3040	10162 0	12641 1	34735 1	71011 1	00006 1	16001 1	12641 1	05567 0
05,3050	C: 01107 0	12501 0	C: 07777 1	C: 32321 0	C: 77445 1	C: 03523 0	C: 21312 1	C: 77001 0
05,3060	C: 00074 1	C: 20100 1	C: 03434 1	34747 1	00006 1	02016 1	00006 1	13075 1
05,3070	00006 1	00015 0	63347 1	00006 1	13076 1	00002 0	03100 0	12474 0
05,3100	33337 0	54335 0	34746 0	00006 1	02033 0	63353 1	54110 0	34733 1
05,3110	54026 1	67745 0	54027 0	67746 0	54030 0	35015 0	54003 0	44737 1
05,3120	71273 1	55273 1	34733 1	55464 1	00006 1	03013 0	34755 1	55463 0
05,3130	55470 1	44751 1	70111 1	54111 1	00006 1	33335 1	53275 1	33346 0
05,3140	00006 1	03011 1	44743 1	70077 0	54077 0	40077 0	74741 0	00006 1
05,3150	13152 0	34742 1	63342 1	40000 0	70110 0	54110 0	33344 1	00006 1
05,3160	03012 1	44750 0	70101 0	54101 0	33345 0	00006 1	03013 0	34740 0
05,3170	00006 1	05013 0	34746 0	00006 1	03014 1	35007 0	54003 0	34734 0
05,3200	55407 1	55406 0	55405 0	55404 1	55403 0	55402 1	55401 1	55400 0
05,3210	45236 1	55410 1	55412 0	55414 0	55416 1	55420 1	55422 0	55424 0
05,3220	55426 1	55430 0	45237 0	55411 0	55413 1	55415 1	55417 0	55421 0
05,3230	55423 1	55425 1	55427 0	55431 1	44755 0	54167 0	54203 1	54217 1
05,3240	54233 1	54247 1	54263 1	54277 1	54313 1	55313 0	54067 1	33341 1
05,3250	54400 1	63343 0	54454 0	63343 0	54530 0	63343 0	54604 1	63343 0
05,3260	54660 0	34363 0	54154 0	44740 1	50154 1	55023 0	10154 0	13262 0
05,3270	55326 0	55327 1	55330 1	55074 1	54045 1	54776 0	55042 1	55013 0
05,3300	55015 0	55012 1	55020 0	55021 1	55001 0	55002 0	55043 0	55312 1
05,3310	55044 1	55304 0	55305 1	55306 1	55307 0	55314 1	54100 1	34760 1
05,3320	55016 0	44753 0	55100 0	34746 0	71303 1	65026 0	55303 1	33340 0
05,3330	55361 0	44360 1	54777 1	00002 0	C: 02024 0	C: 34066 0	C: 00435 0	C: 03437 1
05,3340	C: 03344 1	C: 00400 0	C: 32001 1	C: 00054 0	C: 27470 1	C: 74160 0	C: 30001 0	C: 77755 0
05,3350	C: 37411 1	C: 37000 0	C: 00450 0	C: 00102 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 02000 0
05,3360	C: 00000 1	C: 00000 1	C: 00000 1	C: 00100 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 40000 0
05,3370	I: 44001 0	C: 00001 0	C: 02736 1	I: 47135 0	C: 00012 1	C: 21465 0	I: 71406 0	I: 73525 1

OCTAL LISTING FOR PARAGRAPH # 047, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

05,3400	I: 77626 0	C: 60016 0	C: 00011 1	I: 77634 0	C: 21465 0	I: 71406 0	C: 00025 0	I: 73525 1
05,3410	I: 57406 1	C: 14027 1	C: 22275 1	C: 14023 0	I: 72405 0	C: 00001 0	C: 17763 0	I: 72405 0
05,3420	I: 77626 0	C: 50012 1	C: 00023 0	I: 53435 0	C: 03761 1	C: 00031 0	I: 77650 1	C: 02736 1
05,3430	54016 1	00006 1	22012 1	34745 0	00006 1	05013 0	00335 1	37746 0
05,3440	54337 1	54336 0	33562 0	54335 0	13460 1	10336 0	03575 0	C: 77753 0
05,3450	13451 0	10337 1	13610 1	C: 74001 0	30334 0	00006 1	63460 0	13465 0
05,3460	50332 0	32441 1	54334 1	40332 1	13700 1	50334 0	30000 1	10000 0
05,3470	24334 0	13475 0	56334 0	40000 0	56334 0	24000 1	54336 0	63447 0
05,3500	10000 0	13505 0	C: 47777 0	13505 0	03527 1	30336 1	63502 0	00006 1
05,3510	63575 0	67740 0	00006 0	63533 1	00006 1	50336 1	44000 1	54001 1
05,3520	00006 1	50336 1	43777 1	54336 0	37746 0	56336 1	13623 1	44745 1
05,3530	00006 1	03013 0	00002 0	50336 1	00000 1	10000 0	30336 1	13607 1
05,3540	56336 1	54337 1	34755 1	56336 1	54003 0	74357 0	00006 1	50000 1
05,3550	31402 0	50336 1	52341 0	24336 1	24336 1	24337 0	50337 0	00000 1
05,3560	10000 0	13544 0	C: 03445 1	54337 1	37746 0	54336 0	56337 0	54003 0
05,3570	74357 0	00006 1	50000 1	31402 0	13623 1	30336 1	54003 0	74357 0
05,3600	54001 1	33453 0	26336 0	00006 1	50001 0	31401 0	13623 1	54337 1
05,3610	50337 0	00000 0	10000 0	24337 0	13620 1	54337 1	37746 0	56337 0
05,3620	24000 1	54336 0	13506 0	00006 1	01034 1	30001 0	00006 1	01035 0
05,3630	15270 0	34755 1	54336 0	03675 0	33643 0	54335 0	30025 0	56001 0
05,3640	30336 1	13623 1	C: 03644 1	C: 03657 0	34752 0	26336 0	74357 0	10000 0
05,3650	13661 1	30336 1	70333 0	77721 0	10000 0	13437 0	13633 0	33642 1
05,3660	54335 0	30336 1	54003 0	74357 0	54002 1	34754 0	54001 1	50002 0
05,3670	71401 1	56001 0	50002 0	71400 0	13623 1	00006 1	22335 1	35011 1
05,3700	54001 1	03527 1	32065 0	56001 0	13623 1	C: 03705 0	C: 03706 0	CKSM 76015 1
05,3710	0	0	0	0	0	0	0	0
05,3720	0	0	0	0	0	0	0	0
05,3730	0	0	0	0	0	0	0	0
05,3740	0	0	0	0	0	0	0	0
05,3750	0	0	0	0	0	0	0	0
05,3760	0	0	0	0	0	0	0	0
05,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 050, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

06,2000	54016 1	54016 1	22012 1	11313 0	12010 0	12007 0	12134 1	34757 0
06,2010	54070 1	55313 0	11036 1	02063 0	02063 0	57036 0	74356 1	55036 1
06,2020	64101 0	00006 1	01010 1	02071 0	55016 0	44755 0	54073 1	56776 1
06,2030	64754 0	54776 0	50776 1	11023 0	10776 0	12030 1	12047 1	C: 00012 1
06,2040	10073 1	C: 37764 0	55016 0	00002 0	54073 1	32037 1	12031 0	64753 1
06,2050	50776 1	55023 0	74356 1	54073 1	34350 0	50776 1	74066 1	60073 0
06,2060	00006 1	01010 1	16736 1	10101 0	34755 1	12130 0	11016 0	02024 0
06,2070	12130 0	42171 0	27313 0	37730 1	54027 0	31303 0	00006 1	06032 0
06,2100	74736 0	00006 1	12116 1	23303 0	00006 1	06001 0	55303 1	74736 0
06,2110	10000 0	12116 1	34355 0	05072 1	C: 03450 0	C: 60101 1	50070 0	12120 1
06,2120	03156 0	13006 0	12172 0	13132 0	03156 0	13006 0	12172 0	13132 0
06,2130	00006 1	01010 1	32041 0	12074 1	34736 1	71313 0	00006 1	12165 0
06,2140	11016 0	02024 0	12152 1	44736 0	27313 0	37730 1	54027 0	34743 0
06,2150	27313 0	05270 1	00006 1	01010 1	37730 1	26027 0	34743 0	27313 0
06,2160	11313 0	05270 1	C: 37737 0	02154 0	05270 1	00006 1	01010 1	34736 1
06,2170	12144 0	C: 22400 0	31302 1	00006 1	06030 1	72761 1	00006 1	12227 0
06,2200	54070 1	23302 1	00006 1	06001 0	55302 0	44753 0	56070 0	00006 1
06,2210	62514 0	12213 1	64753 1	24070 0	60000 1	54000 0	12213 1	56071 1
06,2220	50070 0	34736 1	71302 0	50070 0	02755 1	10071 0	12212 0	41302 0
06,2230	74745 1	10000 0	12374 1	34744 1	71302 0	10000 0	12242 0	34744 1
06,2240	27302 0	12374 1	42777 0	71302 0	55302 0	74736 0	10000 0	12347 1
06,2250	41302 0	74743 1	10000 0	12256 0	05567 0	C: 00213 1	02735 1	33005 1
06,2260	05203 0	C: 02266 1	C: 14106 0	12374 1	33005 1	05224 0	44752 1	71302 0
06,2270	57302 1	74752 1	00006 1	12306 1	34736 1	71302 0	00006 1	12264 1
06,2300	40074 0	74744 0	10000 0	15261 0	04635 0	C: 17612 1	34735 1	00006 1
06,2310	05012 1	04674 0	C: 17241 0	05457 1	44763 0	00006 1	03012 1	34741 1
06,2320	05224 0	42774 0	71302 0	55302 0	44746 1	71303 1	55303 1	40076 1
06,2330	74735 0	00006 1	12336 1	26076 1	30025 0	57075 1	02703 1	44735 0
06,2340	00006 1	03012 1	35003 1	05203 0	C: 03227 0	C: 16103 1	15261 0	34750 1
06,2350	00006 1	02012 0	10000 0	12374 1	34744 1	70074 0	10000 0	12374 1
06,2360	02746 0	04674 0	C: 17241 0	34747 1	00006 1	05012 1	05457 1	34746 0
06,2370	05203 0	C: 02313 1	C: 14106 0	12374 1	31303 0	75026 1	54001 1	35026 0

OCTAL LISTING FOR PARAGRAPH # 051, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

06,2400	00006 1	03033 1	00006 1	06001 0	00006 1	12434 1	54070 1	23303 0
06,2410	00006 1	06001 0	55303 1	34755 1	56070 0	60000 1	12421 0	64753 1
06,2420	24070 0	60000 1	54000 0	12420 1	56071 1	50070 0	34737 0	71303 1
06,2430	50070 0	02763 1	10071 0	12417 0	10034 1	12441 0	12465 0	12441 0
06,2440	12465 0	62512 0	00006 1	62464 0	62513 1	00006 1	62462 0	34750 1
06,2450	00006 1	02012 0	10000 0	12462 1	04674 0	C: 17117 0	36241 0	05203 0
06,2460	C: 03113 1	C: 16103 1	34746 0	12465 0	34755 1	61036 0	74746 1	00006 1
06,2470	15270 0	71036 1	10000 0	12507 0	34746 0	71302 0	10000 0	15270 0
06,2500	41036 1	74746 1	64735 1	57036 0	72162 1	27036 1	15270 0	02766 1
06,2510	15270 0	12500 1	C: 63434 1	C: 75252 0	74733 0	54071 0	11302 0	12525 0
06,2520	12525 0	34750 1	00006 1	05011 1	12225 1	02766 1	12225 1	44750 0
06,2530	00006 1	03011 1	12225 1	34752 0	71302 0	10000 0	12225 1	34736 1
06,2540	71302 0	00006 1	12556 1	34735 1	00006 1	02012 0	00006 1	12551 0
06,2550	12225 1	34752 0	27302 0	05567 0	C: 02027 1	12225 1	41302 0	74745 1
06,2560	27302 0	32564 1	54110 0	12225 1	C: 00102 1	10000 0	12361 0	43002 1
06,2570	00006 1	03014 1	42776 1	00006 1	03012 1	44745 1	70101 0	54101 0
06,2600	44355 1	00006 1	02011 0	64736 1	00006 1	01011 0	02743 0	04674 0
06,2610	C: 17150 0	44755 0	54050 0	54051 1	54052 1	54047 0	43001 1	00006 1
06,2620	03014 1	12225 1	00006 1	12643 0	41303 1	74746 1	27303 1	04674 0
06,2630	C: 17150 0	42777 0	70074 0	56074 1	40000 0	74744 0	10000 0	12225 1
06,2640	05567 0	C: 00214 0	12225 1	34752 0	71302 0	10000 0	12225 1	12556 1
06,2650	10000 0	34742 1	57302 1	73004 1	27302 0	02703 1	41302 0	74753 0
06,2660	10000 0	12432 1	31302 1	73000 0	10000 0	12432 1	05567 0	C: 00212 0
06,2670	12432 1	10000 0	12432 1	05567 0	C: 01105 1	12432 1	10000 0	12432 1
06,2700	05567 0	C: 01106 1	12432 1	34761 0	71302 0	00006 1	74742 0	31302 1
06,2710	00006 1	04001 1	40000 0	75025 1	10000 0	12726 1	34753 1	71303 1
06,2720	10000 0	00002 0	44753 0	00006 1	03011 1	00002 0	00006 1	22066 1
06,2730	05735 0	34753 1	00006 1	05011 1	00066 1	43003 0	00006 1	03012 1
06,2740	34763 1	00006 1	05012 1	41036 1	72773 1	27036 1	41302 0	72775 1
06,2750	27302 0	41303 1	74746 1	27303 1	00002 0	12533 1	12703 0	12703 0
06,2760	12565 1	C: 76400 1	12622 1	12650 1	12671 1	12676 0	41303 1	74753 0
06,2770	10000 0	24002 0	00002 0	C: 40010 1	C: 00054 0	C: 00075 0	C: 00272 0	C: 00300 1

OCTAL LISTING FOR PARAGRAPH # 052, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

06,3000	C: 01720 0	C: 00740 1	C: 77000 1	C: 40040 1	C: 76777 1	C: 21450 0	30110 1	00006 1
06,3010	06033 1	74752 1	00006 1	13037 1	22110 1	00006 1	06001 0	73033 0
06,3020	54110 0	74752 1	10000 0	13034 1	37662 1	26110 0	34753 1	05203 0
06,3030	C: 02062 1	C: 52107 0	13132 0	C: 05776 1	44752 1	00006 1	03012 1	30110 1
06,3040	00006 1	06030 1	74745 1	00006 1	13071 0	34752 0	70110 0	10000 0
06,3050	13132 0	34745 0	22110 1	00006 1	06001 0	54110 0	30110 1	74745 1
06,3060	10000 0	13070 1	40074 0	74745 1	10000 0	13070 1	05567 0	C: 00515 0
06,3070	04564 1	30101 1	74750 0	10000 0	13132 0	40103 1	74747 0	10000 0
06,3100	13105 1	30102 1	74744 0	10000 0	13132 0	33127 0	70110 0	10000 0
06,3110	13132 0	04523 1	C: 00035 1	13115 0	13132 0	34741 1	26110 0	43130 1
06,3120	00006 1	03012 1	34752 0	05203 0	C: 02127 1	C: 52107 0	13132 0	C: 32002 1
06,3130	C: 20002 1	C: 02100 1	30034 0	05033 1	55412 0	30034 0	05032 0	54061 1
06,3140	30032 0	05033 1	55415 1	41415 1	00006 1	70061 1	55414 0	30032 0
06,3150	05032 0	55416 1	00006 1	70061 1	55413 1	05270 1	44755 0	00006 1
06,3160	06032 0	74357 0	54002 1	41276 1	70002 1	54001 1	40002 1	71276 1
06,3170	26001 1	00006 1	15270 0	00006 1	74745 1	56001 0	24001 0	60000 1
06,3200	54000 0	13176 0	50001 0	34743 0	54002 1	71276 1	10000 0	13223 0
06,3210	41262 1	50001 0	73242 1	27262 1	41263 0	50001 0	73252 0	27263 0
06,3220	30002 0	27276 1	13236 1	50001 0	43242 1	71262 1	55262 1	50001 0
06,3230	43252 0	71263 0	55263 0	40002 1	71276 1	55276 1	37714 1	05072 1
06,3240	C: 02454 0	C: 40106 1	15270 0	C: 00040 0	C: 00020 0	C: 00100 0	C: 00200 0	C: 00010 0
06,3250	C: 00001 0	C: 00004 0	C: 00002 0	C: 00010 0	C: 00020 0	C: 00004 0	C: 00200 0	C: 00001 0
06,3260	C: 00002 0	C: 00040 0	C: 00100 0	33531 0	56003 1	54163 1	11477 0	13272 1
06,3270	13272 1	13353 0	34751 0	54132 0	50132 1	31453 1	00006 1	50132 1
06,3300	70324 0	54002 1	30001 0	00006 1	74746 1	50132 1	54325 1	30002 0
06,3310	00006 1	74746 1	50132 1	20325 1	50132 1	41452 1	00006 1	71075 0
06,3320	00006 1	74750 0	50132 1	20325 1	10132 0	67746 0	13273 0	13330 0
06,3330	55477 0	54130 1	03356 1	41460 0	03454 1	03373 0	41461 1	03454 1
06,3340	03410 1	31462 0	03454 1	11477 0	13346 1	13353 0	35031 0	05072 1
06,3350	C: 03507 0	C: 14063 1	00003 1	30163 0	54003 0	14631 0	00006 1	22156 0
06,3360	00006 1	40325 1	52155 1	31463 1	03425 1	00006 1	40327 0	52155 1
06,3370	41466 0	03425 1	00156 0	00006 1	22156 0	00006 1	40327 0	52155 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

06,3740	მ	მ	მ	მ	მ	მ	მ	მ
06,3750	მ	მ	მ	მ	მ	მ	მ	მ
06,3760	მ	მ	მ	მ	მ	მ	მ	მ
06,3770	მ	მ	მ	მ	მ	მ	მ	მ

OCTAL LISTING FOR PARAGRAPH # 054, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

07,2000	00004 0	11312 1	02004 1	02006 0	05652 0	C: 00105 0	36241 0	71044 1
07,2010	10000 0	12044 1	34752 0	27044 1	10400 1	12031 0	10454 0	12031 0
07,2020	10530 0	12031 0	10604 1	12031 0	10660 0	12031 0	52134 0	05710 1
07,2030	C: 01207 0	64752 0	55312 1	34755 1	51312 0	53777 0	35025 0	05105 0
07,2040	C: 02060 0	C: 16067 1	00003 1	14631 0	52134 0	05710 1	C: 01211 1	34755 1
07,2050	57312 0	75004 1	10000 0	50000 1	54000 0	34753 1	04674 0	C: 17640 0
07,2060	41312 1	74740 1	27312 1	32330 0	04616 1	C: 20212 1	06001 0	12071 1
07,2070	12060 1	37743 0	70735 1	00006 1	74743 1	55547 1	00006 1	62060 0
07,2100	74751 1	00006 1	12123 1	32331 1	04616 1	C: 20212 1	06001 0	12111 0
07,2110	12103 0	00006 1	31350 0	50120 1	52011 0	34753 1	71547 1	00006 1
07,2120	12133 0	34755 1	12137 1	51547 0	31406 1	50120 1	54011 0	51547 0
07,2130	31403 1	50120 1	54010 1	31405 1	00006 1	50120 1	20010 1	50120 1
07,2140	54012 0	06036 1	I: 77624 1	C: 13370 1	I: 70535 0	C: 00013 0	I: 73406 1	I: 71525 0
07,2150	I: 74206 0	C: 00023 0	I: 74325 0	C: 00001 0	C: 00031 0	I: 45445 0	C: 63762 1	I: 65361 0
07,2160	C: 00031 0	I: 53361 0	C: 00023 0	I: 77626 0	C: 53754 1	C: 22275 1	C: 02715 0	I: 77776 1
07,2170	12202 1	I: 53133 0	C: 00004 0	C: 16177 1	I: 52145 0	C: 00031 0	C: 32011 0	I: 52175 0
07,2200	C: 03761 1	C: 32042 0	34755 1	55547 1	55546 0	35004 0	71312 1	55312 1
07,2210	32621 0	04616 1	C: 20223 0	06001 0	12216 1	12060 1	41312 1	74740 1
07,2220	27312 1	75004 1	55547 1	34755 1	55550 1	31312 0	75015 1	54001 1
07,2230	35015 0	00006 1	06001 0	00006 1	12241 0	11546 0	12240 1	12325 0
07,2240	55546 0	34740 0	27550 1	41546 0	00006 1	76241 1	41547 1	60001 0
07,2250	50120 1	54046 1	30120 1	54166 1	06036 1	I: 76614 0	C: 04307 1	C: 32000 0
07,2260	C: 00002 0	C: 24767 1	C: 00015 0	I: 77624 1	C: 47570 0	I: 76606 0	C: 00001 0	C: 24767 1
07,2270	C: 00023 0	I: 77624 1	C: 47570 0	I: 53435 0	I: 77626 0	C: 77746 1	I: 63335 1	C: 03551 0
07,2300	C: 00031 0	I: 70322 0	C: 00001 0	C: 14031 0	C: 00001 0	I: 56225 1	C: 16623 1	I: 53361 0
07,2310	C: 02715 0	C: 00031 0	C: 02715 0	C: 02767 0	I: 77776 1	11546 0	12240 1	34756 1
07,2320	00004 0	05203 0	C: 02047 0	C: 16067 1	05472 0	05567 0	C: 00111 0	12202 1
07,2330	C: 00307 0	C: 01527 0	54016 1	30033 1	54063 0	30034 0	54064 1	30032 0
07,2340	54065 0	00006 1	30025 0	52062 1	56002 0	54012 0	32624 0	00006 1
07,2350	02016 1	10000 0	12354 0	12404 1	34740 0	71312 1	10000 0	05270 1
07,2360	11312 1	12365 1	05567 0	C: 00112 0	05270 1	34747 1	00006 1	02016 1
07,2370	10000 0	12461 1	34750 1	00006 1	02016 1	10000 0	12422 0	34751 0

OCTAL LISTING FOR PARAGRAPH # 055, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

07,2400	00006 1	02016 1	10000 0	12416 1	34776 0	00006 1	02016 1	00006 1
07,2410	12413 1	04635 0	C: 40115 0	05567 0	C: 00113 1	05270 1	34755 1	54070 1
07,2420	34742 1	12425 1	34753 1	54070 1	34741 1	55547 1	02514 0	12521 1
07,2430	34736 1	71312 1	00006 1	12444 0	41546 0	64751 0	00006 1	62454 0
07,2440	25546 1	47710 1	71312 1	55312 1	31547 0	71312 1	10000 0	12451 1
07,2450	12526 0	05567 0	C: 00114 0	05270 1	05567 0	C: 00107 1	02514 0	12627 1
07,2460	05270 1	02514 0	12507 0	35015 0	71312 1	10000 0	12472 0	05567 0
07,2470	C: 00115 1	05270 1	44355 1	71312 1	64737 0	57312 0	74737 1	10000 0
07,2500	12505 1	41547 1	71312 1	55312 1	12577 1	45015 1	12502 0	11546 0
07,2510	12512 1	12467 1	55546 0	05270 1	40104 0	74744 0	10000 0	24002 0
07,2520	00002 0	34755 1	54070 1	41312 1	75015 1	27312 1	35004 0	71312 1
07,2530	54071 0	00006 1	30062 0	53560 1	31546 1	00006 1	76241 1	56001 0
07,2540	60071 1	26070 1	55550 1	30063 1	50070 0	54000 0	30064 0	50070 0
07,2550	54002 1	30065 1	50070 0	54004 1	02514 0	12604 0	34737 0	61547 0
07,2560	40000 0	71312 1	61547 0	55312 1	75015 1	54001 1	35015 0	00006 1
07,2570	06001 0	10000 0	12577 1	41312 1	74736 0	27312 1	12577 1	35015 0
07,2600	71312 1	00006 1	74746 1	55550 1	35025 0	05072 1	C: 02611 0	C: 16067 1
07,2610	05270 1	02514 0	12627 1	51550 0	32616 1	02211 1	C: 15507 1	C: 15307 1
07,2620	C: 15107 0	C: 15507 1	C: 04000 0	C: 00000 1	C: 00034 0	C: 01507 1	C: 01517 0	32626 1
07,2630	04616 1	C: 20212 1	16001 1	12641 1	34746 0	70154 0	10000 0	12645 0
07,2640	12627 1	44736 0	71312 1	64736 1	55312 1	31045 1	51550 0	54001 1
07,2650	31046 1	51550 0	54003 0	41312 1	74736 0	00006 1	12216 1	31546 1
07,2660	64753 1	40000 0	64756 1	00006 1	62454 0	25546 1	12205 0	00004 0
07,2670	41036 1	74771 0	10000 0	12677 1	05567 0	C: 00206 0	13632 1	03626 0
07,2700	41303 1	74773 1	27303 1	41302 0	75742 1	27302 0	44771 0	00006 1
07,2710	03012 1	03241 0	34747 1	00006 1	05012 1	05457 1	34746 0	05203 0
07,2720	C: 02732 0	C: 16103 1	41302 0	74743 1	10000 0	12730 0	05567 0	C: 00210 1
07,2730	00003 1	14631 0	03614 1	05457 1	44747 0	00006 1	03012 1	34741 1
07,2740	05224 0	03614 1	45742 1	71302 0	55302 0	44773 1	71303 1	55303 1
07,2750	04674 0	C: 14703 0	13604 1	00004 0	03626 0	03117 0	36241 0	05203 0
07,2760	C: 02763 1	C: 16103 1	12730 0	03614 1	34746 0	00006 1	05012 1	34752 0
07,2770	55474 0	51474 1	30321 1	00006 1	51474 1	20032 1	00006 1	74737 1

OCTAL LISTING FOR PARAGRAPH # 056, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

07,3000	56001 0	60000 1	54061 1	13005 0	26001 1	51474 1	23471 1	11474 0
07,3010	02770 0	34752 0	05224 0	03614 1	54061 1	34752 0	55474 0	51474 1
07,3020	11471 0	03025 0	03034 0	03072 1	03034 0	63720 1	00006 1	63102 1
07,3030	51474 1	55471 0	43721 1	24061 0	64754 0	51474 1	54050 0	11474 0
07,3040	03016 0	10061 1	13106 1	05221 0	C: 00226 1	34752 0	54061 1	50000 1
07,3050	30032 0	00006 1	50061 0	20321 0	10000 0	13063 0	13060 0	13063 0
07,3060	10061 1	13046 1	13604 1	63071 1	00006 1	63060 1	05567 0	C: 00211 0
07,3070	13612 0	C: 77511 1	63720 1	00006 1	63102 1	40000 0	51474 1	55471 0
07,3100	33721 0	03033 1	34755 1	51474 1	57471 1	03033 1	37737 0	00006 1
07,3110	05014 1	33722 0	13012 0	34746 0	00006 1	05012 1	05261 1	34750 1
07,3120	00006 1	02012 0	10000 0	00002 0	44746 1	00006 1	03012 1	44742 0
07,3130	00006 1	03014 1	44755 0	54047 0	34750 1	00006 1	05012 1	41036 1
07,3140	73162 0	27036 1	41303 1	74746 1	27303 1	41302 0	74750 0	27302 0
07,3150	44747 0	70075 1	54075 1	44735 0	70076 1	54076 1	44737 1	70077 0
07,3160	54077 0	00002 0	C: 40010 1	00004 0	03626 0	43717 1	00006 1	03012 1
07,3170	44746 1	71303 1	55303 1	03241 0	34742 1	05203 0	C: 03207 1	C: 16103 1
07,3200	35000 1	05203 0	C: 03205 0	C: 16103 1	12730 0	03614 1	13604 1	03621 1
07,3210	15261 0	34750 1	00006 1	02012 0	10000 0	15261 0	41302 0	74737 1
07,3220	27302 0	44750 0	71302 0	55302 0	04674 0	C: 14703 0	15261 0	03621 1
07,3230	15261 0	41302 0	74742 0	27302 0	41303 1	74737 1	27303 1	44747 0
07,3240	13222 1	43162 0	71036 1	64735 1	55036 1	00002 0	44755 0	54037 1
07,3250	54040 1	54041 0	03621 1	14631 0	00004 0	44753 0	71302 0	55302 0
07,3260	04674 0	C: 14703 0	12730 0	00004 0	41302 0	74753 0	27302 0	74742 0
07,3270	10000 0	12730 0	05567 0	C: 00212 0	00004 0	13260 1	54161 0	03626 0
07,3300	11314 1	03342 1	54156 1	34746 0	00006 1	05014 1	34751 0	05203 0
07,3310	C: 03360 1	C: 16103 1	30161 1	56003 1	56161 1	55314 1	74357 0	54061 1
07,3320	34752 0	54157 0	60000 1	60061 0	54160 1	00006 1	50000 1	31401 0
07,3330	52155 1	07256 1	52155 1	50160 0	53401 1	10157 0	13321 0	30161 1
07,3340	54003 0	12730 0	00006 1	30134 1	52155 1	33357 0	15133 1	11314 1
07,3350	13345 1	54156 1	00006 1	30155 0	52134 0	34753 1	13307 1	C: 17347 1
07,3360	43601 1	00006 1	03014 1	03614 1	31314 0	00006 1	74750 0	50000 1
07,3370	13371 0	03406 0	C: 00202 1	03406 0	C: 00302 0	03404 1	C: 00100 0	34755 1

OCTAL LISTING FOR PARAGRAPH # 057, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

07,3400	55314 1	33357 0	05137 1	13205 1	44751 1	27314 1	50002 0	30000 1
07,3410	54064 1	74757 1	64737 0	27314 1	54003 0	74357 0	54061 1	44757 1
07,3420	70064 1	54064 1	00006 1	50061 0	31401 0	52071 0	10070 1	13442 1
07,3430	13432 0	13562 1	10071 0	13437 0	13364 1	13557 1	13364 1	63473 1

07,3440	00006 1	63364 0	00006 1	33603 1	20071 0	30064 0	00006 1	05014 1
07,3450	36073 0	70071 0	56071 1	00006 1	74744 0	54062 1	30070 0	00006 1
07,3460	74743 1	54070 1	30001 0	00006 1	74736 0	26062 1	00006 1	30071 1
07,3470	67746 0	10000 0	13516 1	C: 77601 0	13500 0	34736 1	26062 1	34755 1

07,3500		50061 0		53401 1		30062 0		54047 0		00006 1		74742 0		66244 0		05203 0
07,3510	C:	03360 1		16103 1	C:	34742 1		00006 1		05014 1		15261 0		50061 0		53401 1
07,3520		34736 1		60062 0		54047 0		00006 1		74742 0		67744 1		05203 0		C: 03532 0
07,3530	C:	16103 1		13512 0		03614 1		34750 1		00006 1		02012 0		10000 0		13612 0

07,3540	31314 0	54003 0	74357 0	54061 1	50061 0	11400 0	13552 1	34736 1
07,3550	26047 0	13504 1	50061 0	55400 0	34736 1	26047 0	13523 1	63473 1
07,3560	00006 1	63364 0	00006 1	43603 0	20071 0	30064 0	64743 0	00006 1
07,3570	05014 1	40070 1	54070 1	40071 0	76073 1	40000 0	56071 1	40000 0

07,3600	13453 1	C: 01700 1	C: 00000 1	C: 00034 0	00006 1	00011 1	74753 0	10000 0
07,3610	13612 0	13640 1	34755 1	13635 0	34746 0	71302 0	10000 0	13612 0
07,3620	00002 0	41302 0	74746 1	10000 0	24002 0	00002 0	41302 0	74746 1
07,3630	10000 0	00002 0	44755 0	55304 0	12730 0	54071 0	44755 0	13642 0

07,3640	54071 0	44753 0	54072 0	50071 1	11304 0	13651 1	13661 1	00006 1
07,3650	13662 1	34755 1	50071 1	57304 1	05137 1	40072 0	50064 0	26164 0
07,3660	15261 0	30072 1	50071 1	55304 0	15261 0	34753 1	03672 1	34752 0
07,3670	13672 0	34755 1	00004 0	54071 0	50000 1	11304 0	13714 1	13710 0

07,3700	13704 0	50071 1	55304 0	12730 0	10000 0	13714 1	24133 0	13701 0
07,3710	04645 1	50071 1	55304 0	15133 1	52134 0	05710 1	C: 01210 0	C: 00030 1
07,3720	C: 77500 1	C: 77477 0	C: 00074 1	31307 1	00006 1	13730 1	05652 0	C: 01210 0
07,3730	00006 1	30134 1	53310 0	30006 1	74757 1	27310 0	30167 1	77724 0

07,3740	55311 1	33745 1	54003 0	04635 0	C: 44004 0	C: 03274 0	C: 03746 1	C: 03747 0
07,3750	CKSM 73573 1	0	0	0	0	0	0	0
07,3760	0	0	0	0	0	0	0	0
07,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 060, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

10,2000	C: 20900 0	C: 00000 1	I: 77614 1	C: 01352 1	C: 20021 0	I: 53575 0	I: 77656 1	I: 72441 0
10,2010	C: 01742 1	I: 51136 1	C: 20016 1	I: 43215 0	C: 20001 1	C: 20001 1	C: 02257 0	I: 43414 1
10,2020	C: 02675 1	I: 53575 0	C: 02327 0	I: 77676 0	C: 00023 0	I: 53435 0	C: 02335 0	C: 00015 0
10,2030	I: 53435 0	C: 00023 0	C: 24007 0	C: 00001 0	I: 76521 0	C: 00007 0	C: 03432 1	I: 43414 1
10,2040	C: 02475 0	I: 77160 0	C: 00002 0	C: 00000 1	I: 77614 1	C: 04343 1	C: 20052 1	I: 77160 0
10,2050	C: 00012 1	C: 00002 0	I: 66143 1	C: 10011 0	C: 03375 0	C: 22323 0	C: 10003 0	I: 54214 1
10,2060	C: 04343 1	C: 20063 0	C: 20607 1	C: 02325 1	I: 43134 0	C: 03376 0	C: 01271 1	I: 77650 1
10,2070	C: 73542 0	00004 0	52071 0	34355 0	05072 1	C: 03532 0	C: 60102 1	52071 0
10,2100	00003 1	52006 0	22073 0	30065 1	74757 1	60000 1	54061 1	30065 1
10,2110	75030 0	00006 1	74740 1	54062 1	30065 1	74101 1	56065 1	75024 0
10,2120	10000 0	15370 1	30062 0	50061 0	54751 0	10066 0	12142 0	12130 0
10,2130	40072 0	22072 1	50071 1	52751 0	10066 0	12136 0	12142 0	40025 1
10,2140	50071 1	55051 0	10065 0	12156 0	12161 1	40025 1	50061 0	55051 0
10,2150	30065 1	62154 0	10000 0	12154 1	C: 17777 0	12161 1	00006 1	30025 0
10,2160	53152 1	40062 1	50061 0	54750 1	30002 0	22073 0	00003 1	52006 0
10,2170	22073 0	30062 0	50061 0	54751 0	30070 0	50061 0	55052 0	00006 1
10,2200	30064 0	50061 0	53435 0	12125 1	05474 0	13274 1	54155 1	34735 1
10,2210	12353 1	34755 1	54155 1	32704 0	12353 1	54155 1	33373 0	12353 1
10,2220	54155 1	33360 1	12353 1	54155 1	33361 0	12353 1	54155 1	34735 1
10,2230	12331 0	54155 1	32704 0	12512 1	54155 1	33373 0	12512 1	54155 1
10,2240	33360 1	12512 1	34753 1	02610 1	30100 0	73374 0	10000 0	12305 1
10,2250	30100 0	74743 1	00006 1	12255 0	15155 1	00004 0	44756 0	70100 1
10,2260	64753 1	54100 1	00003 1	41071 1	74747 0	10000 0	12271 0	40370 1
10,2270	54370 1	34753 1	12471 0	30165 0	54156 1	50164 1	33404 1	54162 0
10,2300	50164 1	31070 1	54160 1	54003 0	00002 0	30100 0	73127 1	10000 0
10,2310	13327 0	40100 1	74751 1	00004 0	26100 1	12407 1	30370 0	74144 0
10,2320	12773 1	54155 1	34755 1	12353 1	54155 1	34746 0	12353 1	54155 1
10,2330	34755 1	54160 1	34755 1	12514 1	34755 1	54155 1	33357 0	12353 1
10,2340	54155 1	33357 0	12512 1	54155 1	34736 1	12353 1	54155 1	34736 1
10,2350	12331 0	54155 1	34750 1	54160 1	02575 1	00003 1	12421 0	54155 1
10,2360	33376 0	12512 1	54155 1	33376 0	12353 1	34755 1	54164 0	03247 0
10,2370	12375 0	30100 0	73415 0	10000 0	12450 0	30100 0	75642 0	00006 1

OCTAL LISTING FOR PARAGRAPH # 061, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

10,2400	12403 0	34755 1	12647 1	30100 0	73413 0	00006 1	12411 0	34753 1
10,2410	12647 1	02607 1	03060 1	05137 1	03075 0	30025 0	55165 0	34755 1
10,2420	12471 0	30167 1	77724 0	54163 1	37720 0	05146 1	30160 0	73375 1
10,2430	10000 0	12365 1	12434 1	12242 0	34752 0	54164 0	03247 0	12452 1
10,2440	41072 1	74750 0	10000 0	12452 1	30100 0	73366 0	00006 1	12452 1
10,2450	05652 0	C: 01502 1	02611 0	30163 0	00006 1	04007 1	54366 0	30100 0
10,2460	73367 1	10000 0	12627 1	12465 0	12627 1	03060 1	05137 1	03075 0
10,2470	34752 0	54164 0	12743 1	54155 1	37733 1	12353 1	55045 0	33351 0
10,2500	54155 1	33350 1	12353 1	54155 1	33354 0	12353 1	02570 1	12353 1
10,2510	54155 1	34750 1	54160 1	36244 0	00004 0	54072 0	30167 1	77724 0
10,2520	54063 0	30160 0	74750 0	10000 0	12532 0	30063 1	05072 1	C: 02421 1
10,2530	C: 20067 1	12540 0	30006 1	00006 1	04007 1	54001 1	33412 0	05116 1
10,2540	02575 1	00006 1	30156 0	50064 0	52156 1	00006 1	30160 0	50064 0
10,2550	52160 1	30064 0	54161 0	02602 1	00003 1	14640 0	55045 0	33351 0
10,2560	54155 1	33350 1	12512 1	54155 1	33354 0	12512 1	02570 1	12512 1
10,2570	55144 0	33355 1	54155 1	33356 1	00002 0	00004 0	43365 0	70160 1
10,2600	60003 1	54160 1	22002 0	04645 1	54157 0	60072 1	00001 0	34755 1
10,2610	54164 0	00004 0	30160 0	50164 1	55070 0	73403 1	00006 1	12623 0
10,2620	30157 1	50164 1	54372 0	30155 0	50164 1	54367 1	13104 0	50164 1
10,2630	33404 1	72633 1	03416 1	C: 03004 0	44753 0	60164 1	54154 0	50154 1
10,2640	33363 1	00004 0	05137 1	03075 0	50154 1	33363 1	15133 1	54154 0
10,2650	03060 1	05137 1	30154 1	50064 0	54154 0	32670 1	03076 1	50154 1
10,2660	33405 0	73407 0	03434 1	C: 74004 0	50154 1	34747 1	64751 0	03416 1
10,2670	C: 02637 1	30100 0	74751 1	10000 0	02255 1	12411 0	34755 1	54160 1
10,2700	50160 0	33377 1	64751 0	03434 1	C: 40010 1	50160 0	33363 1	00004 0
10,2710	05137 1	13210 0	31072 0	54003 1	30366 1	04727 1	77724 0	05146 1
10,2720	46244 1	60374 1	14640 0	00003 1	31073 1	54156 1	30100 0	77737 1
10,2730	10000 0	12734 1	13344 0	12255 0	05504 0	C: 00105 0	34736 1	70100 1
10,2740	10000 0	12417 0	12470 1	02275 0	30160 0	74757 1	54001 1	44737 1
10,2750	50164 1	71070 0	50164 1	55070 0	74744 0	54141 1	30156 0	54165 1
10,2760	55073 0	50164 1	10367 1	12772 0	13106 1	40370 1	54370 1	76073 1
10,2770	63370 0	60141 0	64753 1	04155 1	13120 0	04433 1	02273 0	05516 0

OCTAL LISTING FOR PARAGRAPH # 062, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

10,3090	C: 00102 1	05516 0	C: 00103 0	05516 0	C: 00104 1	30160 0	04255 1	12743 1
10,3010	34747 1	70160 1	10000 0	13036 0	34750 1	70160 1	10000 0	13133 1
10,3020	40160 1	74746 1	10000 0	13030 0	50164 1	30372 1	54157 0	13226 0
10,3030	50164 1	30367 0	76073 1	00006 1	13133 1	15155 1	30160 0	74737 1
10,3040	10000 0	13014 0	34737 0	50164 1	27070 0	22007 0	00006 1	62316 1
10,3050	74740 1	00006 1	13056 0	41067 0	63414 0	12773 1	33353 1	12773 1
10,3060	44747 0	00006 1	03011 1	30100 0	73371 0	10000 0	34753 1	54001 1
10,3070	34755 1	50001 0	57042 0	00004 0	00002 0	34217 1	56064 0	00006 1
10,3100	63104 1	56064 0	50064 0	54164 0	00003 1	00002 0	37717 1	05105 0
10,3110	C: 04231 0	C: 04060 0	13134 0	30100 0	73141 1	00006 1	12450 0	15155 1
10,3120	11042 1	15155 1	13124 1	15155 1	30162 1	73372 0	03416 1	C: 24100 0
10,3130	50164 1	33362 0	04442 1	04427 1	30164 1	54157 0	30162 1	72663 1
10,3140	03416 1	C: 40040 1	31074 0	50164 1	74751 1	10000 0	13233 1	11042 1
10,3150	13113 0	13153 1	13113 0	04207 0	13245 0	13264 0	43401 0	60154 1
10,3160	00006 1	26000 0	00006 1	13334 1	34752 0	54161 0	30100 0	74101 1
10,3170	10000 0	13174 1	13302 1	13266 1	40025 1	61165 1	10000 0	40000 0
10,3200	67730 1	64753 1	63457 1	00006 1	62417 1	13302 1	34753 1	12677 1
10,3210	10161 0	64753 1	13214 1	15155 1	50157 1	60372 1	54157 0	30162 1
10,3220	73222 1	03434 1	C: 74044 1	46244 1	04154 0	13226 0	30163 0	77724 0
10,3230	05146 1	30157 1	14640 0	50164 1	44751 1	71074 1	55074 1	34755 1
10,3240	04727 1	36244 0	50164 1	60372 1	14640 0	34755 1	13165 1	40160 1
10,3250	74736 0	10000 0	16736 1	40157 0	50164 1	60372 1	00006 1	13261 0
10,3260	00002 0	11012 1	05155 0	00002 0	34753 1	13165 1	46241 1	70100 1
10,3270	00004 0	54100 1	00003 1	13210 0	37746 0	54161 0	30100 0	74355 1
10,3300	10000 0	12734 1	30100 0	73377 0	10000 0	12676 0	30100 0	73400 1
10,3310	10000 0	13206 1	31072 0	74771 0	10000 0	13210 0	30371 1	00006 1
10,3320	13210 0	35025 0	00004 0	05072 1	C: 02470 0	C: 20060 0	13210 0	30100 0
10,3330	73377 0	10000 0	15155 1	12627 1	50157 1	30367 0	76073 1	40000 0
10,3340	60155 0	00006 1	13164 0	12723 1	46244 1	04154 0	15155 1	15155 1
10,3350	C: 00036 1	C: 00231 1	C: 01407 0	C: 14400 0	C: 00030 1	C: 01006 0	C: 00014 1	C: 20010 1
10,3360	C: 40230 1	C: 40036 0	C: 20415 0	C: 20255 1	C: 20470 0	C: 03400 0	C: 11210 1	C: 66521 1
10,3370	C: 01177 1	C: 00700 0	C: 00704 1	C: 40030 0	C: 34300 0	C: 40100 1	C: 00110 1	C: 02020 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

10,3400	C: 01010 1	C: 00026 0	C: 77730 0	C: 00050 1	C: 20144 1	C: 42424 0	C: 11254 1	C: 74704 1
10,3410	C: 67777 1	C: 40420 0	C: 02421 1	C: 10200 1	C: 30200 0	C: 20100 1	54001 1	74757 1
10,3420	56001 0	75660 0	00004 0	54061 1	50001 0	40074 0	70061 1	50001 0
10,3430	26074 0	00003 1	24002 0	00002 0	54001 1	74757 1	56001 0	75660 0
10,3440	40000 0	00004 0	50001 0	70074 0	50001 0	54074 0	00003 1	24002 0
10,3450	00002 0	00004 0	54001 1	30133 0	55363 1	30134 1	05576 0	C: 77467
10,3460	35006 1	12357 0	00006 1	30025 0	16054 1	10154 0	34755 1	13472 1
10,3470	13471 1	44736 0	54155 1	34755 1	56154 1	00006 1	74736 0	20155 1
10,3500	16060 0	00004 0	30037 0	54154 0	30040 0	54157 0	30041 1	00003 1
10,3510	54161 0	34755 1	54155 1	54160 1	54162 0	16520 1	07256 1	16060 0
10,3520	03550 1	34755 1	54155 1	16057 1	03550 1	52162 0	52155 1	03550 1
10,3530	54156 1	52160 1	52155 1	03550 1	54155 1	30161 1	54154 0	34753 1
10,3540	16057 1	03550 1	52160 1	52155 1	03550 1	54001 1	30157 1	16054 1
10,3550	52155 1	20001 1	10000 0	64753 1	13556 0	40000 0	54154 0	00002 0
10,3560	50000 1	34734 0	26154 0	00002 0	33577 1	54130 1	30154 1	03600 1
10,3570	24130 0	30157 1	03600 1	24130 0	30161 1	03600 1	13515 1	C: 00321 1
10,3600	54142 1	50130 0	10000 0	64753 1	13610 1	64753 1	64753 1	40000 0
10,3610	60142 0	10000 0	64753 1	13615 1	40000 0	54142 1	13622 0	50000 1
10,3620	34734 0	60142 0	50130 0	54000 0	00002 0	50120 1	30046 0	04616 1
10,3630	C: 17276 1	16060 0	C: 02664 1	C: 03467 1	33632 0	54003 0	53667 0	53673 0
10,3640	53667 0	53671 1	53701 1	53671 1	53677 1	53703 0	53677 1	16060 0
10,3650	33633 1	54003 0	53472 0	53476 1	53472 0	53474 0	53504 0	53474 0
10,3660	53502 0	53506 1	53502 0	16060 0	00006 1	34733 1	52155 1	10000 0
10,3670	34755 1	16056 0	13673 1	00006 1	44733 0	16054 1	34753 1	13701 0
10,3700	34755 1	60120 1	54156 1	04616 1	C: 01010 1	10154 0	13742 1	13711 1
10,3710	13742 1	10157 0	13742 1	13715 0	13742 1	10161 0	13742 1	13721 1
10,3720	13742 1	30155 0	00006 1	74736 0	20155 1	30160 0	00006 1	74736 0
10,3730	20160 1	30162 1	00006 1	74736 0	20162 0	34761 0	50156 0	54045 1
10,3740	04635 0	C: 01024 0	34755 1	13736 1	04616 1	C: 01010 1	06060 1	C: 03747 0
10,3750	C: 03750 0	CKSM 65720 1	а	а	а	а	а	а
10,3760	а	а	а	а	а	а	а	а
10,3770	а	а	а	а	а	а	а	а

OCTAL LISTING FOR PARAGRAPH # 064, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

11,2000	I: 77614 1	C: 00475 1	I: 44175 1	C: 03442 0	C: 03461 1	C: 03470 1	I: 46135 1	C: 03377 1
11,2010	C: 22022 1	I: 72575 0	C: 02327 0	C: 26327 0	C: 02335 0	I: 77752 1	C: 26335 0	C: 03470 1
11,2020	I: 77752 1	C: 03470 1	I: 71331 0	C: 03615 0	C: 77776 1	I: 70546 1	C: 17665 1	I: 67154 0
11,2030	C: 00154 1	C: 02701 0	I: 77775 1	C: 02327 0	C: 26655 0	C: 03470 1	C: 16663 0	C: 03450 0
11,2040	C: 02671 0	I: 77201 1	C: 00001 0	C: 02327 0	I: 41456 0	I: 53435 0	C: 02335 0	C: 26674 0
11,2050	C: 03470 1	I: 50256 0	I: 43015 1	C: 03665 1	C: 03665 1	I: 43044 0	C: 22101 1	C: 22101 1
11,2060	C: 03465 0	I: 41575 0	C: 02663 0	I: 63246 1	I: 46206 1	C: 02674 0	I: 51352 1	I: 74256 0
11,2070	I: 77772 0	C: 02663 0	I: 67351 1	C: 22275 1	C: 03615 0	I: 77244 0	C: 22101 1	C: 02663 0
11,2100	C: 03470 1	I: 63345 0	C: 26007 1	C: 02663 0	I: 63256 0	C: 02655 0	I: 41456 0	I: 57435 1
11,2110	C: 00003 1	I: 77606 1	I: 71350 1	C: 03375 0	C: 00023 0	C: 62040 1	C: 22120 1	C: 77767 1
11,2120	I: 67310 1	C: 00012 1	C: 00047 1	I: 77230 0	C: 22126 1	I: 41476 1	I: 77775 1	I: 50235 0
11,2130	I: 71244 0	C: 22133 0	I: 41476 1	I: 67154 0	C: 00000 1	C: 02672 0	I: 43131 0	C: 00027 1
11,2140	C: 00024 1	C: 03752 1	C: 22146 1	I: 77731 1	C: 00027 1	C: 00005 1	I: 45150 1	C: 03375 0
11,2150	C: 25223 0	I: 77214 0	C: 00675 0	C: 02744 1	C: 16343 1	C: 02702 0	I: 45030 0	C: 22234 1
11,2160	C: 27412 0	I: 43135 1	C: 03377 1	C: 00263 0	I: 43030 0	C: 22167 1	C: 00063 1	I: 77775 1
11,2170	C: 02327 0	C: 02655 0	C: 25535 0	C: 02343 1	C: 15543 1	C: 03606 1	C: 01517 0	I: 43015 1
11,2200	C: 03450 0	C: 01673 1	C: 34041 0	C: 27107 1	I: 77775 1	C: 00025 0	C: 02703 1	I: 63154 1
11,2210	C: 03614 1	C: 00001 0	I: 55134 1	C: 03614 1	C: 02701 0	I: 46135 1	C: 00050 1	C: 22231 1
11,2220	I: 52375 1	C: 03470 1	C: 00017 1	I: 77655 1	C: 02663 0	C: 16663 0	C: 03665 1	I: 77650 1
11,2230	C: 22056 1	I: 77775 1	C: 02663 0	C: 03470 1	I: 52375 1	C: 02343 1	C: 02335 0	C: 27366 1
11,2240	C: 02703 1	C: 03564 0	I: 46135 1	C: 03377 1	C: 22261 1	I: 70575 1	C: 03564 0	C: 27564 0
11,2250	C: 02343 1	I: 77742 0	C: 26343 1	C: 03470 1	I: 77742 0	C: 27470 1	C: 03366 1	I: 77742 0
11,2260	C: 03366 1	I: 77201 1	C: 00001 0	C: 03470 1	C: 37442 1	C: 03461 1	C: 00000 1	C: 00000 1
11,2270	C: 00000 1	C: 00000 1	C: 20000 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1
11,2300	C: 00000 1	C: 00000 1	C: 77777 0	C: 77771 0	C: 77763 0	C: 37777 1	C: 37777 1	C: 37777 1
11,2310	C: 37777 1	I: 40354 1	C: 02030 0	C: 00001 0	I: 75543 1	C: 51770 0	I: 53515 0	C: 01535 0
11,2320	I: 60325 0	C: 00045 0	C: 00047 1	I: 77715 1	I: 65241 0	C: 01543 1	C: 02074 0	I: 60225 1
11,2330	C: 01551 1	C: 00051 0	I: 77742 0	I: 65271 0	C: 00003 1	I: 41405 0	C: 00005 1	I: 65316 0
11,2340	C: 00005 1	I: 64716 0	C: 51770 0	I: 40442 1	I: 47515 0	C: 01543 1	I: 44205 0	C: 00045 0
11,2350	I: 41271 0	C: 00003 1	I: 53605 1	C: 23720 0	C: 20176 0	I: 43260 1	C: 00050 1	I: 45257 0
11,2360	C: 20211 1	I: 41205 0	C: 00001 0	C: 00005 1	I: 53657 0	C: 20211 1	C: 20201 0	I: 65215 1
11,2370	C: 01553 0	I: 53605 1	C: 00001 0	C: 20202 0	I: 43204 0	C: 57725 0	I: 77626 0	C: 75647 0

OCTAL LISTING FOR PARAGRAPH # 065, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

11,2400	I: 74020 0	C: 02112 1	C: 00012 1	I: 74014 1	C: 00303 1	C: 24000 1	C: 00002 0	I: 77650 1
11,2410	C: 24000 1	I: 66350 1	C: 01500 0	C: 00051 0	C: 77762 1	I: 54345 1	C: 02076 1	C: 20612 0
11,2420	I: 61500 0	C: 22422 0	I: 43206 1	C: 01551 1	C: 16074 0	I: 77615 0	C: 01517 0	C: 35517 1
11,2430	C: 22311 1	I: 73150 1	C: 02030 0	C: 02030 0	I: 77775 1	C: 22275 1	C: 26062 1	C: 02032 1
11,2440	I: 53257 1	C: 57605 0	C: 01535 0	C: 02040 1	I: 65014 1	C: 01756 1	C: 22453 0	C: 01500 0
11,2450	C: 12132 1	I: 77724 0	C: 01500 0	I: 53575 0	C: 02032 1	C: 16032 1	C: 00045 0	C: 02070 1
11,2460	I: 77624 1	C: 22563 1	I: 66175 1	C: 02040 1	C: 00051 0	C: 16032 1	C: 02072 0	C: 02070 1
11,2470	I: 71214 0	C: 00342 1	C: 22726 1	C: 01517 0	I: 77624 1	C: 33663 1	I: 72174 0	C: 00002 0
11,2500	C: 00051 0	I: 77614 1	C: 00343 0	C: 22506 1	I: 77076 0	C: 00000 1	C: 02040 1	C: 26105 1
11,2510	C: 00003 1	C: 02122 1	I: 45335 0	C: 01012 0	C: 23722 1	I: 43030 0	C: 22521 1	C: 01756 1
11,2520	C: 22535 1	I: 74375 0	C: 02032 1	C: 02070 1	I: 52257 0	C: 57175 0	C: 02040 1	I: 77724 0
11,2530	C: 01500 0	C: 12140 1	C: 02114 1	I: 77724 0	C: 01500 0	I: 62175 0	C: 02105 1	C: 00004 0
11,2540	I: 43014 0	C: 04260 1	C: 00343 0	C: 22550 1	I: 53261 1	C: 20612 0	C: 02122 1	C: 02122 1
11,2550	I: 77624 1	C: 22563 1	I: 62174 1	C: 00004 0	C: 00004 0	I: 77775 1	C: 02122 1	C: 36040 0
11,2560	C: 22563 1	I: 77650 1	C: 22726 1	I: 74575 0	C: 02040 1	I: 40236 1	C: 00001 0	I: 61501 1
11,2570	C: 00040 0	I: 60325 0	C: 02070 1	C: 00041 1	I: 63342 1	C: 02040 1	I: 77656 1	C: 16040 1
11,2600	C: 00045 0	C: 02072 0	I: 55301 0	C: 00042 1	I: 41562 0	I: 77743 1	C: 27734 1	C: 00051 0
11,2610	I: 57124 1	C: 00050 1	C: 00040 0	I: 71264 1	C: 00041 1	C: 00003 1	I: 65057 0	C: 57177 1
11,2620	C: 00050 1	I: 74406 0	I: 50315 0	C: 02032 1	C: 02040 1	I: 44372 1	I: 57206 1	C: 00005 1
11,2630	I: 77752 1	I: 43206 1	C: 23702 0	I: 75406 1	I: 41475 1	C: 00013 0	I: 43352 1	C: 23702 0
11,2640	I: 43325 1	C: 00013 0	C: 22273 1	I: 72475 1	C: 00011 1	I: 56215 1	C: 23674 0	C: 00017 1
11,2650	I: 74275 1	C: 00007 0	C: 02040 1	I: 64515 1	C: 02032 1	I: 41455 0	I: 41345 0	C: 00001 0
11,2660	C: 00015 0	I: 61501 1	C: 00037 0	I: 40665 0	C: 00003 1	C: 51770 0	I: 74276 1	I: 57124 1
11,2670	C: 00050 1	C: 00051 0	I: 55064 0	C: 00036 1	C: 00037 0	I: 77600 1	C: 22677 1	I: 65057 0
11,2700	C: 57177 1	C: 00050 1	I: 77655 1	C: 02062 1	C: 02062 1	I: 43400 1	C: 22707 1	I: 54345 1
11,2710	C: 02100 1	C: 20612 0	I: 44206 0	C: 01551 1	C: 16074 0	C: 01517 0	I: 45425 0	C: 42260 0
11,2720	C: 22311 1	I: 77624 1	C: 23345 1	I: 77614 1	C: 04070 1	C: 27255 0	I: 71354 0	C: 02030 0
11,2730	C: 02070 1	I: 44601 0	C: 00001 0	C: 50027 1	I: 43044 0	C: 23136 1	C: 00343 0	C: 23145 0
11,2740	I: 65375 0	C: 02032 1	C: 01517 0	I: 45125 0	C: 23672 0	C: 51531 1	C: 00017 1	I: 47375 0
11,2750	C: 02013 1	C: 22267 1	I: 61255 1	C: 22267 1	C: 00025 0	I: 77656 1	C: 00025 0	I: 57345 1
11,2760	C: 00023 0	C: 23704 0	I: 63525 0	C: 00023 0	I: 45275 0	C: 23706 1	C: 23700 1	I: 57206 1
11,2770	C: 00023 0	I: 76405 1	C: 23712 1	I: 57325 1	C: 00001 0	C: 23720 0	I: 41421 0	I: 57275 0

OCTAL LISTING FOR PARAGRAPH # 066, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

11,3000	C: 00023 0	C: 23714 1	I: 57325 1	C: 00003 1	C: 23716 0	I: 77621 1	I: 77603 1	C: 51764 0
11,3010	I: 43271 1	C: 02070 1	C: 00005 1	I: 56273 1	C: 51760 1	C: 02070 1	I: 74215 1	C: 00003 1
11,3020	C: 02032 1	C: 14033 1	I: 70403 1	C: 51764 0	I: 43271 1	C: 02070 1	I: 50473 1	C: 51760 1
11,3030	I: 43271 1	C: 02070 1	I: 76561 1	C: 00025 0	I: 77645 0	C: 00033 1	C: 14033 1	C: 02070 1
11,3040	I: 63501 0	C: 00047 1	I: 60316 0	C: 00051 0	I: 54606 0	C: 51754 0	I: 77761 1	C: 00033 1
11,3050	C: 00033 1	I: 56070 0	C: 00046 0	C: 00046 0	I: 43070 1	C: 00050 1	C: 00343 0	C: 23126 0
11,3060	I: 63545 0	C: 00017 1	I: 63525 0	C: 00021 1	I: 65215 1	C: 00003 1	I: 45352 1	C: 00003 1
11,3070	I: 41525 0	C: 00023 0	I: 65361 0	C: 00025 0	I: 45316 1	C: 23672 0	I: 52405 1	C: 27736 0
11,3100	I: 52361 1	C: 02032 1	I: 72561 0	I: 77725 1	C: 00017 1	I: 63205 0	C: 00021 1	C: 02032 1
11,3110	I: 74235 0	C: 00025 0	I: 53332 0	I: 77725 1	I: 41301 0	C: 00050 1	C: 00001 0	I: 74265 0
11,3120	C: 26025 1	I: 53257 1	C: 57605 0	C: 00033 1	I: 77754 1	C: 02030 0	I: 77600 1	C: 23130 1
11,3130	I: 53257 1	C: 20153 1	C: 02062 1	C: 02062 1	I: 77600 1	C: 22707 1	I: 72135 0	C: 01501 1
11,3140	C: 00154 1	I: 73205 1	C: 27740 1	C: 00155 0	C: 23153 1	I: 77745 1	C: 02036 0	C: 24023 0
11,3150	C: 22267 1	I: 77650 1	C: 22756 0	C: 23372 0	C: 23376 1	C: 23407 0	I: 77214 0	C: 00342 1
11,3160	C: 23207 0	C: 01535 0	I: 41241 0	C: 01543 1	C: 02076 1	I: 77640 0	C: 23207 0	I: 43014 0
11,3170	C: 00303 1	C: 23264 0	C: 04340 1	C: 23261 0	I: 45145 0	C: 01517 0	C: 33663 1	C: 02105 1
11,3200	I: 77754 1	C: 02030 0	I: 51445 0	C: 01535 0	I: 50025 0	C: 27744 0	C: 23301 1	I: 51575 1
11,3210	C: 01521 0	I: 77600 1	C: 23235 1	I: 51025 1	C: 23710 0	C: 23235 1	I: 53615 0	C: 23710 0
11,3220	C: 57605 0	I: 45271 1	C: 00013 0	C: 27742 0	I: 77244 0	C: 23235 1	C: 01527 0	I: 45246 0
11,3230	C: 23710 0	I: 77600 1	C: 23235 1	I: 77640 0	C: 23237 0	I: 77624 1	C: 23345 1	I: 77775 1
11,3240	C: 01527 0	C: 25135 1	C: 01521 0	C: 01127 1	I: 77614 1	C: 00261 1	I: 66375 0	C: 01127 1
11,3250	C: 01501 1	C: 00000 1	C: 16032 1	C: 22275 1	C: 02100 1	I: 52014 0	C: 00301 0	C: 23611 0
11,3260	C: 22431 1	I: 52175 0	C: 02105 1	C: 23202 0	I: 60545 0	C: 00013 0	I: 50025 0	C: 27744 0
11,3270	C: 23207 0	I: 71214 0	C: 04340 1	C: 23301 1	C: 01517 0	I: 77624 1	C: 33663 1	I: 77676 0
11,3300	C: 02105 1	I: 77624 1	C: 23305 0	I: 77650 1	C: 23237 0	I: 45020 1	C: 02112 1	C: 23345 1
11,3310	I: 53775 1	C: 01535 0	C: 57576 1	I: 53651 0	C: 02105 1	C: 57574 0	C: 01503 0	C: 15535 0
11,3320	C: 01517 0	I: 77624 1	C: 33774 0	I: 57414 1	C: 00343 0	C: 23326 1	I: 53715 1	C: 01543 1
11,3330	C: 57576 1	I: 77651 0	I: 77657 0	C: 57574 0	C: 01511 0	C: 01543 1	I: 67154 0	C: 02112 1
11,3340	C: 00052 0	I: 52014 0	C: 00303 1	C: 26711 1	C: 26716 0	I: 77354 0	C: 02030 0	C: 01521 0
11,3350	I: 53257 1	C: 57605 0	C: 01535 0	C: 01503 0	C: 25535 0	C: 01527 0	I: 53257 1	C: 57602 1
11,3360	C: 01543 1	C: 01511 0	C: 25543 1	C: 22275 1	C: 01521 0	C: 15527 0	C: 22275 1	C: 01551 1
11,3370	C: 01553 0	I: 77616 0	I: 64575 1	C: 02062 1	C: 36046 0	C: 23552 1	I: 74575 0	C: 02062 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

11,3740	৯	৯	৯	৯	৯	৯	৯	৯
11,3750	৯	৯	৯	৯	৯	৯	৯	৯
11,3760	৯	৯	৯	৯	৯	৯	৯	৯
11,3770	৯	৯	৯	৯	৯	৯	৯	৯

OCTAL LISTING FOR PARAGRAPH # 070, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

12,2000	I: 71201 1	C: 00001 0	C: 22275 1	C: 02177 1	C: 32201 0	C: 10005 0	C: 24017 1	C: 01503 0
12,2010	I: 66256 0	C: 00027 1	C: 00024 1	C: 16647 0	C: 00045 0	C: 24041 1	C: 01503 0	I: 76441 1
12,2020	C: 01511 0	I: 76405 1	C: 00023 0	C: 24043 0	C: 01511 0	I: 57236 1	C: 00017 1	I: 52405 1
12,2030	C: 00041 1	I: 61425 0	C: 10756 1	C: 00045 0	I: 74421 0	C: 10756 1	I: 77671 1	C: 00041 1
12,2040	C: 00011 1	I: 71244 0	C: 24051 0	C: 10774 1	I: 40071 0	C: 00011 1	C: 24055 1	I: 52166 1
12,2050	C: 24055 1	I: 55366 1	C: 10776 0	I: 77600 1	C: 24055 1	C: 00013 0	I: 65205 0	C: 00023 0
12,2060	C: 00011 1	I: 65301 0	C: 00047 1	I: 56257 1	C: 20173 0	I: 50000 1	C: 24112 0	C: 24112 0
12,2070	I: 51525 1	C: 02074 0	I: 50025 0	C: 00001 0	C: 24112 0	I: 77765 0	C: 02074 0	C: 16074 0
12,2100	C: 00013 0	I: 77615 0	C: 02177 1	C: 16177 1	C: 00001 0	I: 77615 0	C: 02201 0	C: 16201 0
12,2110	I: 77650 1	C: 24070 0	I: 77601 0	C: 00001 0	I: 75345 1	C: 02201 0	C: 02074 0	C: 02201 0
12,2120	I: 75345 1	C: 02177 1	C: 02074 0	C: 02177 1	I: 77621 1	C: 02130 1	C: 00025 0	I: 53165 0
12,2130	C: 02074 0	C: 24311 1	I: 51440 0	C: 24311 1	I: 51025 1	C: 00013 0	C: 24311 1	I: 51145 0
12,2140	C: 02074 0	C: 24151 1	I: 57545 1	C: 00013 0	C: 14015 0	C: 22275 1	C: 00013 0	I: 77650 1
12,2150	C: 24154 1	I: 77745 1	C: 22275 1	C: 00015 0	I: 57345 1	C: 02074 0	C: 10767 0	I: 77646 0
12,2160	C: 16203 1	C: 01551 1	I: 45254 0	C: 24165 0	C: 02201 0	C: 15551 1	C: 01553 0	I: 45254 0
12,2170	C: 24172 0	C: 02177 1	I: 77621 1	C: 00025 0	C: 02643 1	I: 63545 0	C: 00025 0	I: 41501 0
12,2200	C: 00047 1	I: 53605 1	C: 00011 1	C: 21573 0	C: 34031 1	C: 24434 1	I: 44200 0	C: 24320 0
12,2210	C: 02074 0	C: 02645 1	I: 44246 1	C: 02203 1	I: 71244 0	C: 24342 1	C: 00037 0	I: 60225 1
12,2220	C: 01551 1	C: 00047 1	I: 60325 0	C: 02643 1	C: 00050 1	I: 41260 0	C: 00047 1	C: 02645 1
12,2230	I: 56257 1	C: 21202 1	I: 41542 1	I: 71244 0	C: 24255 0	C: 00025 0	C: 00013 0	I: 45221 1
12,2240	C: 00015 0	I: 51000 0	C: 24247 0	C: 24247 0	I: 52145 0	C: 00001 0	C: 24267 1	I: 45345 1
12,2250	C: 00015 0	C: 00025 0	I: 52075 1	C: 10772 1	C: 24267 1	I: 77745 1	C: 00025 0	C: 00015 0
12,2260	I: 45221 1	C: 00013 0	I: 50000 1	C: 24303 1	C: 24303 1	I: 77745 1	C: 00001 0	C: 02643 1
12,2270	I: 43254 0	C: 24342 1	C: 00025 0	C: 14025 0	C: 00037 0	C: 01551 1	I: 46034 1	C: 24657 0
12,2300	C: 24342 1	I: 77650 1	C: 24175 1	I: 45345 1	C: 00013 0	C: 00025 0	I: 52075 1	C: 10772 1
12,2310	C: 24267 1	I: 70545 1	C: 00013 0	I: 77765 0	C: 02074 0	C: 00025 0	I: 77650 1	C: 24137 1
12,2320	I: 50145 1	C: 00025 0	C: 24337 0	C: 00013 0	I: 70545 1	C: 02643 1	C: 02643 1	I: 44254 1
12,2330	C: 02112 1	C: 00025 0	C: 14025 0	C: 01551 1	C: 00037 0	I: 77650 1	C: 24276 1	C: 00015 0
12,2340	I: 77650 1	C: 24324 1	I: 44545 0	C: 00041 1	I: 74225 1	C: 00035 1	C: 02647 0	I: 65372 1
12,2350	C: 00025 0	I: 60316 0	C: 00047 1	I: 57275 0	C: 00023 0	C: 00025 0	I: 53605 1	C: 00033 1
12,2360	C: 21572 1	I: 77621 1	C: 00037 0	I: 74352 0	C: 01511 0	I: 53372 1	I: 77712 0	C: 01535 0
12,2370	I: 60246 1	C: 00050 1	C: 14043 0	C: 00031 0	I: 45275 0	C: 00033 1	C: 10754 0	I: 76405 1

OCTAL LISTING FOR PARAGRAPH # 071, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "3" DENOTES UNUSFD FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

12,2400	C: 00021 1	I: 53605 1	C: 00025 0	C: 56601 0	I: 74271 0	C: 00043 0	C: 02647 0	I: 65372 1
12,2410	C: 00035 1	I: 56257 1	C: 56602 0	C: 00043 0	I: 74221 0	C: 10770 0	C: 01511 0	I: 42455 0
12,2420	I: 77626 0	C: 62234 0	C: 00037 0	I: 77615 0	C: 02201 0	C: 15551 1	C: 00025 0	I: 77615 0
12,2430	C: 02177 1	C: 01553 0	I: 77650 1	C: 02112 1	I: 77776 1	07221 1	C: 00010 0	C: 02525 1
12,2440	C: 12526 0	C: 67356 0	C: 75666 0	C: 15001 1	C: 23771 1	C: 64342 0	C: 43674 0	C: 06563 1
12,2450	C: 04645 1	C: 75173 0	C: 52672 0	C: 00656 1	C: 14331 0	C: 77633 1	C: 40512 0	C: 00023 0
12,2460	C: 11210 1	C: 77774 0	C: 67506 0	06036 1	C: 14033 1	C: 00031 0	I: 77776 1	07221 1
12,2470	C: 00010 0	C: 01000 0	C: 00000 1	C: 72525 0	C: 52506 0	C: 13301 1	C: 15337 1	C: 62776 0
12,2500	C: 54733 1	C: 11176 1	C: 13267 0	C: 73410 0	C: 51674 0	C: 01446 0	C: 33641 1	C: 77451 1
12,2510	C: 65233 0	C: 00055 1	C: 37266 1	C: 77767 1	C: 52336 0	06036 1	I: 53605 1	C: 00001 0
12,2520	C: 21574 1	C: 00035 1	I: 72405 0	C: 00043 0	I: 65234 1	C: 21537 0	I: 53605 1	C: 00033 1
12,2530	C: 21574 1	I: 72405 0	C: 00045 0	I: 65234 1	C: 21537 0	C: 00041 1	I: 76261 0	C: 20607 1
12,2540	I: 41301 0	C: 00047 1	C: 00025 0	I: 76257 0	C: 20576 1	I: 57232 0	C: 00023 0	C: 00037 0
12,2550	I: 77616 0	I: 71214 0	C: 00614 1	C: 24621 1	C: 00037 0	I: 60225 1	C: 02762 0	C: 00047 1
12,2560	I: 60325 0	C: 00015 0	C: 00050 1	I: 41260 0	C: 00047 1	C: 02760 1	I: 56257 1	C: 21202 1
12,2570	I: 43142 1	C: 04351 1	C: 24575 0	I: 75246 0	C: 02760 1	I: 51006 0	C: 24633 1	I: 43145 0
12,2600	C: 02766 1	C: 04311 0	C: 24604 0	C: 00017 1	I: 45221 1	C: 00011 1	I: 51000 0	C: 24613 0
12,2610	C: 24613 0	I: 77650 1	C: 24645 0	I: 45345 1	C: 00011 1	C: 02766 1	I: 52005 0	C: 10772 1
12,2620	C: 24647 1	I: 41345 0	C: 00011 1	C: 00051 0	I: 41325 0	C: 00017 1	C: 00051 0	I: 77625 0
12,2630	I: 52165 1	C: 02760 1	C: 24575 0	I: 43145 0	C: 02766 1	C: 04311 0	C: 24640 0	C: 00011 1
12,2640	I: 45221 1	C: 00017 1	I: 50000 1	C: 24651 0	C: 24651 0	I: 77745 1	C: 00001 0	C: 00015 0
12,2650	I: 77616 0	I: 45345 1	C: 00017 1	C: 02766 1	I: 52005 0	C: 10772 1	C: 24647 1	44753 0
12,2660	50120 1	60026 0	50120 1	54026 1	54154 0	06060 1	I: 44545 0	C: 00041 1
12,2670	I: 74225 1	C: 00035 1	C: 02722 1	I: 65372 1	C: 00025 0	I: 60316 0	C: 00047 1	I: 57275 0
12,2700	C: 00023 0	C: 00025 0	I: 53605 1	C: 00033 1	C: 21572 1	I: 77621 1	C: 00037 0	I: 74352 0
12,2710	C: 02744 1	I: 53372 1	I: 41512 1	I: 77646 0	I: 77701 1	C: 00047 1	C: 16720 0	C: 00031 0
12,2720	I: 45205 1	C: 00033 1	C: 10754 0	I: 76405 1	C: 00021 1	I: 53605 1	C: 00025 0	C: 21176 1
12,2730	I: 74271 0	C: 02720 0	C: 02722 1	C: 00035 1	I: 56257 1	C: 21175 1	C: 21175 1	C: 02720 0
12,2740	I: 77621 1	C: 10770 0	I: 53361 0	C: 02744 1	I: 43412 1	I: 40220 0	C: 02710 0	C: 00001 0
12,2750	I: 63375 0	C: 02655 0	C: 02744 1	I: 77624 1	C: 11005 1	I: 45000 0	C: 24775 1	C: 25000 0
12,2760	I: 43145 0	C: 00031 0	C: 04310 1	C: 02710 0	I: 45014 0	C: 04273 0	C: 24434 1	I: 45014 0
12,2770	C: 03706 0	C: 02710 0	C: 24666 1	I: 77650 1	C: 02710 0	I: 77614 1	C: 04033 0	C: 02710 0

OCTAL LISTING FOR PARAGRAPH # 072, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

12,3000	I: 66374 1	C: 00003 1	C: 00052 0	C: 00001 0	I: 77614 1	C: 04276 0	I: 65366 1	C: 02732 0
12,3010	I: 44342 1	C: 10760 1	I: 54325 1	C: 02730 1	C: 21607 0	I: 77671 1	I: 77600 1	C: 25133 1
12,3020	I: 41225 1	C: 02766 1	I: 40132 0	C: 25133 1	I: 63406 0	I: 65351 0	C: 00155 0	C: 02742 1
12,3030	I: 76202 0	I: 75440 0	C: 25216 0	I: 43306 0	I: 61000 0	C: 25131 0	C: 25024 0	I: 40065 0
12,3040	C: 10754 0	C: 25216 0	I: 41440 1	C: 25216 0	I: 77716 1	I: 41301 0	C: 00047 1	C: 02742 1
12,3050	I: 77457 1	C: 21567 0	I: 07221 1	C: 00005 1	C: 20000 0	C: 00000 1	C: 72525 0	C: 52471 1
12,3060	C: 03146 1	C: 15003 0	C: 75556 0	C: 45210 0	C: 01615 1	C: 13553 0	C: 76371 0	C: 63777 0
12,3070	C: 01232 0	C: 27367 0	06036 1	I: 76405 1	I: 43006 0	C: 04316 1	C: 25203 1	I: 60316 0
12,3100	C: 00047 1	I: 53605 1	C: 02742 1	C: 21565 1	C: 14031 0	C: 00041 1	I: 75542 0	I: 41306 1
12,3110	I: 77632 0	C: 00025 0	I: 60316 0	C: 00047 1	I: 41325 0	C: 02740 0	C: 00041 1	I: 75452 0
12,3120	I: 56405 0	C: 02766 1	C: 14043 0	C: 02742 1	I: 43021 0	C: 10756 1	C: 04270 0	C: 00045 0
12,3130	I: 77616 0	I: 77774 0	C: 00003 1	I: 51001 1	C: 00001 0	C: 25140 0	I: 77614 1	C: 04076 1
12,3140	I: 75545 1	C: 02740 0	I: 41325 0	C: 02730 1	C: 02766 1	I: 65352 0	C: 02732 0	I: 43202 0
12,3150	C: 10764 0	I: 41225 1	I: 55301 0	C: 00047 1	C: 02730 1	I: 51457 0	C: 21174 0	I: 63406 0
12,3160	C: 14043 0	C: 10762 0	I: 63406 0	I: 65234 1	C: 21537 0	C: 02742 1	I: 40405 1	C: 00043 0
12,3170	I: 77771 0	I: 75440 0	C: 25216 0	I: 77615 0	I: 60304 0	C: 25162 0	C: 00047 1	I: 77665 1
12,3200	I: 52057 1	C: 21172 0	C: 25042 0	I: 50145 1	C: 02742 1	C: 25216 0	I: 60366 1	C: 00047 1
12,3210	I: 53665 1	C: 10776 0	C: 20176 0	I: 41425 1	I: 77650 1	C: 25077 0	I: 40001 1	C: 00001 0
12,3220	C: 25221 1	I: 43414 1	C: 04070 1	I: 40220 0	C: 02710 0	C: 00001 0	I: 76614 0	C: 02674 0
12,3230	C: 10005 0	C: 14017 1	C: 02671 0	I: 77675 0	C: 10763 1	C: 02764 0	I: 77214 0	C: 00474 0
12,3240	C: 02655 0	I: 45115 0	C: 02663 0	C: 11051 0	C: 16730 1	C: 02720 0	I: 65301 0	C: 00047 1
12,3250	C: 00041 1	I: 56342 1	I: 65257 1	C: 20173 0	I: 77626 0	C: 75045 1	I: 44342 1	C: 10760 1
12,3260	C: 02734 0	I: 53106 0	C: 25472 1	I: 65301 0	C: 00047 1	C: 00001 0	I: 56342 1	I: 75457 0
12,3270	C: 20176 0	I: 54325 1	C: 02730 1	C: 20607 1	I: 43271 1	C: 02734 0	I: 77626 0	C: 77760 0
12,3300	I: 50000 1	C: 25306 0	C: 25311 0	I: 50025 0	C: 11002 0	C: 25311 0	I: 77745 1	C: 11002 0
12,3310	C: 00017 1	I: 77745 1	C: 02732 0	I: 45261 0	C: 20607 1	I: 77626 0	C: 61041 0	C: 02673 1
12,3320	I: 71240 1	C: 25512 0	C: 02736 1	I: 56352 0	C: 02730 1	I: 77600 1	C: 25512 0	C: 00011 1
12,3330	I: 66214 0	C: 00715 1	C: 25476 0	C: 00051 0	C: 00001 0	I: 77745 1	C: 02766 1	I: 77605 1
12,3340	C: 02730 1	I: 45342 0	C: 02736 1	I: 65301 0	C: 00047 1	C: 02734 0	I: 56257 1	C: 20170 0
12,3350	I: 53040 0	C: 25426 0	C: 25426 0	C: 16740 0	C: 02766 1	I: 43316 1	C: 10766 1	I: 41301 0
12,3360	C: 00047 1	C: 02740 0	I: 44257 1	C: 20571 0	C: 10764 0	C: 16742 1	C: 02740 0	I: 45000 0
12,3370	C: 25431 0	C: 25000 0	I: 77745 1	C: 00037 0	C: 16762 0	C: 00031 0	I: 45014 0	C: 04310 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

12,3740	C: 02710 0	C: 03741 0	C: 03742 0	CKSM 41316 0	0	0	0	0
12,3750	0	0	0	0	0	0	0	0
12,3760	0	0	0	0	0	0	0	0
12,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 074, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

13,2000	C: 07112 1	C: 06620 0	C: 27446 1	C: 14620 0	C: 16471 1	C: 01352 1	C: 22437 1	C: 16067 1
13,2010	C: 00000 1	C: 00000 1	C: 02302 1	C: 24736 0	C: 00000 1	C: 00000 1	C: 77776 1	C: 53032 0
13,2020	C: 10407 0	C: 05344 1	C: 13710 0	C: 35320 0	C: 12160 0	C: 12124 0	I: 43014 0	C: 01474 1
13,2030	C: 04347 0	C: 26036 0	I: 43014 0	C: 02756 1	C: 26036 0	C: 01476 0	I: 45014 0	C: 01667 1
13,2040	C: 27134 1	I: 71214 0	C: 04307 1	C: 26063 0	C: 01571 0	C: 34041 0	C: 27412 0	I: 45014 0
13,2050	C: 01674 0	C: 26644 0	I: 77614 1	C: 02756 1	C: 26060 0	I: 43014 0	C: 01476 0	C: 01475 0
13,2060	I: 45014 0	C: 01467 0	C: 27134 1	I: 77614 1	C: 01236 1	C: 26632 1	I: 43414 1	C: 01674 0
13,2070	I: 43414 1	C: 04756 1	C: 26073 1	I: 53775 1	C: 01521 0	C: 57605 0	I: 53655 1	C: 01535 0
13,2100	C: 57576 1	C: 25221 1	C: 01527 0	I: 53257 1	C: 57602 1	C: 01543 1	I: 77657 0	C: 57576 1
13,2110	C: 15227 1	C: 01517 0	C: 01235 1	I: 77616 0	I: 53775 1	C: 01521 0	C: 57605 0	I: 53655 1
13,2120	C: 01535 0	C: 57576 1	C: 25720 0	C: 01527 0	I: 53257 1	C: 57602 1	C: 01543 1	I: 77657 0
13,2130	C: 57576 1	C: 01726 0	I: 77616 0	C: 00041 1	I: 57545 1	C: 00043 0	I: 67401 0	C: 00001 0
13,2140	I: 44206 0	C: 22273 1	C: 14005 1	C: 22275 1	C: 24043 0	C: 00041 1	I: 41056 1	C: 52421 1
13,2150	C: 14041 1	C: 00041 1	I: 44142 0	C: 00051 0	C: 14023 0	C: 00045 0	I: 77742 0	C: 34021 0
13,2160	C: 47222 0	I: 43206 1	C: 22273 1	C: 24007 0	C: 00005 1	I: 77634 0	C: 21541 1	C: 25112 1
13,2170	C: 00001 0	I: 77634 0	C: 21541 1	C: 01110 0	I: 77776 1	40110 0	74740 1	10000 0
13,2200	12204 1	53110 1	53112 0	53110 1	06036 1	I: 77650 1	C: 00051 0	05504 0
13,2210	C: 00031 0	06036 1	I: 77775 1	C: 03432 1	C: 02227 1	I: 77776 1	32336 0	04616 1
13,2220	C: 20351 1	12333 1	02224 1	02216 0	32337 1	04616 1	C: 20351 1	12333 1
13,2230	02232 0	02224 1	06036 1	I: 77745 1	C: 03440 1	C: 34041 0	C: 27043 0	I: 53575 0
13,2240	C: 00001 0	I: 77676 0	C: 00031 0	I: 53435 0	C: 00007 0	C: 00023 0	I: 53435 0	C: 00031 0
13,2250	C: 24015 0	C: 02227 1	I: 76505 0	C: 00015 0	I: 77655 1	C: 00007 0	C: 00007 0	I: 77624 1
13,2260	C: 27412 0	I: 77624 1	C: 26340 1	I: 53775 1	C: 00007 0	C: 57176 0	C: 25543 1	C: 00001 0
13,2270	I: 77657 0	C: 57176 0	C: 15535 0	C: 03440 1	C: 01517 0	I: 71214 0	C: 01673 1	C: 01643 1
13,2300	C: 34041 0	C: 27107 1	I: 77624 1	C: 27412 0	I: 77775 1	C: 00017 1	C: 01503 0	C: 15535 0
13,2310	C: 00015 0	C: 25517 0	C: 00025 0	I: 77624 1	C: 23361 1	I: 77776 1	05353 1	C: 04024 0
13,2320	05504 0	C: 00236 0	06036 1	I: 77624 1	C: 26661 1	I: 77531 0	C: 00053 1	C: 26332 1
13,2330	04616 1	C: 27447 0	I: 77776 1	34755 1	55460 0	16001 1	C: 01524 0	C: 01441 1
13,2340	I: 43174 1	C: 00002 0	C: 00063 1	I: 77014 1	C: 04303 0	C: 00052 0	C: 00000 1	I: 43414 1
13,2350	C: 00263 0	I: 40220 0	C: 03672 1	C: 00001 0	C: 24007 0	C: 02032 1	I: 51406 1	C: 16070 1
13,2360	C: 22275 1	I: 71414 0	C: 01743 0	C: 26364 1	I: 77624 1	C: 51531 1	I: 77656 1	C: 36032 0
13,2370	C: 26550 0	I: 77624 1	C: 26560 0	I: 63545 0	C: 02032 1	I: 63525 0	C: 02034 1	I: 75415 0

OCTAL LISTING FOR PARAGRAPH # 075, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

13,2400	I: 76405 1	C: 00011 1	C: 14021 1	C: 02036 0	C: 34023 1	C: 26510 1	C: 15121 1	C: 02032 1
13,2410	C: 14021 1	C: 02034 1	C: 34023 1	C: 26510 1	C: 15123 0	C: 02070 1	I: 77625 0	C: 03671 1
13,2420	C: 35125 1	C: 03672 1	I: 40220 0	C: 03672 1	C: 00001 0	C: 34007 1	C: 26550 0	I: 73545 1
13,2430	C: 01121 1	I: 65275 1	C: 00011 1	C: 01121 1	I: 65346 0	C: 01123 0	I: 57356 0	I: 71525 0
13,2440	C: 01121 1	I: 71525 0	C: 01123 0	I: 55475 1	I: 41456 0	C: 36032 0	C: 26560 0	I: 43145 0
13,2450	C: 22275 1	C: 01743 0	C: 26454 0	I: 77746 1	I: 77624 1	C: 51504 1	C: 16032 1	C: 03671 1
13,2460	I: 74215 1	C: 01125 0	C: 02032 1	I: 77772 0	C: 36032 0	C: 03672 1	I: 63545 0	C: 02036 0
13,2470	I: 44352 0	C: 22273 1	I: 44275 1	C: 26507 1	C: 22273 1	I: 75465 1	C: 26503 0	I: 77622 1
13,2500	C: 03671 1	I: 77616 0	C: 00446 1	C: 00305 1	C: 17711 0	C: 05254 1	C: 00155 0	C: 25250 1
13,2510	I: 77600 1	C: 26512 0	I: 63545 0	C: 00023 0	I: 63525 0	C: 00021 1	I: 77615 0	I: 75454 0
13,2520	C: 26536 0	I: 40065 0	C: 00023 0	C: 26543 1	I: 67542 0	C: 00025 0	I: 50125 1	C: 00021 1
13,2530	C: 26532 1	I: 43545 1	I: 57545 1	I: 43244 1	C: 26540 1	C: 22273 1	C: 00025 0	I: 77616 0
13,2540	I: 52025 1	C: 22273 1	C: 26536 0	I: 75345 1	C: 10760 1	C: 00023 0	C: 00025 0	I: 77616 0
13,2550	I: 43145 0	C: 26505 0	C: 01743 0	C: 26556 0	I: 77735 0	C: 22273 1	C: 00011 1	I: 77616 0
13,2560	I: 71220 1	C: 00051 0	C: 10003 0	I: 71214 0	C: 01703 1	C: 26575 1	C: 10001 1	I: 45014 0
13,2570	C: 00742 0	C: 26573 1	C: 26466 1	C: 37671 0	C: 00051 0	I: 77214 0	C: 00702 1	C: 26573 1
13,2600	C: 02023 1	I: 64446 0	I: 77650 1	C: 26573 1	05353 1	C: 00052 0	35017 1	05105 0
13,2610	C: 02613 1	C: 26063 0	05261 1	06036 1	I: 47014 1	C: 04712 1	C: 26653 0	C: 21462 1
13,2620	C: 00041 1	I: 77624 1	C: 27412 0	I: 45014 0	C: 01076 1	C: 26644 0	I: 77650 1	C: 26026 1
13,2630	C: 00003 1	C: 25140 0	I: 77414 0	C: 01672 0	05353 1	C: 20032 1	00006 1	32631 1
13,2640	05277 0	C: 02604 1	C: 26063 0	05155 0	I: 43014 0	C: 01472 1	C: 01673 1	I: 43014 0
13,2650	C: 01676 1	C: 01675 1	I: 77616 0	I: 77776 1	05353 1	C: 00002 0	05516 0	C: 00221 0
13,2660	05155 0	I: 47020 0	C: 00051 0	C: 26674 0	I: 45014 0	C: 04063 0	C: 26114 1	I: 43014 0
13,2670	C: 00303 1	C: 00051 0	C: 04223 0	C: 00051 0	03036 1	55500 1	51500 0	31502 1
13,2700	51500 0	55554 0	11500 1	12675 0	06060 1	I: 43034 1	C: 26723 0	C: 04303 0
13,2710	C: 26716 0	I: 66214 0	C: 00263 0	C: 02031 1	C: 00000 1	I: 77616 0	I: 66214 0	C: 00063 1
13,2720	C: 02031 1	C: 00002 0	I: 77616 0	03036 1	55500 1	51500 0	31554 1	51500 0
13,2730	55502 0	11500 1	12724 0	06060 1	I: 47020 0	C: 00051 0	C: 26747 1	I: 45014 0
13,2740	C: 04064 1	C: 26070 1	I: 43014 0	C: 00303 1	C: 00051 0	C: 04224 1	C: 00051 0	03036 1
13,2750	55500 1	51500 0	31502 1	51500 0	55626 0	11500 1	12750 0	06060 1
13,2760	I: 47014 1	C: 04307 1	C: 27001 0	C: 26770 0	I: 52014 0	C: 04304 1	C: 26716 0	C: 26711 1
13,2770	03036 1	55500 1	51500 0	31626 1	51500 0	55502 0	11500 1	12771 0

OCTAL LISTING FOR PARAGRAPH # 076, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

13,3000	06060 1	I: 77201 1	C: 00001 0	C: 02023 1	I: 41525 0	C: 00041 1	C: 15517 0	C: 27736 0
13,3010	I: 77624 1	C: 51504 1	C: 25535 0	C: 22267 1	C: 14001 0	C: 01517 0	C: 14007 0	C: 27736 0
13,3020	I: 45014 0	C: 00063 1	C: 51504 1	I: 74235 0	C: 01535 0	C: 26001 1	C: 25543 1	C: 22275 1
13,3030	C: 01521 0	I: 67174 1	C: 00002 0	C: 02030 0	C: 35527 1	C: 27157 1	33042 1	54006 0
13,3040	33457 1	00002 0	C: 26063 0	I: 45020 1	C: 00046 0	C: 27412 0	I: 43130 1	C: 02102 0
13,3050	C: 01474 1	I: 43014 0	C: 01467 0	C: 01676 1	I: 77614 1	C: 01633 0	C: 27136 0	I: 45020 1
13,3060	C: 00046 0	C: 27412 0	I: 43130 1	C: 02102 0	C: 01634 1	C: 27051 0	I: 45020 1	C: 00046 0
13,3070	C: 27412 0	I: 43130 1	C: 02102 0	C: 01474 1	I: 43014 0	C: 01676 1	C: 01433 1	C: 27136 0
13,3100	I: 45020 1	C: 00046 0	C: 27412 0	I: 43130 1	C: 02102 0	C: 01634 1	C: 27074 1	I: 66214 0
13,3110	C: 01467 0	C: 02031 1	C: 00000 1	I: 66214 0	C: 00343 0	C: 27120 1	C: 02031 1	C: 00002 0
13,3120	I: 77220 1	C: 02102 0	C: 22275 1	C: 01521 0	C: 35527 1	C: 23345 1	I: 43014 0	C: 01676 1
13,3130	C: 04062 1	I: 77614 1	C: 04020 1	C: 27150 0	I: 77620 0	C: 02102 0	I: 43014 0	C: 04060 0
13,3140	C: 04062 1	I: 77731 1	C: 00053 1	C: 27150 0	I: 52014 0	C: 01714 1	C: 26705 1	C: 26760 1
13,3150	I: 77745 1	C: 00041 1	C: 01116 0	I: 52014 0	C: 01753 1	C: 27255 0	C: 27241 0	I: 77414 0
13,3160	C: 01652 1	C: 27200 0	05353 1	C: 04022 0	05504 0	C: 00236 0	06036 1	I: 77731 1
13,3170	C: 00053 1	C: 27176 1	I: 52014 0	C: 01714 1	C: 26661 1	C: 26734 0	I: 77624 1	C: 11165 0
13,3200	I: 45001 1	C: 00001 0	C: 23345 1	I: 53775 1	C: 01503 0	C: 57576 1	I: 53715 1	C: 01511 0
13,3210	C: 57576 1	I: 63325 0	C: 01517 0	C: 01503 0	I: 64715 0	C: 01511 0	C: 51770 0	I: 76006 0
13,3220	C: 77765 0	I: 76014 0	C: 00303 1	C: 27225 1	C: 77775 1	I: 40001 1	C: 00001 0	C: 27230 0
13,3230	I: 43014 0	C: 04676 1	C: 01667 1	I: 77535 1	C: 02103 1	30154 1	50120 1	54052 1
13,3240	03427 0	I: 45345 1	C: 01116 0	C: 01517 0	C: 36074 1	C: 23345 1	I: 77624 1	C: 22311 1
13,3250	I: 43345 1	C: 01551 1	C: 01517 0	C: 35517 1	C: 27200 0	I: 43014 0	C: 04752 0	C: 27262 1
13,3260	C: 01632 1	C: 27225 1	I: 73001 1	C: 00013 0	C: 02030 0	I: 51575 1	C: 01535 0	I: 43006 0
13,3270	C: 00262 1	I: 50023 0	C: 55467 1	C: 27276 1	I: 77614 1	C: 00062 0	I: 41345 0	C: 00013 0
13,3300	C: 00043 0	I: 55762 1	C: 51770 0	I: 41366 1	C: 23676 1	I: 40442 1	I: 54345 1	C: 00155 0
13,3310	C: 20220 0	I: 40006 0	C: 27337 0	I: 50021 1	C: 27411 0	C: 27337 0	I: 45345 1	C: 01116 0
13,3320	C: 01517 0	I: 54234 0	C: 21516 0	C: 20211 1	C: 02076 1	I: 51400 1	C: 27343 0	I: 50025 0
13,3330	C: 00015 0	C: 27347 1	I: 75345 1	C: 00015 0	C: 02076 1	C: 36076 0	C: 27347 1	I: 65345 0
13,3340	C: 27411 0	I: 77650 1	C: 27316 0	I: 77634 0	C: 21664 0	C: 36076 0	C: 27332 0	I: 51545 1
13,3350	C: 02076 1	I: 50025 0	C: 27407 1	C: 27157 1	I: 46135 1	C: 01012 0	C: 27361 0	I: 77650 1
13,3360	C: 23156 1	I: 77614 1	C: 01707 0	C: 23156 1	I: 45345 1	C: 02076 1	C: 00015 0	I: 43040 1
13,3370	C: 27157 1	C: 04242 1	C: 23156 1	I: 45345 1	C: 01116 0	C: 01517 0	I: 77640 0	C: 27225 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

13,3740	C: 63145 1	C: 00243 1	C: 32703 1	C: 03654 0	C: 21000 1	C: 03654 0	C: 21000 1	C: 04627 0
13,3750	C: 25200 1	C: 03751 1	C: 03752 1	CKSM 72477 0	0	0	0	0
13,3760	0	0	0	0	0	0	0	0
13,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 100, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

14,2000	C: 26723 0	C: 00450 0	C: 00065 1	C: 01265 1	C: 00302 0	C: 24533 1	C: 00052 0	C: 04047 0
14,2010	C: 15261 0	C: 27231 1	C: 74126 1	C: 61161 0	C: 70032 1	C: 54470 0	C: 15013 1	C: 10432 0
14,2020	C: 67066 0	C: 40370 1	C: 02550 0	C: 31133 1	C: 07207 0	C: 24243 1	C: 67275 0	C: 67544 0
14,2030	C: 13261 0	C: 25121 1	C: 05075 0	C: 16350 0	C: 70715 0	C: 55404 1	C: 62466 1	C: 54577 0
14,2040	C: 10650 0	C: 17202 1	C: 63234 1	C: 43704 0	C: 73710 0	C: 50170 1	C: 07203 1	C: 13612 0
14,2050	C: 61746 0	C: 77370 0	C: 02343 1	C: 05340 0	C: 03235 0	C: 14762 1	C: 62030 0	C: 51212 1
14,2060	C: 70715 0	C: 64117 1	C: 01744 1	C: 11157 1	C: 63531 0	C: 66055 1	C: 12007 0	C: 37503 0
14,2070	C: 76145 0	C: 53477 0	C: 60372 1	C: 43674 0	C: 03370 0	C: 15121 1	C: 76123 0	C: 64245 0
14,2100	C: 72437 1	C: 45623 1	C: 61041 0	C: 57124 1	C: 72275 1	C: 55365 1	C: 62641 0	C: 72150 0
14,2110	C: 70712 1	C: 41542 1	C: 67363 0	C: 50441 0	C: 64426 0	C: 77263 0	C: 07157 0	C: 34056 0
14,2120	C: 63326 0	C: 77723 1	C: 67516 1	C: 72566 1	C: 05231 1	C: 14031 0	C: 64753 1	C: 63156 0
14,2130	C: 71237 1	C: 42272 0	C: 66427 0	C: 64260 1	C: 66546 0	C: 73302 1	C: 73261 0	C: 73575 1
14,2140	C: 14122 0	C: 07016 1	C: 61247 1	C: 42015 0	C: 72314 1	C: 67004 1	C: 74744 0	C: 74104 1
14,2150	C: 70605 0	C: 63103 0	C: 77154 1	C: 54113 0	C: 61601 1	C: 62472 1	C: 60604 0	C: 63166 0
14,2160	C: 77033 1	C: 63044 1	C: 73162 0	C: 53261 1	C: 60431 1	C: 63350 1	C: 00660 1	C: 22763 0
14,2170	C: 04045 1	C: 01424 1	C: 62165 1	C: 45335 0	C: 07327 0	C: 21564 0	C: 03267 1	C: 34557 1
14,2200	C: 63472 0	C: 50705 0	C: 11661 0	C: 21433 0	C: 75501 1	C: 72421 0	C: 70431 0	C: 65316 0
14,2210	C: 07510 1	C: 12666 1	C: 13727 1	C: 21520 0	C: 72161 1	C: 43161 0	C: 11144 0	C: 32323 1
14,2220	C: 64200 1	C: 76476 0	C: 71323 0	C: 70264 0	C: 16403 1	C: 05717 0	C: 01365 0	C: 17662 0
14,2230	C: 75055 0	C: 75101 0	C: 17030 1	C: 32613 1	C: 73321 0	C: 65667 0	C: 77010 0	C: 66714 0
14,2240	C: 11515 0	C: 05314 1	C: 63215 1	C: 53630 1	C: 02145 0	C: 21163 0	C: 12715 1	C: 21123 1
14,2250	C: 13401 0	C: 26125 0	C: 03161 1	C: 14610 0	C: 17401 1	C: 36465 0	C: 75552 1	C: 56556 1
14,2260	C: 05473 1	C: 01565 0	C: 16217 1	C: 31643 1	C: 04417 1	C: 22211 0	C: 06444 0	C: 33354 0
14,2270	C: 07765 1	C: 20153 1	C: 14154 1	C: 23613 1	C: 13202 0	C: 05024 1	C: 13243 0	C: 07665 0
14,2300	C: 01067 1	C: 01242 1	C: 10561 1	C: 05666 1	C: 10401 0	C: 00357 0	C: 65477 0	C: 61124 1
14,2310	C: 00154 1	C: 03111 0	C: 00077 1	C: 35676 0	C: 17777 0	C: 01142 1	C: 07674 0	C: 11416 1
14,2320	C: 03415 1	C: 12707 1	C: 62413 0	C: 43135 1	C: 07511 0	C: 03423 1	C: 01672 0	C: 12054 0
14,2330	C: 15735 1	C: 15405 1	C: 16745 0	C: 21763 0	C: 02613 1	C: 24675 0	C: 73007 1	C: 50430 0
14,2340	C: 15777 1	C: 12457 1	C: 00324 1	C: 03265 0	C: 07571 0	C: 17020 0	C: 15325 1	C: 77620 0
14,2350	C: 02745 0	C: 37560 0	C: 33663 1	C: 77745 1	C: 03560 1	C: 34041 0	C: 27057 0	C: 61131 0
14,2360	C: 00052 0	C: 00000 1	C: 30404 1	C: 74375 0	C: 02723 0	C: 30001 0	C: 52372 0	C: 00001 0
14,2370	I: 77656 1	C: 26723 0	C: 00001 0	C: 57456 1	C: 16707 0	C: 30005 1	C: 77624 1	C: 30436 0

OCTAL LISTING FOR PARAGRAPH # 101, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

14,2400	C: 14017 1	C: 30445 1	C: 34023 1	C: 30431 1	I: 74375 0	C: 02723 0	C: 30007 0	I: 53445 1
14,2410	C: 02715 0	C: 26715 0	C: 02723 0	I: 53361 0	C: 30001 0	C: 00001 0	I: 57456 1	C: 26707 0
14,2420	C: 00001 0	I: 57456 1	C: 16723 0	C: 30003 1	I: 77624 1	C: 30436 0	C: 14023 0	C: 30445 1
14,2430	C: 00017 1	I: 77745 1	C: 30447 0	C: 00021 1	I: 77650 1	C: 02745 0	I: 70471 1	C: 00045 0
14,2440	I: 43336 0	C: 30451 1	I: 70546 1	I: 77616 0	C: 07760 1	C: 14473 1	C: 04000 0	C: 00000 1
14,2450	C: 00343 0	C: 21616 0	04645 1	55745 1	06036 1	I: 77624 1	C: 47443 1	I: 77624 1
14,2460	C: 31267 0	I: 77601 0	C: 00001 0	I: 71214 0	C: 01465 1	C: 22275 1	C: 26756 1	C: 07665 0
14,2470	I: 63361 0	C: 22273 1	C: 02701 0	I: 74370 0	C: 00344 1	C: 22273 1	I: 77655 1	I: 53505 1
14,2500	C: 01734 0	C: 02731 0	I: 66331 0	C: 00051 0	C: 00006 1	C: 00052 0	C: 00006 1	I: 52100 1
14,2510	C: 30512 1	C: 30627 1	I: 50373 0	C: 30347 1	C: 02731 0	I: 50025 0	C: 30626 0	C: 30507 0
14,2520	I: 77754 1	C: 00046 0	I: 52104 0	C: 30525 0	C: 30507 0	C: 30373 0	C: 47430 0	C: 02731 0
14,2530	I: 50025 0	C: 30626 0	C: 30522 1	I: 47773 1	C: 30347 1	C: 47430 0	I: 51025 1	C: 30624 1
14,2540	C: 30522 1	I: 45173 0	C: 30347 1	C: 30601 0	I: 77614 1	C: 01710 0	C: 30507 0	I: 45173 0
14,2550	C: 47430 0	C: 30601 0	I: 77614 1	C: 01710 0	C: 30522 1	I: 77614 1	C: 01605 0	C: 30574 1
14,2560	I: 65120 1	C: 02755 1	C: 02756 1	I: 47773 1	C: 30347 1	C: 47430 0	I: 43006 0	C: 01545 1
14,2570	C: 30560 1	I: 45345 1	I: 77644 1	C: 30522 1	I: 67130 1	C: 02755 1	C: 02756 1	I: 77650 1
14,2600	C: 30522 1	I: 51321 0	C: 02707 0	C: 00017 1	I: 77654 0	C: 30620 0	I: 75240 0	C: 30620 0
14,2610	C: 00160 0	I: 75240 0	C: 30620 0	C: 00162 1	I: 43040 1	C: 30620 0	C: 01630 0	C: 00052 0
14,2620	I: 77614 1	C: 01430 1	C: 00052 0	C: 05110 1	C: 35052 0	C: 05110 1	C: 35052 0	I: 77414 0
14,2630	C: 01745 0	C: 30633 1	02654 1	I: 73150 1	C: 02755 1	C: 02756 1	I: 47775 1	C: 02731 0
14,2640	C: 30347 1	I: 47715 1	C: 02731 0	C: 47430 0	I: 77625 0	I: 66044 1	C: 30652 0	C: 02756 1
14,2650	I: 77734 1	C: 02755 1	I: 77776 1	25745 0	31745 0	04622 0	I: 77620 0	C: 02746 0
14,2660	I: 77776 1	34761 0	04616 1	C: 20476 0	06001 0	02667 1	02712 1	06036 1
14,2670	I: 43234 0	C: 21462 1	C: 31024 0	I: 77624 1	C: 30347 1	I: 77776 1	04616 1	C: 30452 1
14,2700	02702 0	02712 1	05567 0	C: 00405 0	35006 1	04616 1	C: 20351 1	06001 0
14,2710	02712 1	02661 1	34755 1	55757 1	06036 1	I: 77776 1	05353 1	C: 05024 1
14,2720	C: 13000 0	06036 1	I: 77624 1	C: 31610 1	I: 77776 1	04616 1	C: 16000 0	04616 1
14,2730	C: 17665 1	05703 0	11757 1	12735 0	03006 1	06036 1	I: 77775 1	C: 02715 0
14,2740	C: 02767 0	I: 77776 1	05353 1	C: 05024 1	C: 13000 0	06036 1	I: 45145 0	C: 03560 1
14,2750	C: 32540 1	I: 53521 1	C: 01734 0	C: 26715 0	C: 03552 0	I: 53521 1	C: 01734 0	C: 26707 0
14,2760	C: 02761 0	C: 24007 0	C: 02767 0	C: 34015 1	C: 31121 1	I: 45014 0	C: 00354 0	C: 30775 1
14,2770	C: 47345 0	I: 77624 1	C: 31066 0	I: 77614 1	C: 01273 0	I: 77776 1	35742 0	04616 1

OCTAL LISTING FOR PARAGRAPH # 102, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

14,3000	C: 20476 0	06001 0	02661 1	06036 1	I: 77650 1	C: 02746 0	06036 1	I: 77775 1
14,3010	C: 02715 0	C: 02761 0	I: 45145 0	C: 03560 1	C: 32540 1	C: 03552 0	I: 77731 1	C: 02760 1
14,3020	C: 00001 0	I: 77650 1	C: 30715 1	C: 00002 0	C: 06240 1	I: 45020 1	C: 02746 0	C: 47151 1
14,3030	I: 43014 0	C: 01260 1	C: 01662 1	I: 77776 1	33065 1	04616 1	C: 20327 0	33120 1
14,3040	04616 1	C: 17276 1	04616 1	C: 17671 1	05703 0	05353 1	C: 05024 1	C: 13000 0
14,3050	06036 1	I: 75160 1	C: 03604 0	C: 01733 1	I: 77624 1	C: 31237 0	I: 43014 0	C: 01273 0
14,3060	C: 01462 0	I: 77624 1	C: 31523 1	I: 77650 1	C: 30775 1	C: 04024 0	I: 77620 0	C: 02745 0
14,3070	I: 77624 1	C: 47151 1	I: 77776 1	33117 0	04616 1	C: 20351 1	06001 0	03101 1
14,3100	03114 0	05353 1	C: 00214 0	33120 1	04616 1	C: 17276 1	04616 1	C: 17671 1
14,3110	05703 0	05353 1	C: 05024 1	C: 13000 0	06036 1	I: 77650 1	C: 02745 0	C: 01535 0
14,3120	C: 02737 0	I: 43020 1	C: 02745 0	C: 00074 1	I: 77760 0	C: 02706 1	I: 47773 1	C: 00001 0
14,3130	C: 00007 0	I: 65552 0	C: 00025 0	I: 43014 0	C: 00354 0	C: 31145 0	C: 00174 0	I: 71360 1
14,3140	C: 00006 1	C: 00025 0	C: 00023 0	I: 77650 1	C: 31126 0	I: 45345 1	C: 00025 0	C: 00023 0
14,3150	I: 47046 0	C: 21516 0	C: 01046 1	I: 77414 0	C: 00074 1	33171 0	04616 1	C: 20351 1
14,3160	16001 1	03166 0	06036 1	I: 52014 0	C: 00274 0	C: 02745 0	06036 1	I: 77650 1
14,3170	C: 02745 0	C: 01405 1	I: 45020 1	C: 00035 1	C: 31534 1	I: 66234 1	C: 31253 1	C: 00051 0
14,3200	C: 00001 0	I: 40370 1	C: 00003 1	C: 00005 1	I: 70543 1	C: 00325 0	I: 70523 1	C: 00005 1
14,3210	I: 51425 0	I: 45206 1	C: 31252 0	I: 71240 1	C: 31226 0	I: 51025 1	C: 31253 1	C: 31226 0
14,3220	I: 77624 1	C: 31506 0	I: 77624 1	C: 31523 1	I: 77650 1	C: 31230 1	I: 77700 0	C: 31204 0
14,3230	I: 75160 1	C: 02642 0	C: 01733 1	I: 77624 1	C: 31237 0	I: 77650 1	C: 00035 1	I: 77773 1
14,3240	C: 00001 0	C: 10001 1	I: 77773 1	C: 00007 0	C: 10007 1	I: 77773 1	C: 00015 0	C: 10015 1
14,3250	I: 77616 0	C: 00056 1	C: 37722 1	00004 0	30032 0	50120 1	54001 1	30033 1
14,3260	50120 1	54002 1	30034 0	50120 1	54003 0	00003 1	06060 1	I: 77760 0
14,3270	C: 02664 1	I: 41345 0	C: 00737 1	C: 00747 0	I: 77676 0	I: 70525 1	C: 00741 0	I: 41325 0
14,3300	C: 00745 1	C: 00747 0	I: 76466 1	C: 04001 1	I: 41345 0	C: 00743 1	C: 00741 0	I: 77752 1
14,3310	C: 00033 1	I: 77605 1	C: 00737 1	I: 41325 0	C: 00751 1	C: 00745 1	I: 77625 0	I: 41325 0
14,3320	C: 00743 1	C: 00747 0	I: 77676 0	I: 41325 0	C: 00751 1	C: 00737 1	I: 41325 0	C: 00745 1
14,3330	C: 00033 1	I: 55415 1	I: 77772 0	C: 04015 1	I: 76433 1	C: 00001 0	C: 04007 1	I: 77616 0
14,3340	04616 1	C: 33635 1	34761 0	04616 1	C: 20476 0	06001 0	13374 0	05353 1
14,3350	C: 05024 1	C: 13000 0	34755 1	54321 0	54322 0	54323 1	33504 0	04616 1
14,3360	C: 20324 0	33505 1	04616 1	C: 20324 0	06036 1	I: 77624 1	C: 31506 0	I: 77776 1
14,3370	05353 1	C: 05024 1	C: 13000 0	13342 0	05353 1	C: 00014 1	06036 1	I: 77624 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

14,3740	၈	၈	၈	၈	၈	၈	၈	၈
14,3750	၈	၈	၈	၈	၈	၈	၈	၈
14,3760	၈	၈	၈	၈	၈	၈	၈	၈
14,3770	၈	၈	၈	၈	၈	၈	၈	၈

OCTAL LISTING FOR PARAGRAPH # 104, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

15,2000	I: 77773 1	C: 00001 0	C: 00767 1	I: 47133 0	C: 00002 0	C: 21465 0	C: 00031 0	I: 77654 0
15,2010	C: 16171 1	I: 71406 0	I: 73525 1	I: 65361 0	C: 00023 0	I: 52361 1	C: 00015 0	I: 47256 0
15,2020	C: 03761 1	I: 41456 0	I: 47133 0	C: 00004 0	C: 21465 0	C: 00033 1	I: 43225 0	C: 00031 0
15,2030	C: 32047 0	I: 77605 1	C: 32534 1	C: 00033 1	I: 74356 1	I: 65372 1	C: 00033 1	I: 74346 0
15,2040	C: 03761 1	I: 53372 1	I: 45056 0	C: 47570 0	C: 34031 1	C: 16276 0	C: 37777 1	C: 37775 0
15,2050	04616 1	C: 11175 1	34750 1	70076 1	10000 0	02060 0	34752 0	02061 1
15,2060	34753 1	55145 1	34753 1	04616 1	C: 20566 0	06001 0	12073 0	02062 1
15,2070	05353 1	C: 00014 1	05155 0	31145 0	76244 1	50000 1	02077 0	02105 1
15,2100	02166 1	02105 1	06036 1	I: 77650 1	C: 32162 0	00006 1	34755 1	53046 0
15,2110	32172 1	04616 1	C: 20351 1	06001 0	02116 0	02110 0	53046 0	00006 1
15,2120	62122 1	12124 0	00006 1	30025 0	53775 1	31145 0	74752 1	10000 0
15,2130	02134 0	06036 1	I: 77650 1	C: 32223 0	06036 1	I: 77745 1	C: 02775 0	I: 77624 1
15,2140	C: 31566 0	I: 77624 1	C: 31534 1	I: 77776 1	32171 1	04616 1	C: 20351 1	06001 0
15,2150	12174 0	06036 1	I: 77650 1	C: 32141 1	06036 1	I: 77624 1	C: 31172 1	I: 43014 0
15,2160	C: 01462 0	C: 01273 0	I: 77624 1	C: 30656 1	I: 77776 1	06001 0	06036 1	I: 77650 1
15,2170	C: 32141 1	C: 01426 0	C: 01442 1	C: 01531 1	32222 1	04616 1	C: 20476 0	16001 1
15,2200	12154 1	06036 1	I: 64375 1	C: 03605 1	C: 01734 0	I: 77656 1	C: 26665 0	C: 03613 0
15,2210	I: 53521 1	C: 01734 0	C: 26673 1	C: 03621 1	I: 53521 1	C: 01734 0	C: 36701 1	C: 31025 1
15,2220	I: 77650 1	C: 32164 0	C: 00013 0	I: 43014 0	C: 01463 1	C: 00662 0	I: 77201 1	C: 00001 0
15,2230	C: 02023 1	I: 41525 0	C: 02775 0	I: 77624 1	C: 51504 1	I: 77742 0	C: 16032 1	C: 02775 0
15,2240	I: 77624 1	C: 26351 1	I: 70545 1	C: 01123 0	C: 16711 1	C: 01125 0	C: 16713 0	C: 01121 1
15,2250	C: 02707 0	I: 77776 1	32173 0	04616 1	C: 20351 1	16001 1	12260 0	12252 1
15,2260	06036 1	I: 72545 0	C: 02711 1	C: 15123 0	C: 02713 0	C: 15125 0	C: 02707 0	C: 15121 1
15,2270	C: 02775 0	I: 77624 1	C: 26422 1	I: 53575 0	C: 02032 1	C: 37605 0	C: 33647 1	I: 77650 1
15,2300	C: 32141 1	40077 0	74737 1	10000 0	12523 0	32531 1	04616 1	C: 20351 1
15,2310	06001 0	12313 0	12301 0	47743 1	70735 1	00006 1	76241 1	56001 0
15,2320	51757 0	55755 0	50120 1	54046 1	00006 1	12523 0	40000 0	62625 1
15,2330	00006 1	62523 1	06036 1	I: 77624 1	C: 47443 1	I: 64373 1	C: 30347 1	C: 01734 0
15,2340	I: 45056 0	C: 47575 0	C: 02731 0	I: 77776 1	34753 1	55052 0	42537 0	55745 1
15,2350	54000 0	12354 0	34735 1	27745 1	34737 0	54001 1	31745 0	50120 1
15,2360	52011 0	06036 1	I: 77624 1	C: 13370 1	I: 50375 0	C: 02731 0	C: 03761 1	I: 65557 0
15,2370	C: 00031 0	I: 51025 1	C: 32534 1	C: 32455 1	I: 45345 1	C: 00031 0	C: 32536 0	I: 71240 1

OCTAL LISTING FOR PARAGRAPH # 105, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

15,2400	C: 32450 1	C: 00031 0	I: 42405 0	C: 23710 0	C: 24031 0	C: 03761 1	I: 53435 0	C: 22273 1
15,2410	I: 47206 0	C: 03761 1	I: 77676 0	I: 63256 0	C: 03761 1	I: 53435 0	C: 02731 0	I: 50206 0
15,2420	C: 00001 0	I: 65552 0	C: 24033 1	I: 77641 1	I: 71244 0	C: 32432 0	C: 32047 0	I: 77625 0
15,2430	C: 00033 1	C: 00033 1	I: 70535 0	C: 02746 0	I: 41415 1	C: 00033 1	I: 77634 0	C: 21520 0
15,2440	C: 15046 1	C: 00031 0	I: 77615 0	I: 77634 0	C: 21520 0	C: 01047 0	I: 77776 1	12476 1
15,2450	I: 77776 1	34755 1	55045 0	55046 0	12476 1	I: 77776 1	25052 1	41052 0
15,2460	64757 0	00006 1	62466 1	32537 1	27745 1	12350 1	05567 0	C: 00404 1
15,2470	35006 1	04616 1	C: 20351 1	16001 1	12523 0	12301 0	32532 1	04616 1
15,2500	C: 20351 1	16001 1	12504 0	12301 0	34751 0	71052 0	00006 1	12511 1
15,2510	12513 0	34757 0	71052 0	00006 1	74745 1	56001 0	55745 1	47743 1
15,2520	70735 1	61745 0	54735 1	04616 1	C: 16000 0	04616 1	C: 17665 1	05703 0
15,2530	13123 0	C: 00306 1	C: 01517 0	C: 02525 1	C: 12525 0	C: 00026 0	C: 30131 1	C: 12525 0
15,2540	C: 03560 1	I: 77420 1	C: 02736 1	47743 1	70735 1	00006 1	76241 1	56001 0
15,2550	51757 0	55755 0	10000 0	12567 0	32626 1	04616 1	C: 20351 1	02554 1
15,2560	02562 1	02554 1	06036 1	I: 53575 0	C: 02707 0	I: 77650 1	C: 02736 1	40000 0
15,2570	62625 1	00006 1	62603 0	51757 0	31755 1	50120 1	54046 1	06036 1
15,2600	I: 52173 0	C: 30347 1	C: 02736 1	06036 1	I: 45145 0	C: 03560 1	C: 30347 1	I: 77340 0
15,2610	C: 02757 0	C: 02707 0	C: 24001 0	C: 02715 0	C: 26707 0	C: 00001 0	C: 02715 0	I: 70143 0
15,2620	C: 02756 1	C: 00154 1	I: 52173 0	C: 02343 1	C: 02736 1	C: 00343 0	C: 01530 0	44737 1
15,2630	54322 0	40000 0	54323 1	54321 0	06036 1	I: 45014 0	C: 01662 1	C: 32734 0
15,2640	I: 66370 0	C: 00022 1	C: 00051 0	C: 00006 1	I: 77744 0	C: 00050 1	I: 45173 0	C: 55512 1
15,2650	C: 47577 1	C: 06707 1	I: 77775 1	C: 00231 0	I: 73744 1	C: 00047 1	C: 75040 1	I: 71152 1
15,2660	C: 00047 1	I: 63047 1	C: 55512 1	C: 00002 0	C: 06665 1	I: 45100 1	C: 32646 1	C: 47255 0
15,2670	I: 74575 0	C: 02715 0	C: 36723 1	C: 32734 0	I: 74575 0	C: 02715 0	I: 53455 0	C: 02723 0
15,2700	C: 02761 0	I: 77641 1	C: 02235 1	I: 65552 0	C: 01046 1	I: 77776 1	05516 0	C: 00014 1
15,2710	C: 33040 0	04616 1	C: 20351 1	06001 0	12717 0	05504 0	C: 00014 1	05353 1
15,2720	C: 05024 1	C: 13000 0	06036 1	I: 77775 1	C: 02761 0	C: 02235 1	I: 77776 1	34751 0
15,2730	70074 0	10000 0	12627 1	13535 0	I: 77220 1	C: 02745 0	C: 22275 1	C: 02707 0
15,2740	I: 77776 1	05353 1	C: 05024 1	C: 13000 0	04616 1	C: 16753 1	04616 1	C: 17671 1
15,2750	05703 0	04616 1	C: 17163 0	04616 1	C: 17671 1	05703 0	33037 0	55736 0
15,2760	37715 0	55075 0	04616 1	C: 15701 0	05353 1	C: 05024 1	C: 13000 0	04616 1
15,2770	C: 77533 1	06036 1	I: 77776 1	35000 1	05173 1	C: 02777 1	05155 0	04674 0

OCTAL LISTING FOR PARAGRAPH # 106, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRITVE OPERATOR WORDS) OR "C" (CONSTANTS)

15,3000	C: 77533 1	35023 0	05105 0	C: 03006 1	C: 32055 0	05261 1	04616 1	C: 15263 1
15,3010	25736 1	06036 1	I: 53375 0	C: 00325 0	C: 02707 0	C: 02707 0	I: 50135 0	C: 02737 0
15,3020	C: 32772 1	I: 53575 0	C: 02707 0	C: 36731 1	C: 47443 1	I: 77624 1	C: 47575 0	C: 02715 0
15,3030	I: 77776 1	05353 1	C: 05024 1	C: 13000 0	06036 1	I: 77650 1	C: 02745 0	C: 77751 1
15,3040	C: 01404 0	I: 71220 1	C: 02745 0	C: 00322 1	I: 65325 0	C: 00324 1	C: 00323 0	I: 77666 1
15,3050	C: 24767 1	C: 22273 1	I: 77624 1	C: 47570 0	C: 26707 0	C: 22271 0	I: 77624 1	C: 47577 1
15,3060	C: 36715 1	C: 47443 1	I: 77624 1	C: 31267 0	I: 77775 1	C: 02665 0	C: 24007 0	C: 02673 1
15,3070	C: 34015 1	C: 47345 0	I: 77624 1	C: 47151 1	I: 77776 1	04616 1	C: 17163 0	04616 1
15,3100	C: 17671 1	05703 0	33113 1	04616 1	C: 17276 1	04616 1	C: 17671 1	05703 0
15,3110	06036 1	I: 77650 1	C: 02745 0	C: 02737 0	34755 1	13117 1	34753 1	55577 1
15,3120	05353 1	C: 04024 0	12301 0	31757 0	00006 1	13144 1	06036 1	I: 77775 1
15,3130	C: 02715 0	C: 02767 0	I: 77776 1	05353 1	C: 05024 1	C: 13000 0	06036 1	I: 45145 0
15,3140	C: 03560 1	C: 32540 1	C: 36731 1	C: 33156 0	06036 1	I: 77775 1	C: 02715 0	C: 02761 0
15,3150	I: 45145 0	C: 03560 1	C: 32540 1	C: 02723 0	I: 77776 1	13116 0	I: 77131 1	C: 00052 0
15,3160	C: 00006 1	C: 00014 1	I: 64373 1	C: 75040 1	C: 03605 1	I: 77656 1	C: 12723 1	I: 77773 1
15,3170	C: 75002 1	C: 10023 1	I: 43104 0	C: 33162 1	C: 04315 1	C: 33203 0	I: 77624 1	C: 31121 1
15,3200	I: 77614 1	C: 00354 0	C: 33264 1	I: 77624 1	C: 47345 0	I: 77624 1	C: 47151 1	I: 77776 1
15,3210	34752 0	70104 0	10000 0	13222 1	33316 0	04616 1	C: 20351 1	06001 0
15,3220	13222 1	13265 1	06036 1	I: 40175 0	C: 02740 0	C: 33226 1	C: 02750 1	I: 40141 1
15,3230	C: 30451 1	C: 33273 1	I: 52131 0	C: 02746 0	C: 33236 0	C: 33074 1	I: 77776 1	05353 1
15,3240	C: 05024 1	C: 13000 0	06036 1	I: 75160 1	C: 03604 0	C: 01733 1	I: 45014 0	C: 01462 0
15,3250	C: 31237 0	I: 77776 1	11145 1	13255 1	13265 1	34752 0	70104 0	10000 0
15,3260	13543 1	06036 1	I: 77624 1	C: 33470 1	I: 77776 1	35742 0	04616 1	C: 20476 0
15,3270	16001 1	13543 1	16001 1	I: 75160 1	C: 02664 1	C: 02642 0	I: 77624 1	C: 31237 0
15,3300	I: 77624 1	C: 47443 1	I: 77624 1	C: 31267 0	I: 77624 1	C: 47255 0	I: 77624 1	C: 31506 0
15,3310	I: 77624 1	C: 31523 1	I: 77624 1	C: 33041 1	I: 77650 1	C: 33236 0	C: 01535 0	04616 1
15,3320	C: 33635 1	06036 1	I: 77745 1	C: 03440 1	C: 01046 1	I: 77776 1	32172 1	04616 1
15,3330	C: 20510 1	16001 1	13337 1	13326 1	05353 1	C: 00014 1	05155 0	06036 1
15,3340	I: 50145 1	C: 01046 1	C: 33367 0	I: 65234 1	C: 21462 1	C: 01046 1	I: 65254 1	C: 33357 0
15,3350	I: 51025 1	C: 01046 1	C: 33357 0	I: 45545 1	C: 74337 0	C: 36775 1	C: 33361 0	I: 45545 1
15,3360	C: 75002 1	C: 34041 0	C: 27057 0	I: 53575 0	C: 00001 0	C: 37605 0	C: 33647 1	I: 77776 1
15,3370	34755 1	55145 1	55146 1	34737 0	70077 0	10000 0	34745 0	27146 1

OCTAL LISTING FOR PARAGRAPH # 107, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALIO WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

15,3400	34753 1	70102 0	10000 0	34750 1	27146 1	34750 1	55144 0	33634 0
15,3410	04616 1	C: 20351 1	16001 1	13415 0	13407 0	05353 1	C: 05024 1	C: 13000 0
15,3420	34737 0	70077 0	10000 0	13523 1	34753 1	70102 0	10000 0	13527 0
15,3430	34752 0	71145 1	10000 0	13527 0	05567 0	C: 00701 1	35006 1	04616 1
15,3440	C: 20351 1	16001 1	13407 0	13407 0	I: 40220 0	C: 02746 0	C: 00001 0	I: 77634 0
15,3450	C: 21462 1	C: 27560 1	C: 02723 0	I: 41525 0	C: 03560 1	I: 77624 1	C: 51504 1	C: 26723 0
15,3460	C: 02731 0	I: 65201 1	C: 00001 0	C: 03560 1	I: 45006 0	C: 51504 1	C: 36731 1	C: 02746 0
15,3470	I: 45020 1	C: 02746 0	C: 47443 1	I: 40234 0	C: 21462 1	C: 00001 0	C: 37560 0	C: 31267 0
15,3500	I: 61375 1	C: 02673 1	C: 01734 0	I: 65256 0	C: 03560 1	I: 45006 0	C: 51531 1	C: 26243 0
15,3510	C: 02701 0	I: 53505 1	C: 01734 0	I: 41525 0	C: 03560 1	I: 77624 1	C: 51531 1	C: 02251 0
15,3520	I: 77614 1	C: 03036 1	C: 02746 0	06036 1	I: 77624 1	C: 33470 1	I: 77776 1	05504 0
15,3530	C: 00205 0	34753 1	71145 1	10000 0	12627 1	05353 1	C: 04024 0	34753 1
15,3540	70102 0	10000 0	13557 1	05353 1	C: 04024 0	05516 0	C: 00205 0	36244 0
15,3550	71145 1	50000 1	13553 0	13557 1	13600 0	13616 1	13617 0	06036 1
15,3560	I: 77775 1	C: 02243 0	C: 26723 0	C: 02251 0	C: 36731 1	C: 47443 1	I: 77624 1	C: 31267 0
15,3570	I: 77775 1	C: 02673 1	C: 26761 0	C: 02701 0	C: 36767 1	C: 33444 0	I: 77650 1	C: 33156 0
15,3600	06036 1	I: 53575 0	C: 02023 1	C: 26723 0	C: 02251 0	C: 36731 1	C: 47443 1	I: 77624 1
15,3610	C: 31267 0	I: 45175 0	C: 02235 1	C: 47565 1	I: 77650 1	C: 33572 1	13114 1	06036 1
15,3620	I: 53575 0	C: 02023 1	C: 02723 0	C: 26731 0	C: 02235 1	I: 77624 1	C: 47565 1	C: 36761 1
15,3630	C: 33444 0	I: 77776 1	13116 0	C: 00701 1	C: 01206 1	41302 0	74743 1	10000 0
15,3640	13644 0	05567 0	C: 00210 1	06001 0	05504 0	C: 00007 0	04631 1	I: 77220 1
15,3650	C: 02746 0	C: 01555 0	I: 47235 0	C: 01563 0	C: 03605 1	I: 77656 1	C: 03621 1	I: 53435 0
15,3660	C: 03605 1	C: 37613 1	C: 02746 0	I: 54201 0	C: 00001 0	C: 20617 0	I: 56371 1	C: 01707 0
15,3670	C: 12024 1	C: 00031 0	I: 77170 1	C: 00000 1	C: 00000 1	I: 77614 1	C: 00274 0	I: 77745 1
15,3700	C: 12004 0	C: 00027 1	I: 40745 0	C: 00031 0	C: 12050 1	I: 42661 0	C: 20211 1	C: 12046 0
15,3710	I: 40756 1	C: 12044 1	I: 62015 1	C: 00027 1	C: 77771 0	C: 00027 1	I: 77614 1	C: 00054 0
15,3720	C: 33702 1	I: 40745 0	C: 00031 0	C: 65747 0	I: 42661 0	C: 20206 1	C: 65741 0	I: 77625 0
15,3730	C: 00027 1	C: 10021 0	I: 63135 0	C: 00050 1	C: 77775 1	I: 53015 0	C: 12026 0	C: 33767 1
15,3740	I: 77644 1	C: 33677 1	I: 45345 1	C: 00021 1	C: 00025 0	I: 65356 1	C: 00021 1	I: 65356 1
15,3750	C: 00021 1	I: 55546 0	I: 53521 1	C: 12002 0	C: 02723 0	I: 65345 0	C: 12004 0	C: 00023 0
15,3760	I: 65356 1	C: 00023 0	I: 55546 0	I: 53521 1	C: 12002 0	C: 02715 0	I: 77616 0	I: 77745 1
15,3770	C: 12004 0	C: 00027 1	I: 77650 1	C: 33721 0	I: 77616 0	C: 03775 1	C: 03776 1	CKSM 66242 0

OCTAL LISTING FOR PARAGRAPH # 110, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

16,2000	00006 1	00031 0	40000 0	74355 1	00006 1	12154 1	41303 1	74746 1
16,2010	10000 0	12203 0	41273 1	74751 1	27273 1	12160 0	34742 1	00006 1
16,2020	02030 0	10000 0	12154 1	00002 0	22016 0	00006 1	22012 1	31273 0
16,2030	74737 1	10000 0	12041 1	34737 0	27273 1	37714 1	05072 1	C: 02447 1
16,2040	C: 40106 1	02000 0	30111 0	74751 1	00006 1	12154 1	04674 0	C: 40153 1
16,2050	34755 1	55524 1	55525 0	55526 0	55417 0	55420 1	55421 0	55426 1
16,2060	55427 0	55430 0	55537 0	55540 0	55541 1	55542 1	55422 0	55423 1
16,2070	55500 1	55502 0	55545 0	55546 0	55510 0	55512 1	55501 0	55627 1
16,2100	55631 0	55630 1	55632 0	55456 0	55457 1	42177 0	71273 1	55273 1
16,2110	00006 1	30033 1	53437 1	30034 0	55440 1	41273 1	74740 1	27273 1
16,2120	34751 0	55535 1	55536 1	34733 1	54031 1	55464 1	55466 0	34755 1
16,2130	55465 0	55467 1	55463 0	55470 1	55471 0	55472 0	44363 1	55755 0
16,2140	34752 0	55431 1	55432 1	55433 0	00006 1	32202 0	53275 1	37726 0
16,2150	54030 0	15270 0	C: 02024 0	C: 34106 1	04674 0	C: 36563 1	04674 0	C: 35425 1
16,2160	00006 1	32153 1	53275 1	34755 1	55470 1	55471 0	55472 0	00006 1
16,2170	01005 0	00006 1	01006 0	42200 0	00006 1	03012 1	12147 0	C: 03021 1
16,2200	C: 07400 1	C: 02210 0	C: 34106 1	00006 1	32207 0	52006 0	C: 02226 0	C: 40106 1
16,2210	37726 0	26030 0	22016 0	00006 1	22012 1	11755 0	05634 0	C: 02000 0
16,2220	02000 0	31633 0	00006 1	21636 1	02245 0	55633 1	31634 1	00006 1
16,2230	21637 0	02245 0	55634 0	31635 0	00006 1	21640 0	02245 0	55635 1
16,2240	00006 1	27443 1	00006 1	27455 0	13624 0	10000 0	64753 1	00002 0
16,2250	40000 0	00002 0	00006 1	71737 1	21425 1	00006 1	31425 0	53742 0
16,2260	11424 0	12263 0	12273 1	62304 1	00006 1	62273 0	11424 0	34733 1
16,2270	00002 0	44733 0	00002 0	53425 1	00006 1	10061 1	00002 0	54007 1
16,2300	00002 0	50000 1	44734 1	00002 0	C: 77147 0	31735 1	00006 1	71530 1
16,2310	55743 1	30032 0	54001 1	00006 1	21436 0	23436 1	55735 0	33603 1
16,2320	54061 1	41743 1	00006 1	74736 0	27426 1	31744 1	61545 1	00006 1
16,2330	77735 0	27427 0	31745 0	61546 1	00006 1	77735 0	27430 0	30033 1
16,2340	54001 1	00006 1	21437 1	23437 0	55736 0	00006 1	71412 0	61735 1
16,2350	53425 1	02255 1	00006 1	61417 1	27426 1	02277 1	55426 1	00006 1
16,2360	31742 1	21445 1	41452 1	00006 1	73603 0	21445 1	30034 0	54001 1
16,2370	00006 1	21440 1	55737 1	23440 0	31413 0	00006 1	71736 0	53425 1

OCTAL LISTING FOR PARAGRAPH # 111, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

16,2400	31415 0	02252 0	00006 1	61420 0	27427 0	02277 1	55427 0	00006 1
16,2410	31742 1	21447 0	41453 0	00006 1	73603 0	21447 0	31414 1	00006 1
16,2420	71736 0	53425 1	31416 0	02252 0	00006 1	61421 1	27430 0	02277 1
16,2430	55430 0	00006 1	31742 1	21451 1	41454 1	00006 1	73603 0	21451 1
16,2440	30111 0	74737 1	00006 1	12451 1	00006 1	31405 1	52062 1	31403 1
16,2450	12455 0	00006 1	31410 0	52062 1	31406 1	54063 0	11426 1	12461 1
16,2460	12476 1	60063 1	00006 1	62476 0	22007 0	23426 0	34755 1	00006 1
16,2470	11431 1	27417 0	02277 1	55417 0	30061 0	55431 1	25431 0	31743 0
16,2500	27417 0	02277 1	55417 0	11427 0	12506 1	12533 1	60063 1	00006 1
16,2510	62533 0	22007 0	23427 1	34755 1	00006 1	11432 1	55735 0	27420 1
16,2520	02277 1	55420 1	30061 0	57432 0	60062 0	57735 1	00006 1	74756 0
16,2530	00006 1	11735 0	27537 0	25432 0	31744 1	61545 1	27420 1	02277 1
16,2540	55420 1	11430 0	12544 1	12571 1	60063 1	00006 1	62571 0	22007 0
16,2550	23430 1	34755 1	00006 1	11433 0	55736 0	27421 0	02277 1	55421 0
16,2560	30061 0	57433 1	60062 0	57736 1	00006 1	74756 0	00006 1	11736 0
16,2570	27541 1	25433 1	31745 0	61546 1	27421 0	02277 1	55421 0	40111 1
16,2600	74744 0	10000 0	12613 0	55422 0	55423 1	55545 0	55546 0	55537 0
16,2610	55541 1	12635 1	C: 00074 1	31510 1	00006 1	74766 0	21540 0	31537 1
16,2620	55422 0	00006 1	73601 1	55545 0	31512 0	00006 1	74766 0	21542 1
16,2630	31541 0	55423 1	00006 1	73601 1	55546 0	34747 1	71273 1	10000 0
16,2640	03721 0	52011 0	53752 1	32654 1	56017 1	22012 1	53754 1	32653 0
16,2650	52016 1	53756 0	15275 0	C: 02655 0	11630 1	12667 0	12673 0	11632 0
16,2660	12671 1	12703 0	34740 0	71273 1	00006 1	12713 1	02717 1	55630 1
16,2670	12657 0	55632 0	12662 0	55500 1	55510 0	45007 1	00006 1	03012 1
16,2700	34735 1	55630 1	12657 0	55502 0	55512 1	45020 1	00006 1	03012 1
16,2710	34735 1	55632 0	12662 0	41273 0	74740 1	27273 1	13607 1	00006 1
16,2720	00031 0	40000 0	73576 1	00006 1	12773 1	00006 1	74745 1	50000 1
16,2730	33555 1	55742 0	36241 0	03534 0	46241 1	61741 1	00006 1	12772 0
16,2740	44756 0	61742 1	00006 1	62761 0	41741 0	64751 0	00006 1	62772 1
16,2750	05567 0	C: 02001 1	34753 1	23273 0	00006 1	06001 0	55273 1	34755 1
16,2760	12773 1	34753 1	23273 0	00006 1	06001 0	55273 1	74753 0	64751 0
16,2770	27742 0	12732 1	31737 0	55470 1	34737 0	00006 1	02031 1	00006 1

OCTAL LISTING FOR PARAGRAPH # 112, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

16,3000	13006 0	30111 0	74743 1	10000 0	13442 1	13050 0	34735 1	70111 1
16,3010	00006 1	13050 0	34755 1	55462 1	30032 0	55633 1	11456 0	13033 0
16,3020	34751 0	00006 1	02031 1	00006 1	13043 1	34750 1	00006 1	02031 1
16,3030	00006 1	13041 0	13421 1	00006 1	00031 0	40000 0	75742 1	55456 0
16,3040	13421 1	44363 1	13044 0	34363 0	55524 1	34753 1	55456 0	13327 0
16,3050	00006 1	00031 0	55441 0	74735 0	00006 1	13202 0	34740 0	70111 1
16,3060	00006 1	13442 1	34743 0	71273 1	00006 1	13077 0	34737 0	00006 1
16,3070	02031 1	00006 1	13177 1	45014 0	71273 1	55273 1	13177 1	31273 0
16,3100	74742 0	00006 1	13104 0	13177 1	31273 0	74741 0	00006 1	13115 0
16,3110	13177 1	C: 00001 0	C: 00050 1	C: 74777 0	C: 00056 1	44740 1	00004 0	70111 1
16,3120	54111 1	34737 0	00006 1	02031 1	00006 1	13131 0	30032 0	55633 1
16,3130	03133 0	04574 0	C: 40153 1	00003 1	13442 1	55462 1	34740 0	26111 1
16,3140	34755 1	55444 0	55445 1	55446 1	55447 0	55450 0	55451 1	55452 1
16,3150	55453 0	55454 1	54042 0	54044 0	33113 1	71273 1	55273 1	41273 1
16,3160	74743 1	27273 1	03164 1	13421 1	22044 1	30042 1	53461 1	34755 1
16,3170	54043 1	54042 0	54044 0	33602 0	00006 1	05013 0	00002 0	34755 1
16,3200	54043 1	13206 1	34740 0	70111 1	00006 1	13135 1	30032 0	55633 1
16,3210	10043 1	13214 1	13214 1	13214 1	60000 1	63114 0	00006 1	00006 1
16,3220	70043 1	30001 0	00006 1	71442 0	57452 0	40000 0	61452 0	55735 0
16,3230	03164 1	41452 1	61417 1	55425 1	11735 0	13240 0	13246 0	13240 0
16,3240	61474 1	00006 1	63246 1	33112 0	55443 1	03257 1	31273 0	74742 0
16,3250	00006 1	13253 1	03257 1	31444 1	55750 0	55462 1	03446 1	30032 0
16,3260	55633 1	34755 1	55444 0	55445 1	55462 1	11425 1	03271 0	03271 0
16,3270	03271 0	55735 0	61474 1	00006 1	63304 0	31443 0	00006 1	63304 0
16,3300	41273 1	74742 0	27273 1	13307 1	44742 0	71273 1	55273 1	41425 1
16,3310	00006 1	71551 0	20001 1	02277 1	00006 1	77715 1	55524 1	31735 1
16,3320	61473 0	00006 1	63325 0	36241 0	13334 1	31524 0	27524 1	34747 1
16,3330	70111 1	10000 0	34753 1	64751 0	55741 0	34753 1	54001 1	11524 1
16,3340	13345 1	13421 1	13344 0	13421 1	22007 0	64753 1	55735 0	23742 1
16,3350	03514 1	46241 1	61741 1	00006 1	13356 0	44752 1	64751 0	55521 1
16,3360	31737 0	05745 1	41735 0	63575 0	00006 1	63607 0	63555 1	00006 1
16,3370	63375 0	27735 0	51742 1	33604 0	55524 1	31735 1	22007 0	00004 0

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

16,3400	53467 1	04874 0	C: 37046 1	44740 1	71273 1	55273 1	03410 1	13607 1
16,3410	30111 0	54001 1	34747 1	00006 1	06001 0	54111 1	00003 1	00002 0
16,3420	03410 0	05744 0	34755 1	55524 1	13607 1	30033 1	00006 1	21634 0
16,3430	00006 1	71412 0	57750 1	30032 0	00006 1	21633 1	61277 1	27750 0
16,3440	57462 0	00002 0	03425 1	41641 1	61417 1	55425 1	44753 0	55476 1
16,3450	30111 0	74737 1	00006 1	13470 0	00004 0	04674 0	C: 37700 1	31524 0
16,3460	00006 1	13420 0	00003 1	41741 0	66241 0	00006 1	13335 0	13327 0
16,3470	34755 1	55477 0	00004 0	04674 0	C: 37207 0	00003 1	41737 1	63513 0
16,3500	00006 1	63327 1	11524 1	13505 0	13421 1	63512 1	00006 1	63327 1
16,3510	36241 0	13334 1	C: 77377 1	C: 75117 1	36241 0	55740 1	51741 1	33546 0
16,3520	51742 1	72537 1	55737 1	71263 0	10000 0	13527 0	00002 0	11740 1
16,3530	13534 1	05567 0	C: 02003 0	13421 1	55741 0	13515 1	12752 1	C: 00252 1
16,3540	C: 00125 1	C: 00140 1	C: 00006 1	C: 00220 1	C: 00011 1	C: 00151 1	C: 00146 1	C: 00226 1
16,3550	C: 00231 1	C: 00151 1	C: 00132 1	C: 00245 1	C: 00377 1	C: 77445 1	C: 00004 0	C: 00002 0
16,3560	C: 07776 0	C: 00005 1	C: 00011 1	C: 00012 1	C: 07776 0	C: 00003 1	C: 00010 0	C: 00007 0
16,3570	C: 07776 0	C: 07776 0	C: 07776 0	C: 07776 0	C: 07776 0	C: 00360 1	C: 07400 1	C: 00266 0
16,3600	C: 74631 0	C: 06315 0	C: 00600 1	C: 00632 0	C: 77751 1	C: 00026 0	C: 02713 0	41643 0
16,3610	61421 1	02277 1	55435 0	41642 1	61420 0	02277 1	55434 1	00006 1
16,3620	33623 0	52006 0	C: 02043 1	C: 36106 0	34752 0	55742 0	60000 1	54002 1
16,3630	51742 1	11524 1	13634 1	13653 0	63714 0	00006 1	63672 1	51742 1
16,3640	11524 1	33714 0	13644 0	43714 1	51742 1	27524 1	51742 1	11524 1
16,3650	43600 0	13653 0	33600 1	00006 1	51742 1	71521 1	30001 0	51742 1
16,3660	55735 0	00006 1	74742 0	00006 1	63715 1	50002 0	27513 0	11742 0
16,3670	13625 1	13701 0	34755 1	51742 1	57524 0	00006 1	74760 0	30001 0
16,3700	13653 0	31736 1	61737 0	00006 1	71532 0	55745 1	41737 1	61736 1
16,3710	00006 1	71531 0	55744 0	12305 1	C: 77537 0	40000 0	24002 0	13665 0
16,3720	C: 07400 1	41500 1	00006 1	71507 0	23510 1	41502 0	00006 1	71511 1
16,3730	23512 0	11500 1	34742 1	13735 1	34743 0	54066 0	11502 0	34740 0
16,3740	13742 1	34741 1	26066 0	43720 0	00006 1	02012 0	60066 1	00006 1
16,3750	01012 0	44747 0	71273 1	55273 1	00002 0	C: 03755 0	C: 03756 0	CKSM 06426 1
16,3760	0	0	0	0	0	0	0	0
16,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 114, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

17,2000	10031 1	00002 0	05677 1	02003 0	34733 1	00006 1	03013 0	34733 1
17,2010	22007 0	53467 1	53465 0	23463 1	54031 1	67724 1	54000 0	12023 0
17,2020	34733 1	54031 1	12034 0	34735 1	00006 1	05013 0	31464 0	67724 1
17,2030	54000 0	12034 0	34733 1	55464 1	50001 0	15744 1	22016 0	00006 1
17,2040	22012 1	02000 0	15270 0	34737 0	00006 1	02031 1	10000 0	12054 0
17,2050	40111 1	74740 1	00006 1	12055 1	02563 0	11627 1	12544 1	12531 0
17,2060	34755 1	55627 1	53435 0	03100 0	53425 1	34745 0	00006 1	02031 1
17,2070	00006 1	12117 0	34744 1	00006 1	02031 1	00006 1	12120 1	34746 0
17,2100	70111 1	10000 0	12117 0	55471 0	55472 0	40111 1	74744 0	00006 1
17,2110	12115 1	30106 0	74737 1	10000 0	34752 0	55477 0	12151 1	34753 1
17,2120	64751 0	55742 0	67744 1	55477 0	30111 0	74741 0	10000 0	12256 0
17,2130	30111 0	74742 0	10000 0	34753 1	64752 0	55741 0	03130 0	11737 1
17,2140	12143 1	05567 0	C: 02002 1	35765 0	71737 1	55471 0	45765 1	71737 1
17,2150	55472 0	34737 0	00006 1	02031 1	10000 0	12616 0	34735 1	70111 1
17,2160	00006 1	12260 0	00004 0	04674 0	C: 40153 1	34755 1	55446 1	55450 0
17,2170	00003 1	00006 1	00031 0	55735 0	11457 1	12217 0	31735 1	74753 0
17,2200	00006 1	12223 1	31735 1	74752 1	00006 1	12227 0	31735 1	74747 0
17,2210	00006 1	12233 0	31735 1	74746 1	00006 1	12235 0	13015 1	41735 0
17,2220	72255 0	55457 1	13015 1	33041 1	55525 0	43041 0	12237 1	43041 0
17,2230	55525 0	33041 1	12237 1	33041 1	12236 0	43041 0	55525 0	55526 0
17,2240	32254 0	55475 1	34753 1	55457 1	55476 1	30111 0	74742 0	10000 0
17,2250	34753 1	64752 0	55741 0	12661 0	C: 02244 1	C: 00063 1	34751 0	12135 0
17,2260	55631 0	44753 0	55627 1	34735 1	71441 0	00006 1	12305 1	34740 0
17,2270	70111 1	00006 1	12616 0	44743 1	71273 1	55273 1	12302 0	C: 00050 1
17,2300	C: 00001 0	C: 00056 1	34755 1	55460 0	55461 1	11460 0	12311 1	12311 1
17,2310	12311 1	60000 1	60000 1	62301 1	00006 1	71460 0	30001 0	00006 1
17,2320	71442 0	57453 1	40000 0	61453 1	55737 1	11461 1	12331 0	12331 0
17,2330	12331 0	60000 1	60000 1	62301 1	00006 1	71461 1	30001 0	00006 1
17,2340	71442 0	57454 0	40000 0	61454 0	55740 1	41453 0	61420 0	55434 1
17,2350	41454 1	61421 1	55435 0	53435 0	03100 0	53425 1	11737 1	02362 1
17,2360	02362 1	02362 1	61474 1	00006 1	62366 0	12404 1	11740 1	02372 0
17,2370	02372 0	02372 0	61474 1	00006 1	62376 1	12404 1	31273 0	74741 0

OCTAL LISTING FOR PARAGRAPH # 115, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

17,2400	00006 1	12403 0	12406 0	12616 0	32277 1	55455 0	00004 0	04674 0
17,2410	C: 40153 1	00003 1	34755 1	55446 1	55447 0	55450 0	55451 1	11424 0
17,2420	12423 1	12423 1	12423 1	61474 1	00006 1	62441 1	11425 1	12432 1
17,2430	12432 1	12432 1	61474 1	00006 1	62436 1	12452 1	34755 1	55425 1
17,2440	12452 1	11425 1	02445 0	02445 0	02445 0	61474 1	00006 1	62461 0
17,2450	34755 1	55424 0	31455 1	00006 1	62461 0	41273 1	74741 0	27273 1
17,2460	02464 0	44741 0	71273 1	55273 1	32530 0	55475 1	34753 1	55476 1
17,2470	34751 0	55741 0	51476 0	51535 0	12475 1	34751 0	51476 0	55535 1
17,2500	12737 1	51476 0	11424 0	34755 1	12506 1	34753 1	51476 0	63657 0
17,2510	50000 1	41571 1	00006 1	51476 0	71474 0	54002 1	20001 1	60002 0
17,2520	54000 0	12523 0	30002 0	51476 0	55525 0	12661 0	34755 1	12523 0
17,2530	C: 02467 0	34736 1	70111 1	10000 0	12060 1	11501 0	12540 0	12060 1
17,2540	00006 1	00005 1	10000 0	12547 1	00006 1	32562 1	52006 0	11631 0
17,2550	12552 0	12060 1	00004 0	04674 0	C: 43450 1	00003 1	34755 1	55631 0
17,2560	12060 1	C: 03263 0	C: 42106 0	30033 1	00006 1	21634 0	55735 0	00006 1
17,2570	71413 1	55750 0	30034 0	00006 1	21635 1	55736 0	00006 1	71415 1
17,2600	61300 0	61750 1	57446 0	31735 1	00006 1	71414 0	55750 0	31736 1
17,2610	00006 1	71416 1	61301 1	61750 1	57450 1	00002 0	31450 1	22000 1
17,2620	31446 0	03100 0	53750 0	33045 0	55475 1	34753 1	55476 1	51476 0
17,2630	51535 0	12632 0	34751 0	51476 0	55535 1	12737 1	51476 0	31747 1
17,2640	55750 0	51476 0	31424 1	55425 1	30111 0	74737 1	10000 0	12652 0
17,2650	03207 1	12661 0	40111 1	74736 0	10000 0	55627 1	03700 0	34751 0
17,2660	55741 0	30101 1	74737 1	00006 1	12675 0	40106 1	74737 1	00006 1
17,2670	12675 0	30111 0	74744 0	00006 1	13015 1	34752 0	54001 1	51476 0
17,2700	11525 0	12706 0	12731 1	12705 0	12731 1	22007 0	64753 1	55735 0
17,2710	31476 0	60001 0	55742 0	31735 1	63042 1	00006 1	62742 1	03130 0
17,2720	51476 0	33037 0	54001 1	31737 0	00004 0	50001 0	05745 1	00003 1
17,2730	13003 0	51476 0	33037 0	00004 0	50000 1	05744 0	00003 1	11476 1
17,2740	01475 0	13173 0	41735 0	63041 1	00006 1	62764 0	27735 0	51476 0
17,2750	11525 0	33041 1	12754 1	43041 0	51476 0	55525 0	11477 0	12763 0
17,2760	00006 1	00004 0	74753 0	55741 0	03130 0	51476 0	33037 0	00004 0
17,2770	55467 1	31737 0	51467 0	05745 1	31735 1	55466 0	03046 0	00003 1

OCTAL LISTING FOR PARAGRAPH # 116, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

17,3000	34755 1	51476 0	55535 1	46244 1	61741 1	00006 1	63011 1	34752 0
17,3010	13012 0	34753 1	51476 0	55522 1	12737 1	34755 1	55525 0	55526 0
17,3020	34751 0	00004 0	57535 0	00006 1	13026 1	05750 0	34751 0	57536 0
17,3030	00003 1	00006 1	13173 0	00004 0	05761 1	00003 1	13173 0	C: 00004 0
17,3040	C: 00015 0	C: 00026 0	C: 77417 0	C: 00600 1	C: 00266 0	C: 02626 1	41466 0	60031 0
17,3050	00006 1	63063 1	23463 1	53465 0	53467 1	54031 1	23463 1	34735 1
17,3060	00006 1	05013 0	00002 0	61464 0	00006 1	63074 1	23465 1	53467 1
17,3070	00006 1	60031 0	53465 0	00002 0	40000 0	64754 0	55466 0	00002 0
17,3100	55735 0	60001 0	55736 0	13111 1	10000 0	34733 1	13110 0	34735 1
17,3110	55736 0	41735 0	60001 0	55735 0	13120 0	00006 1	74733 0	30001 0
17,3120	00006 1	73127 1	57736 1	00006 1	73127 1	23736 1	00002 0	C: 26501 1
17,3130	51742 1	33162 1	51741 1	73166 1	55737 1	71262 1	10000 0	13141 1
17,3140	00002 0	36244 0	55741 0	51742 1	33162 1	51741 1	73166 1	55737 1
17,3150	71262 1	00006 1	13140 0	11741 0	13142 1	51476 0	55525 0	05567 0
17,3160	C: 02004 1	12731 1	C: 00110 1	C: 00022 1	C: 00204 1	C: 00041 1	C: 00125 1	C: 00252 1
17,3170	C: 00146 1	C: 00231 1	C: 00377 1	33175 1	07753 1	C: 03176 1	53752 1	52011 0
17,3200	53754 1	56017 1	22002 0	34735 1	53756 0	52016 1	15272 1	00006 1
17,3210	23743 0	51476 0	33657 0	55744 0	31425 0	00006 1	63223 1	31744 1
17,3220	55742 0	33661 0	13233 1	41750 0	55750 0	41425 1	55425 1	34753 1
17,3230	27744 0	55742 0	43661 1	55736 0	31750 1	00006 1	74747 0	10000 0
17,3240	13621 0	13243 0	13565 0	34737 0	00006 1	70001 1	55750 0	31425 0
17,3250	00006 1	74750 0	00006 1	13255 1	13627 0	23425 0	31425 0	00006 1
17,3260	70000 0	00006 1	74737 1	55735 0	11750 0	63662 0	13270 0	63662 0
17,3270	00006 1	51744 1	61601 1	00006 1	63301 0	34752 0	27742 0	34751 0
17,3300	13304 1	11477 0	13304 1	13275 0	55741 0	41735 0	00006 1	51742 1
17,3310	71567 0	51744 1	61601 1	00006 1	61750 1	55737 1	00006 1	63477 0
17,3320	51744 1	31573 1	00006 1	71735 0	61750 1	51744 1	61603 0	00006 1
17,3330	63363 1	51476 0	41525 0	00006 1	71736 0	00006 1	63357 0	11555 1
17,3340	13351 1	41737 1	51744 1	61605 0	00006 1	63357 0	03463 0	31737 0
17,3350	13517 0	51744 1	41601 0	60000 1	61737 0	00006 1	63361 0	34755 1
17,3360	13423 0	03463 0	13504 1	54001 1	11736 0	13371 0	05677 1	44752 1
17,3370	27742 0	30001 0	00006 1	51742 1	71576 0	20001 1	70001 1	53746 1

OCTAL LISTING FOR PARAGRAPH # 117, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "@" DENOTES UNUSED FIXED MEMORY

ALL VALIO WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

17,3400	51742 1	31570 1	00006 1	71425 1	55740 1	00006 1	73671 0	61745 0
17,3410	67745 0	00006 1	63440 1	31740 0	00006 1	73672 0	61745 0	63663 1
17,3420	00006 1	63450 0	34741 1	00006 1	71736 0	51476 0	55525 0	00006 1
17,3430	51476 0	71547 1	30001 0	00006 1	63437 1	34751 0	55741 0	01743 0

17,3440	43670	1	61740	0	53746	1	00006	1	11745	1	00006	1	74736	0	13560	0
17,3450	00006	1	33674	1	21746	1	31740	0	63664	0	53746	1	00006	1	11745	1
17,3460	00006	1	74736	0	13423	0	41736	0	55736	0	31425	0	00006	1	51742	1
17,3470	71567	0	55740	1	63675	0	00006	1	63476	1	13427	1	00002	0	03463	0

17,3500	31737 0	61555 0	00006 1	63517 1	41556 1	61740 0	00006 1	63512 1
17,3510	31740 0	13423 0	11425 1	34746 0	13423 0	05677 1	13423 0	00006 1
17,3520	51744 1	61605 0	00006 1	51742 1	71575 0	20001 1	20001 1	53746 1
17,3530	31740 0	63675 0	00006 1	70000 0	00006 1	61745 0	00006 1	63422 0

17,3540	31745 0	67745 0	00006 1	63553 1	33665 1	53746 1	00006 1	11745 1
17,3550	61740 0	63666 1	13423 0	43667 1	53746 1	00006 1	11745 1	61740 0
17,3560	63677 1	00006 1	63357 0	63676 0	13423 0	44740 1	27425 1	00006 1
17,3570	63611 1	03647 1	31425 0	00006 1	51742 1	71571 1	67740 0	00006 1

17,3600	63602 0	13422 1	00006 1	13422 1	64740 0	20001 1	20001 1	20001 1
17,3610	13560 0	03651 0	11736 0	34753 1	13616 1	37746 0	27742 0	41425 1
17,3620	13573 1	03647 1	34740 0	61425 0	54000 0	13573 1	13422 1	03647 1
17,3630	51744 1	41601 0	61750 1	00006 1	74741 0	57425 0	00006 1	70000 0

17,3640	00006 1	51744 1	71571 1	61425 0	00006 1	63357 0	13422 1	41736 0
17,3650	55736 0	34751 0	55741 0	34735 1	55737 1	00002 0	C: 77757 1	C: 00000 1
17,3660	C: 00020 0	C: 14400 0	C: 76447 1	C: 77750 0	C: 00632 0	C: 01463 1	C: 00232 1	C: 77462 1
17,3670	C: 77631 0	C: 77145 1	C: 75462 0	C: 00007 0	C: 25605 0	C: 76631 1	C: 00122 0	C: 77655 1

17,3700	31425 0	00006 1	74766 0	00006 1	13717 1	54001 1	36241 0	55741 0
17,3710	10001 1	13753 1	05677 1	34736 1	51476 0	55525 0	00002 0	51476 0
17,3720	11525 0	13725 0	13737 0	31425 0	13726 0	41425 1	22000 1	40111 1
17,3730	74744 0	10000 0	34767 0	60001 0	00006 1	63737 1	13716 0	31425 0

17,3740	61750 1	00006 1	71411 0	00006 1	13761 0	00006 1	63755 0	31425 0
17,3750	63664 0	00006 1	63761 1	44736 0	13714 1	43664 1	61425 0	00006 1
17,3760	63713 1	34755 1	13714 1	C: 03763 0	C: 03764 1	CKSM 63234 1	0	0
17,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 120, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

20,2000	C: 01150 1	C: 01046 1	C: 07361 1	C: 00666 1	32114 1	70111 1	55343 0	40106 1
20,2010	74737 1	10000 0	34736 1	27343 0	31343 1	74355 1	00006 1	12034 0
20,2020	31343 1	72113 1	55343 0	32112 1	04616 1	C: 20231 0	15472 1	12037 0
20,2030	12014 1	36241 0	05464 1	15155 1	34737 0	27343 0	12021 1	00004 0
20,2040	44737 1	70106 1	54001 1	41343 0	74736 0	10000 0	34737 0	60001 0
20,2050	54106 1	41343 0	74355 1	10000 0	44737 1	62114 1	71343 0	54001 1
20,2060	42114 0	70111 1	60001 0	54111 1	74737 1	10000 0	31332 1	61331 1
20,2070	55244 0	30111 0	74741 0	00006 1	12101 1	44735 0	70075 1	54075 1
20,2100	12104 1	40075 1	74735 0	26075 1	30111 0	76244 1	60000 1	55325 0
20,2110	04635 0	C: 02203 1	C: 00256 0	C: 31113 1	C: 13113 0	74745 1	10000 0	44752 1
20,2120	64753 1	27644 1	15270 0	30111 0	74750 0	00006 1	12140 1	32151 0
20,2130	55346 0	00006 1	22070 0	37714 1	05072 1	C: 02454 0	C: 40106 1	00070 0
20,2140	32150 1	12130 0	00006 1	22070 0	02153 1	32152 0	55346 0	12133 0
20,2150	C: 00155 0	C: 03434 1	C: 00554 0	35015 0	56003 1	54001 1	30032 0	55633 1
20,2160	30033 1	55634 0	30034 0	55635 1	12170 1	35015 0	56003 1	54001 1
20,2170	34755 1	55641 1	55642 1	55643 0	55636 1	55637 0	55640 0	55277 0
20,2200	55300 1	55301 0	22003 1	00002 0	00006 1	22071 1	02165 1	22003 1
20,2210	55537 0	55540 0	55541 1	55542 1	55422 0	55423 1	55545 0	55546 0
20,2220	22003 1	40111 1	74744 0	26111 1	02124 1	00071 1	31273 0	54001 1
20,2230	34750 1	00006 1	06001 0	55273 1	74750 0	10000 0	12322 1	30074 1
20,2240	74750 0	10000 0	12252 1	41446 1	55760 0	41450 0	55761 1	41462 1
20,2250	57757 0	12442 0	00006 1	22061 0	30322 1	00006 1	20033 0	55757 1
20,2260	00006 1	71413 1	57760 1	30323 0	00006 1	20034 1	55761 1	00006 1
20,2270	71415 1	61760 1	02435 1	55760 0	31757 0	00006 1	71414 0	57761 0
20,2300	00006 1	71416 1	61761 0	02435 1	55761 1	31757 0	00006 1	71412 0
20,2310	57757 0	30321 1	00006 1	20032 1	61757 0	02435 1	55757 1	00006 1
20,2320	22061 0	12442 0	31273 0	76241 1	00006 1	12362 0	74751 1	00006 1
20,2330	12353 1	44746 1	00006 1	03012 1	44755 0	55757 1	55760 0	55761 1
20,2340	55762 1	55763 0	55764 1	54050 0	54051 1	54052 1	46241 1	71273 1
20,2350	64752 0	55273 1	12442 0	34746 0	00006 1	05012 1	46241 1	71273 1
20,2360	55273 1	12442 0	34746 0	00006 1	02012 0	10000 0	12373 0	41273 1
20,2370	74751 1	27273 1	12442 0	34752 0	54063 0	42434 1	00006 1	50063 1

OCTAL LISTING FOR PARAGRAPH # 121, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

20,2400	71757 1	54001 1	10000 0	32432 0	12406 0	42432 1	60001 0	54061 1
20,2410	12414 0	50000 1	32432 0	54001 1	50063 1	41762 1	60001 0	50063 1
20,2420	26050 0	50063 1	23762 0	10063 0	12374 1	37737 0	00006 1	05014 1
20,2430	12442 0	C: 77177 0	C: 37200 1	C: 00600 1	C: 03146 1	54007 1	00002 0	50000 1
20,2440	44734 1	00002 0	00006 1	32446 0	52006 0	C: 02016 1	C: 34106 1	34755 1
20,2450	55537 0	55541 1	55422 0	55423 1	04616 1	C: 40461 0	05155 0	35015 0
20,2460	54003 0	04645 1	54117 1	30111 0	74737 1	54157 0	10000 0	41332 0
20,2470	61244 1	55331 0	00004 0	30106 0	74737 1	00006 1	12522 1	44733 0
20,2500	55473 1	35742 0	54154 0	41331 0	61400 1	00006 1	62513 1	41331 0
20,2510	62001 1	00006 1	62540 1	27331 0	22007 0	10157 0	31332 1	61331 1
20,2520	53245 1	12540 0	44742 0	55473 1	36241 0	54154 0	41331 0	62002 1
20,2530	00006 1	62513 1	41331 0	62003 0	61400 1	00006 1	62540 1	12513 0
20,2540	00003 1	10157 0	13030 0	34752 0	54155 1	44752 1	26154 0	31331 1
20,2550	50154 1	63006 1	54156 1	00006 1	50154 1	32770 0	00006 1	10156 1
20,2560	50154 1	63005 1	50155 0	55530 1	10155 1	12544 1	12570 0	12607 0
20,2570	31532 1	61531 1	00006 1	73026 1	55533 1	55534 0	10154 0	34755 1
20,2600	55501 0	13142 1	44752 1	54154 0	44753 0	54155 1	12547 1	31246 0
20,2610	00006 1	71244 0	02724 1	C: 03027 1	00006 1	C: 71527 1	C: 00004 0	54154 0
20,2620	00006 1	71532 0	02724 1	C: 02000 0	55511 1	30154 1	00006 1	71531 0
20,2630	02724 1	C: 02000 0	55507 0	00006 1	73025 1	55503 1	00006 1	70000 0
20,2640	55504 0	31511 0	00006 1	73025 1	55505 1	00006 1	70000 0	55506 1
20,2650	00006 1	00012 1	54155 1	34752 0	12656 1	34755 1	54154 0	30155 0
20,2660	50154 1	73021 0	00006 1	12677 1	30155 0	50154 1	73022 0	00006 1
20,2670	12674 1	50154 1	41507 0	12700 0	50154 1	31507 1	12700 0	34755 1
20,2700	50154 1	55510 0	10154 0	12655 1	40111 1	74736 0	00006 1	13576 1
20,2710	41274 0	63655 1	00006 1	12715 1	13576 1	11631 0	12721 0	04674 0
20,2720	C: 43450 1	10157 0	13561 1	13143 0	54161 0	54160 1	50002 0	30000 1
20,2730	24002 0	50000 1	30000 1	00006 1	12763 0	54162 0	10000 0	64753 1
20,2740	12742 0	64753 1	56161 1	00006 1	62746 0	40000 0	60161 1	00006 1
20,2750	62755 1	30160 0	00006 1	10162 0	00002 0	10160 1	10162 0	12763 0
20,2760	10162 0	34735 1	00002 0	34733 1	00002 0	C: 01240 0	C: 22513 0	C: 00141 0
20,2770	C: 07416 0	C: 00030 1	C: 21261 1	C: 00021 1	C: 03766 0	C: 00153 0	C: 07111 1	C: 00072 1

OCTAL LISTING FOR PARAGRAPH # 122, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

20,3000	C: 24103 0	C: 00135 0	C: 11511 1	C: 04754 0	C: 77142 0	C: 00061 0	C: 00217 0	C: 00464 1
20,3010	C: 75642 0	C: 00536 1	C: 75705 1	C: 00001 0	C: 77616 0	C: 05154 1	C: 00052 0	C: 00231 1
20,3020	C: 77174 0	C: 01400 1	C: 01000 0	C: 06000 1	C: 04000 0	C: 23146 0	C: 13241 1	C: 00337 0
20,3030	34753 1	54160 1	34753 1	54161 0	50160 0	33125 1	00006 1	71331 0
20,3040	00006 1	71332 0	50160 0	63126 1	54154 0	13051 1	54161 0	00006 1
20,3050	26160 1	50160 0	33130 0	00006 1	50161 1	71331 0	50160 0	63132 1
20,3060	00006 1	50161 1	71331 0	26154 0	10161 0	13046 1	10160 1	13076 1
20,3070	C: 00000 1	C: 20354 1	30154 1	54155 1	34757 0	13031 1	34742 1	55530 1
20,3100	34733 1	55551 0	55571 1	55572 1	55611 1	55612 1	00006 1	33071 1
20,3110	00006 1	10155 1	00004 0	55531 0	55532 0	31244 1	00006 1	70154 0
20,3120	00006 1	71246 1	02724 1	C: 00155 0	55511 1	12632 0	C: 06176 1	C: 77650 1
20,3130	C: 72260 0	C: 76637 1	C: 02167 0	C: 00645 0	C: 06335 1	C: 04256 1	C: 30163 0	C: 64072 0
20,3140	C: 53632 0	C: 15133 1	55631 0	31346 1	00006 1	74737 1	54001 1	60000 1
20,3150	54115 0	41346 0	60001 0	54114 1	00004 0	31541 0	54001 1	31537 1
20,3160	04674 0	C: 37100 1	53544 1	00003 1	30111 0	74744 0	10000 0	34753 1
20,3170	54116 0	61501 1	10000 0	33653 1	54151 0	00006 1	13202 0	10116 0
20,3200	33652 0	54152 0	31530 0	64743 0	54157 0	31530 0	03570 0	00004 0
20,3210	55551 0	55552 0	44743 1	00006 1	71551 0	00006 1	10157 0	55557 0
20,3220	55560 1	34733 1	55553 1	55554 0	00003 1	22007 0	10116 0	53544 1
20,3230	34755 1	54154 0	54163 1	50154 1	11543 0	64753 1	13241 1	64753 1
20,3240	24163 0	54162 0	40163 1	54164 0	31346 1	54143 0	54144 1	30162 1
20,3250	63654 0	00006 1	63322 1	10151 0	13265 1	31346 1	50164 1	26144 1
20,3260	50163 0	54145 0	30114 0	50164 1	54146 0	30162 1	03570 0	50164 1
20,3270	54130 1	34733 1	50163 0	54127 1	30162 1	61533 0	61533 0	64743 0
20,3300	54000 0	13346 1	30162 1	00006 1	74736 0	61533 0	54157 0	64744 1
20,3310	54157 1	03570 0	00006 1	74736 0	54160 1	33321 1	54161 0	44744 0
20,3320	13623 1	13353 0	54001 1	34733 1	54127 1	54130 1	10151 0	13346 1
20,3330	34744 1	60001 0	00006 1	63343 0	30115 1	50164 1	54146 0	60000 1
20,3340	50163 0	54145 0	13346 1	31346 1	54146 0	54145 0	30162 1	61533 0
20,3350	61533 0	54157 0	03614 1	50164 1	54134 0	30160 0	50164 1	54126 0
20,3360	30162 1	61533 0	64743 0	54000 0	13366 0	34733 1	63654 0	54157 0
20,3370	03614 1	50164 1	54132 0	30160 0	50164 1	54124 1	40162 0	61533 0

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

20,3740	მ	მ	მ	მ	მ	მ	მ	მ
20,3750	მ	მ	მ	მ	მ	მ	მ	მ
20,3760	მ	მ	მ	მ	მ	მ	მ	მ
20,3770	მ	მ	მ	მ	მ	მ	მ	მ

OCTAL LISTING FOR PARAGRAPH # 124, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

21,2000	C: 24402 1	C: 01551 1	C: 21357 0	C: 22316 0	C: 01507 1	C: 00547 1	56016 0	00006 1
21,2010	22012 1	05321 1	C: 00100 0	15270 0	00006 1	00031 0	40000 0	72077 1
21,2020	55645 0	34752 0	55644 1	34756 1	05173 1	C: 02032 1	15270 0	55644 1
21,2030	34757 0	05224 0	00006 1	00031 0	40000 0	72077 1	57645 1	54001 1
21,2040	11645 0	12030 1	10001 1	12052 0	11644 1	12027 1	34740 0	00006 1
21,2050	05013 0	15261 0	30001 0	74746 1	10000 0	42100 0	27643 0	30001 0
21,2060	74747 0	10000 0	32100 1	27643 0	30001 0	74753 0	10000 0	42101 1
21,2070	27642 1	30001 0	74752 1	10000 0	32101 0	27642 1	12046 0	C: 00063 1
21,2100	C: 01074 0	C: 00217 0	40103 1	74747 0	10000 0	15261 0	11056 1	12111 0
21,2110	12314 1	55712 0	36010 0	05173 1	C: 02102 0	41303 1	74753 0	00006 1
21,2120	12136 0	70107 0	00006 1	12127 0	34747 1	54001 1	04606 0	34752 0
21,2130	70107 0	00006 1	12136 0	34751 0	54001 1	04606 0	30105 0	74743 1
21,2140	00006 1	12340 0	41011 1	62272 1	00006 1	12340 0	00006 1	00030 1
21,2150	40000 0	54001 1	74750 0	10000 0	12172 0	41011 1	62270 0	00006 1
21,2160	12340 0	30001 0	74753 0	10000 0	12167 1	12340 0	02274 1	44755 0
21,2170	12173 1	02274 1	34752 0	54002 1	00004 0	32200 1	54017 0	50017 1
21,2200	12201 1	32271 1	60002 0	54001 1	40000 0	52761 0	50002 0	32270 0
21,2210	55011 1	55163 0	10002 1	40106 1	74737 1	26106 1	42273 1	70111 1
21,2220	54111 1	40101 0	74745 1	26101 0	44355 1	00006 1	02011 0	64737 0
21,2230	00006 1	01011 0	34735 1	54107 0	40074 0	74752 1	26074 0	00006 1
21,2240	30025 0	53345 0	00006 1	32267 0	53253 0	00006 1	34755 1	52753 1
21,2250	00006 1	34755 1	52757 0	00006 1	34755 1	52765 1	36244 0	54001 1
21,2260	40000 0	52761 0	37727 1	54030 0	04635 0	C: 12766 0	C: 03525 0	C: 76067 1
21,2270	C: 00106 0	C: 00027 1	C: 00107 1	C: 00640 0	40775 0	61011 0	00006 1	12310 0
21,2300	40105 1	74743 1	10000 0	12310 0	30103 0	74747 0	10000 0	00002 0
21,2310	04364 1	04457 0	04635 0	C: 20723 0	40107 0	74735 0	00006 1	12334 0
21,2320	34746 0	70107 0	00006 1	12334 0	40107 0	74742 0	00006 1	12334 0
21,2330	37717 1	05072 1	C: 03717 0	C: 70067 1	00006 1	34755 1	52755 1	12115 1
21,2340	23712 1	40025 1	53056 1	40103 1	74741 0	10000 0	13237 0	31303 0
21,2350	74745 1	10000 0	12424 0	02510 1	41303 1	74745 1	27303 1	34752 0
21,2360	00006 1	05014 1	31741 1	00006 1	71704 1	56070 0	31742 1	00006 1
21,2370	71705 0	26070 1	31743 0	00006 1	71706 0	26070 1	32000 0	00006 1

OCTAL LISTING FOR PARAGRAPH # 125, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

21,2400	70070 1	20001 1	20001 1	56070 0	31714 1	00006 1	71713 1	60070 0
21,2410	55707 1	41707 1	00006 1	62415 0	12417 0	31707 0	64735 1	54060 0
21,2420	34751 0	00006 1	05014 1	15261 0	02510 1	44745 1	71303 1	55303 1
21,2430	44752 1	00006 1	03014 1	11737 1	12440 1	12440 1	12456 0	55737 1
21,2440	44753 0	53740 1	53711 0	34742 1	56002 0	22007 0	31713 0	00006 1
21,2450	10002 1	00006 1	72002 0	12457 1	53711 0	12477 0	32001 1	00006 1
21,2460	71707 1	20001 1	61711 1	55711 0	34755 1	27710 1	34733 1	64753 1
21,2470	61711 1	55711 0	34755 1	64733 1	61710 0	55710 1	13234 0	11711 0
21,2500	12504 0	12504 0	34755 1	55711 0	11710 1	34735 1	61711 1	12417 0
21,2510	00006 1	23712 1	34746 0	00006 1	02030 0	10000 0	13237 0	40075 1
21,2520	74736 0	00006 1	12560 1	40075 1	74736 0	26075 1	44745 1	71303 1
21,2530	55303 1	40074 0	74752 1	00006 1	15261 0	34744 1	00006 1	05012 1
21,2540	34755 1	55700 0	55701 1	55674 1	55675 0	34750 1	05173 1	C: 02551 1
21,2550	15261 0	34752 0	00006 1	05012 1	41303 1	74744 0	27303 1	15261 0
21,2560	41235 0	60025 0	64736 1	64736 1	57713 0	34777 1	54065 0	00006 1
21,2570	31237 0	20001 1	20001 1	00006 1	71713 1	00006 1	10065 0	57704 0
21,2600	00006 1	31525 1	20001 1	20001 1	27704 1	30037 0	61160 1	00006 1
21,2610	72004 0	27704 1	00006 1	31241 1	20001 1	20001 1	00006 1	71713 1
21,2620	00006 1	10065 0	57705 1	00006 1	31527 0	20001 1	20001 1	27705 0
21,2630	30040 0	61161 0	00006 1	72004 0	27705 0	00006 1	31243 0	20001 1
21,2640	20001 1	00006 1	71713 1	00006 1	10065 0	57706 1	00006 1	31531 1
21,2650	20001 1	20001 1	27706 0	30041 1	61162 0	00006 1	72004 0	27706 0
21,2660	34751 0	05224 0	40074 0	74752 1	10000 0	12667 0	01712 1	31731 0
21,2670	61704 0	54061 1	31733 1	61705 1	54062 1	31735 1	61706 1	54063 0
21,2700	30061 0	00006 1	71715 1	56070 0	30062 0	00006 1	71717 0	26070 1
21,2710	30063 1	00006 1	71721 0	26070 1	30070 0	60000 1	57702 0	30061 0
21,2720	00006 1	71723 1	56070 0	30062 0	00006 1	71725 1	26070 1	30063 1
21,2730	00006 1	71727 0	26070 1	30070 0	60000 1	57703 1	35015 0	54003 0
21,2740	31415 0	54063 0	31416 0	54064 1	35016 0	54003 0	30064 0	00006 1
21,2750	71702 1	56070 0	30063 1	00006 1	71703 0	26070 1	32003 0	00006 1
21,2760	70070 1	20001 1	57676 1	30064 0	00006 1	71703 0	56070 0	30063 1
21,2770	00006 1	71702 1	40000 0	26070 1	32003 0	00006 1	70070 1	20001 1

OCTAL LISTING FOR PARAGRAPH # 126, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRITVE OPERATOR WORDS) OR "C" (CONSTANTS)

21,3000	57677 0	42005 1	54066 0	34753 1	54065 0	50065 1	11676 0	13013 1
21,3010	13114 1	13021 0	13114 1	50065 1	41676 0	62005 0	00006 1	63027 1
21,3020	13114 1	50065 1	31676 1	62005 0	00006 1	63027 1	13114 1	50065 1
21,3030	11674 1	13035 0	13046 1	13042 0	13046 1	50065 1	31676 1	00006 1
21,3040	63065 1	13046 1	50065 1	41676 0	00006 1	63102 1	50065 1	11700 0
21,3050	13060 0	13053 0	13076 1	50065 1	31676 1	00006 1	63104 1	13067 1
21,3060	50065 1	31676 1	00006 1	63065 1	13067 1	42005 1	13210 0	50065 1
21,3070	41674 1	62005 0	50065 1	56072 1	34753 1	13213 0	50065 1	31676 1
21,3100	00006 1	63104 1	32005 0	13210 0	50065 1	31674 0	62005 0	40000 0
21,3110	50065 1	56072 1	44753 0	13213 0	50065 1	11700 0	13145 0	13121 1
21,3120	13152 0	50065 1	41674 1	00006 1	63126 1	13161 0	50065 1	41676 0
21,3130	00006 1	63204 1	60066 1	50065 1	61674 0	00006 1	63204 1	50065 1
21,3140	61676 1	00006 1	50065 1	61674 0	13210 0	50065 1	41676 0	00006 1
21,3150	63204 1	13156 1	50065 1	31676 1	00006 1	63204 1	50065 1	41674 1
21,3160	13210 0	50065 1	31676 1	00006 1	63204 1	32005 0	50065 1	61674 0
21,3170	40000 0	50065 1	61676 1	00006 1	63204 1	00006 1	50065 1	61676 1
21,3200	50065 1	61674 0	40000 0	13210 0	50065 1	41674 1	50065 1	61676 1
21,3210	50065 1	56072 1	34755 1	50065 1	55700 0	50065 1	30072 1	64754 0
21,3220	50065 1	54053 0	50065 1	30072 1	50065 1	27674 1	10065 0	13004 1
21,3230	35020 0	00006 1	05014 1	01712 1	34755 1	54001 1	12454 1	40074 0
21,3240	74752 1	00006 1	13253 1	34744 1	71303 1	10000 0	34752 0	64744 1
21,3250	40000 0	00006 1	03012 1	43262 0	71303 1	55303 1	44736 0	70075 1
21,3260	54075 1	15261 0	C: 00300 1	37746 0	55627 1	34751 0	55535 1	55536 1
21,3270	34752 0	55631 0	55630 1	55632 0	30021 1	60000 1	55476 1	34752 0
21,3300	55746 1	31541 0	00006 1	74751 1	31435 1	13314 0	34755 1	55746 1
21,3310	31537 1	00006 1	74751 1	31434 0	53744 0	00006 1	51746 0	31504 1
21,3320	53742 0	51746 0	31446 0	00006 1	71742 0	23735 1	00006 1	74743 1
21,3330	53736 0	00006 1	74743 1	27736 0	31743 0	00006 1	71741 0	23741 1
21,3340	00006 1	74740 1	53742 0	00006 1	74740 1	27742 0	31744 1	00006 1
21,3350	70000 0	53740 1	31744 1	00006 1	63360 1	00006 1	31740 0	13362 1
21,3360	00006 1	41740 1	53750 0	00006 1	31742 1	21750 0	11747 0	13373 1
21,3370	13372 0	13375 1	11750 0	34753 1	13376 1	44753 0	55745 1	11745 1

OCTAL LISTING FOR PARAGRAPH # 127, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

21,3400	13405 1	13405 1	00006 1	41742 0	53742 0	00006 1	31742 1	53750 0
21,3410	00006 1	31740 0	21750 0	31737 0	00006 1	73446 0	53740 1	56001 0
21,3420	00006 1	73446 0	27740 1	54001 1	13426 0	27737 1	53742 0	21740 1
21,3430	31737 0	00006 1	71744 0	53740 1	56001 0	00006 1	71744 0	27740 1
21,3440	54001 1	13443 0	27737 1	53740 1	21736 0	13561 1	C: 25253 1	C: 23146 0
21,3450	34753 1	55501 0	34752 0	22002 0	22071 1	13457 0	34755 1	54066 0
21,3460	50066 1	31507 1	00006 1	63533 1	54063 0	50066 1	41537 0	00006 1
21,3470	13533 0	54002 1	00006 1	73447 1	60002 0	54001 1	13503 0	40000 0
21,3500	50066 1	57500 0	13537 1	00006 1	63511 1	40000 0	54062 1	44753 0
21,3510	13513 1	54062 1	34753 1	50066 1	55500 1	30063 1	00006 1	74740 1
21,3520	60062 0	00006 1	63537 0	40062 1	00006 1	73560 0	00006 1	10063 0
21,3530	00006 1	13533 0	13545 1	34755 1	50066 1	55500 1	13547 0	36010 0
21,3540	50066 1	55630 1	34755 1	55501 0	13547 0	50066 1	55630 1	10066 0
21,3550	13456 1	52073 1	52063 0	04674 0	C: 35721 0	52063 0	52073 1	00071 1
21,3560	C: 00240 1	11747 0	13603 1	13565 0	13571 0	41750 0	64741 1	00006 1
21,3570	63574 1	00006 1	34756 1	13714 1	34317 0	55737 1	34752 0	55740 1
21,3600	57750 1	57747 1	13616 1	35742 0	55740 1	34755 1	55737 1	13616 1
21,3610	31747 1	13633 0	37745 0	27740 1	00006 1	63610 0	41747 0	51740 0
21,3620	64735 1	00006 1	63612 1	51740 0	34735 1	56002 0	00006 1	31750 1
21,3630	00006 1	10002 1	55747 0	00006 1	74737 1	55743 1	33761 1	03763 0
21,3640	03763 0	03763 0	00006 1	71747 0	53750 0	31737 0	61740 0	54021 0
21,3650	60021 1	54002 1	00006 1	63701 1	44317 1	60002 0	00006 1	63664 0
21,3660	54002 1	34755 1	57747 1	55750 0	50002 0	34735 1	54002 1	00006 1
21,3670	71750 0	56001 0	34755 1	53750 0	00006 1	63701 1	00006 1	70002 1
21,3700	21750 0	41745 1	00006 1	63707 1	00006 1	41750 0	13713 0	00006 1
21,3710	13714 1	00006 1	31750 1	21736 0	11735 0	13721 1	13720 0	13723 0
21,3720	11736 0	34753 1	13724 1	44753 0	54001 1	51746 0	57500 0	00006 1
21,3730	70001 1	10001 1	13747 1	13744 1	13736 1	13744 1	51746 0	55510 0
21,3740	51746 0	43760 1	00006 1	03012 1	41273 1	74747 0	27273 1	11746 1
21,3750	13306 0	31476 0	54021 0	00006 1	33757 1	52006 0	C: 03173 1	C: 36106 0
21,3760	C: 01400 1	C: 20761 0	C: 06000 1	55742 0	54021 0	31743 0	22007 0	00006 1
21,3770	11742 0	60021 1	00002 0	C: 03773 1	C: 03774 0	CKSM 52576 1	a	a

OCTAL LISTING FOR PARAGRAPH # 130, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

22,2000	C: 27533 1	C: 07571 0	C: 25004 1	C: 06702 1	06036 1	I: 77634 0	C: 44403 0	C: 03275 1
22,2010	I: 51535 0	C: 00324 1	I: 51025 1	C: 04403 1	C: 44724 0	I: 72364 0	C: 03244 0	C: 03275 1
22,2020	I: 77624 1	C: 44410 1	I: 72364 0	C: 02234 0	C: 00322 1	I: 77624 1	C: 44410 1	I: 45160 1
22,2030	C: 03244 0	C: 44326 0	I: 45575 1	C: 50461 1	I: 77626 0	C: 50467 1	I: 77626 0	C: 74475 1
22,2040	I: 75160 1	C: 03301 0	C: 02234 0	I: 77624 1	C: 44312 1	I: 45575 1	C: 51526 1	I: 77626 0
22,2050	C: 51534 1	I: 77626 0	C: 75542 0	I: 45001 1	C: 00023 0	C: 44335 1	I: 45575 1	C: 50461 1
22,2060	I: 77626 0	C: 50467 1	I: 77626 0	C: 74475 1	I: 45345 1	C: 03304 0	C: 02237 0	I: 45325 1
22,2070	C: 02241 1	C: 03306 1	I: 45325 1	C: 03314 1	C: 02247 1	I: 77666 1	C: 03324 1	I: 43345 1
22,2100	C: 02235 1	C: 02255 1	I: 43225 0	C: 06414 0	C: 02245 0	C: 03332 0	I: 77726 1	C: 03334 0
22,2110	I: 51025 1	C: 04363 0	C: 44117 0	I: 77751 1	C: 00322 1	C: 37234 0	C: 44742 0	I: 45345 1
22,2120	C: 03334 0	C: 04365 0	I: 77244 0	C: 44131 1	C: 03324 1	I: 77656 1	C: 03267 1	I: 77650 1
22,2130	C: 44744 0	I: 53375 0	C: 02235 1	C: 03302 0	I: 77762 1	C: 27302 0	C: 02243 0	I: 74455 0
22,2140	C: 03310 0	C: 27310 0	C: 02251 0	I: 74455 0	C: 03316 0	C: 03316 0	I: 70545 1	C: 03332 0
22,2150	I: 45325 1	C: 06422 0	C: 03332 0	I: 65204 1	C: 21664 0	C: 03322 1	I: 56225 1	C: 00001 0
22,2160	C: 00003 1	I: 65366 1	C: 03312 1	I: 56225 1	C: 00001 0	C: 00003 1	I: 65366 1	C: 03302 0
22,2170	I: 56225 1	C: 00001 0	C: 00003 1	I: 55566 1	I: 77656 1	C: 03267 1	I: 45345 1	C: 03267 1
22,2200	C: 03271 0	I: 71240 1	C: 44211 0	C: 03267 1	I: 50025 0	C: 03273 1	C: 44266 0	I: 77650 1
22,2210	C: 44242 0	I: 45345 1	C: 03271 0	C: 03273 1	I: 77640 0	C: 44266 0	I: 51145 0	C: 03326 0
22,2220	C: 44224 0	I: 57575 1	C: 03267 1	C: 03267 1	I: 51145 0	C: 03304 0	C: 44232 1	I: 57545 1
22,2230	C: 03267 1	C: 03267 1	I: 51145 0	C: 03314 1	C: 44744 0	I: 57545 1	C: 03273 1	C: 03273 1
22,2240	I: 77650 1	C: 44744 0	I: 51145 0	C: 03324 1	C: 44250 0	I: 57575 1	C: 03267 1	C: 03267 1
22,2250	I: 51145 0	C: 03304 0	C: 44256 0	I: 57545 1	C: 03271 0	C: 03271 0	I: 51145 0	C: 03306 1
22,2260	C: 44744 0	I: 57545 1	C: 03273 1	C: 03273 1	I: 77650 1	C: 44744 0	I: 51145 0	C: 03330 1
22,2270	C: 44274 0	I: 57575 1	C: 03267 1	C: 03267 1	I: 51145 0	C: 03306 1	C: 44302 0	I: 57545 1
22,2300	C: 03267 1	C: 03267 1	I: 51145 0	C: 03314 1	C: 44744 0	I: 57545 1	C: 03271 0	C: 03271 0
22,2310	I: 77650 1	C: 44744 0	I: 76601 1	C: 00001 0	C: 00001 0	I: 62703 1	C: 77776 1	C: 00007 0
22,2320	I: 62703 1	C: 77776 1	C: 00015 0	I: 41503 1	C: 77776 1	I: 77616 0	I: 76601 1	C: 00001 0
22,2330	C: 00001 0	I: 62713 0	C: 00007 0	C: 00015 0	I: 77606 1	I: 77776 1	50120 1	52013 1
22,2340	50120 1	52017 0	50120 1	52013 1	50120 1	52015 1	50120 1	52005 0
22,2350	50120 1	52015 1	50120 1	52003 0	50120 1	52007 1	50120 1	52003 0
22,2360	06036 1	I: 77616 0	C: 00013 0	C: 13563 0	C: 17070 0	C: 34343 1	C: 15666 0	C: 20443 0
22,2370	C: 33555 1	C: 01106 1	C: 67777 1	C: 77777 0	C: 04000 0	C: 00000 1	C: 00216 1	C: 36323 0

OCTAL LISTING FOR PARAGRAPH # 131, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

22,2400	C: 17773 1	C: 00057 0	C: 14344 1	30034 0	54156 1	00006 1	30033 1	16475 0
22,2410	I: 66370 0	C: 00003 1	C: 00051 0	C: 00001 0	C: 00010 0	I: 77601 0	C: 00001 0	I: 47133 0
22,2420	C: 00013 0	C: 21465 0	C: 00013 0	I: 65356 1	C: 00013 0	I: 41546 0	I: 71300 1	C: 44417 0
22,2430	C: 00007 0	I: 72405 0	C: 00013 0	C: 10001 1	I: 41345 0	C: 00005 1	C: 00001 0	I: 41325 0
22,2440	C: 00007 0	C: 00011 1	I: 72405 0	C: 00003 1	I: 72421 0	C: 00015 0	C: 10003 0	I: 41345 0
22,2450	C: 00003 1	C: 00005 1	I: 41325 0	C: 00007 0	C: 00011 1	I: 72405 0	C: 00001 0	I: 72415 1
22,2460	C: 00017 1	C: 10005 0	I: 77745 1	C: 00011 1	C: 10007 1	I: 77745 1	C: 00013 0	I: 72405 0
22,2470	C: 00003 1	C: 10011 0	I: 41345 0	C: 00013 0	C: 00001 0	I: 72476 1	C: 10013 1	I: 41345 0
22,2500	C: 00005 1	C: 00013 0	I: 72476 1	C: 10015 1	I: 77745 1	I: 72405 0	C: 00011 1	I: 41325 0
22,2510	C: 00007 0	C: 00001 0	I: 72415 1	I: 77626 0	C: 67760 0	I: 77745 1	I: 72405 0	C: 00011 1
22,2520	I: 41325 0	C: 00007 0	C: 00003 1	I: 72425 1	I: 77626 0	C: 67756 1	I: 77616 0	I: 41401 1
22,2530	C: 00001 0	I: 65356 1	I: 41546 0	I: 65302 0	I: 41021 1	C: 06422 0	C: 21664 0	I: 77725 1
22,2540	C: 03267 1	I: 41316 0	C: 00005 1	I: 52415 0	C: 00003 1	I: 77604 0	C: 21664 0	C: 16235 1
22,2550	C: 03271 0	I: 41316 0	C: 00005 1	I: 52415 0	C: 00003 1	I: 77604 0	C: 21664 0	C: 16245 0
22,2560	C: 03273 1	I: 41316 0	C: 00005 1	I: 52415 0	C: 00003 1	I: 77604 0	C: 21664 0	C: 02255 1
22,2570	I: 41345 0	C: 03267 1	C: 03271 0	I: 72405 0	C: 00005 1	I: 41325 0	C: 03273 1	C: 00001 0
22,2600	I: 43206 1	C: 00007 0	I: 41112 0	C: 21664 0	C: 16243 0	I: 62421 1	I: 77604 0	C: 21664 0
22,2610	C: 16237 0	C: 03267 1	I: 41205 0	C: 03273 1	C: 00005 1	I: 65352 0	C: 03271 0	I: 41405 0
22,2620	C: 00001 0	I: 62415 0	C: 00007 0	I: 77604 0	C: 21664 0	C: 16241 1	I: 62421 1	I: 77604 0
22,2630	C: 21664 0	C: 16251 0	C: 03271 0	I: 41205 0	C: 03273 1	C: 00005 1	I: 65352 0	C: 03267 1
22,2640	I: 41405 0	C: 00001 0	I: 62415 0	C: 00007 0	I: 77604 0	C: 21664 0	C: 16253 1	I: 62421 1
22,2650	I: 77604 0	C: 21664 0	C: 02247 1	I: 77616 0	I: 67543 1	C: 00007 0	I: 71406 0	I: 41152 1
22,2660	C: 21664 0	C: 00051 0	I: 57543 1	C: 00015 0	I: 67471 1	C: 00051 0	I: 51123 0	C: 00001 0
22,2670	C: 44702 1	I: 57545 1	I: 43244 1	C: 44677 1	C: 06422 0	I: 77650 1	C: 44701 1	I: 77625 0
22,2700	C: 06422 0	I: 77606 1	I: 57543 1	C: 00013 0	I: 67471 1	C: 00051 0	I: 51123 0	C: 00011 1
22,2710	C: 44722 0	I: 57545 1	I: 43244 1	C: 44717 0	C: 06422 0	I: 77650 1	C: 44723 1	I: 52025 1
22,2720	C: 06422 0	C: 44723 1	I: 77745 1	I: 43466 1	I: 77776 1	05567 0	C: 00401 1	12732 1
22,2730	04616 1	C: 40153 1	04616 1	C: 40165 1	34752 0	00004 0	05203 0	C: 03234 1
22,2740	C: 44066 1	15155 1	I: 77776 1	12732 1	I: 77614 1	C: 01074 0	I: 70740 0	C: 01325 1
22,2750	C: 04772 1	I: 45002 1	C: 44527 1	I: 74343 0	C: 04772 1	C: 03267 1	C: 17324 1	C: 03334 0
22,2760	I: 55605 1	C: 05002 0	C: 04772 1	I: 77661 0	C: 20606 0	C: 03332 0	I: 77614 1	C: 01035 0
22,2770	C: 45010 1	C: 00221 0	C: 24255 0	C: 00554 0	C: 02660 0	C: 02660 0	C: 13301 1	C: 16161 0

OCTAL LISTING FOR PARAGRAPH # 132, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

22,3000	C: 30707 1	C: 00003 1	C: 04000 0	04616 1	C: 54240 0	10000 0	12730 0	06036 1
22,3010	I: 75160 1	C: 03244 0	C: 02234 0	I: 77624 1	C: 44312 1	I: 45575 1	C: 50516 0	I: 77626 0
22,3020	C: 50524 1	I: 77626 0	C: 74532 0	I: 45160 1	C: 03244 0	C: 44654 0	I: 77634 0	C: 21524 1
22,3030	C: 03302 0	I: 77414 0	C: 01215 0	C: 45122 1	34752 0	55272 0	51272 1	31674 0
22,3040	00006 1	51272 1	21701 1	00006 1	73121 1	10000 0	64753 1	13051 1
22,3050	40000 0	51272 1	55636 1	51272 1	31701 0	51272 1	57674 0	51272 1
22,3060	55633 1	11272 0	13035 0	00003 1	03075 0	13170 0	34753 1	00004 0
22,3070	05203 0	C: 03213 1	C: 44066 1	00003 1	15155 1	00006 1	40025 1	53706 0
22,3100	00006 1	31732 0	21706 0	11705 0	00002 0	13107 0	13117 1	11706 0
22,3110	00002 0	13113 0	40000 0	63166 0	00006 1	63117 0	24002 0	24002 0
22,3120	00002 0	C: 03146 1	I: 77776 1	00006 1	30025 0	21732 1	00006 1	43166 1
22,3130	21732 1	00004 0	34752 0	55677 1	60000 1	55700 0	50000 1	31723 0
22,3140	51677 0	55641 1	00006 1	63145 1	40000 0	00006 1	73167 0	00006 1
22,3150	51700 1	71723 1	00006 1	51677 0	11530 1	51677 0	55277 0	11677 1
22,3160	13133 1	30025 0	63166 0	57704 0	13034 1	C: 00000 1	C: 00144 0	C: 75777 1
22,3170	40025 1	61704 0	10000 0	64753 1	13177 1	64735 1	40000 0	00004 0
22,3200	05203 0	C: 03206 0	C: 44066 1	33166 0	27704 1	15155 1	37713 0	05105 0
22,3210	C: 03003 1	C: 44066 1	05261 1	34755 1	55640 0	55643 0	55301 0	55637 0
22,3220	55642 1	55300 1	30323 0	55635 1	30322 1	55634 0	30321 1	55633 1
22,3230	34755 1	55641 1	55636 1	55277 0	31311 0	54063 0	34755 1	53310 0
22,3240	05116 1	05261 1	06036 1	I: 52014 0	C: 03712 0	C: 45465 1	C: 45247 1	I: 77776 1
22,3250	34752 0	55051 0	34753 1	55052 0	33316 0	04616 1	C: 20212 1	05472 0
22,3260	03262 1	03254 1	34750 1	05203 0	C: 03430 0	C: 44064 0	00003 1	33320 0
22,3270	54003 0	34755 1	55537 0	35021 1	05105 0	C: 03321 1	C: 44064 0	00003 1
22,3300	36244 0	71537 0	10000 0	03310 0	34777 1	04616 1	C: 01735 1	03300 1
22,3310	33317 1	04616 1	C: 20212 1	05563 1	05563 1	03267 1	C: 01014 0	C: 04054 1
22,3320	C: 02140 0	06036 1	I: 77634 0	C: 21462 1	C: 00041 1	C: 02211 1	I: 77776 1	41052 0
22,3330	64753 1	00006 1	13356 0	06036 1	I: 77624 1	C: 27043 0	I: 77775 1	C: 00001 0
22,3340	C: 26213 0	C: 00007 0	C: 02221 1	I: 77743 1	C: 73774 1	C: 00037 0	I: 77743 1	C: 72411 0
22,3350	C: 02205 1	I: 46135 1	C: 00050 1	C: 45367 1	I: 77650 1	C: 45373 1	06036 1	I: 77624 1
22,3360	C: 27057 0	I: 77650 1	C: 45336 0	C: 00001 0	C: 11530 1	C: 00002 0	C: 31230 1	I: 43145 0
22,3370	C: 06276 1	C: 03635 1	C: 45377 0	I: 51575 1	C: 02023 1	I: 77614 1	C: 03475 1	C: 36207 1

OCTAL LISTING FOR PARAGRAPH # 133, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

22,3400	C: 45551 1	I: 45234 0	C: 21462 1	C: 02211 1	C: 02211 1	I: 53145 1	C: 02143 0	C: 45420 0
22,3410	I: 43345 1	C: 02143 0	C: 02211 1	C: 02143 0	I: 77776 1	34753 1	55537 0	05155 0
22,3420	I: 43345 1	C: 02141 1	C: 02211 1	C: 02141 1	I: 77776 1	34752 0	55537 0	05155 0
22,3430	34747 1	71044 1	10000 0	03441 0	37712 1	05072 1	C: 05472 0	C: 04062 1

22,3440	05261 1	34777 1	05203 0	C: 03430 0	C: 44064 0	36244 0	71537 0	50000 1
22,3450	03451 1	05261 1	03460 0	34777 1	54001 1	34755 1	21541 1	05261 1
22,3460	34777 1	54001 1	34755 1	21543 0	05261 1	I: 77776 1	35021 1	05105 0
22,3470	C: 03503 1	C: 44064 0	00003 1	10067 1	05122 0	33317 1	04616 1	C: 20212 1

22,3500	05563 1	05563 1	03475 1	06036 1	I: 52175 0	C: 01221 1	C: 45507 1	C: 26213 0
22,3510	C: 01227 1	C: 02221 1	I: 52014 0	C: 04304 1	C: 45516 1	C: 45527 0	I: 71214 0	C: 03475 1
22,3520	C: 04001 1	C: 14037 0	C: 05364 0	C: 26205 1	C: 02023 1	I: 52046 1	C: 45536 0	I: 71214 0
22,3530	C: 03675 0	C: 04003 0	C: 14037 0	C: 05366 1	C: 16205 1	C: 06276 1	C: 36207 1	C: 45551 1

22,3540	I: 77776 1	34747 1	71044 1	00006 1	15472 1	34777 1	04616 1	C: 01735 1
22,3550	03503 1	I: 44001 0	C: 00001 0	C: 00051 0	I: 77214 0	C: 03755 0	C: 45565 0	C: 02213 0
22,3560	I: 77752 1	C: 26213 0	C: 02221 1	I: 77752 1	C: 02221 1	I: 77624 1	C: 57333 0	I: 77624 1
22,3570	C: 57401 0	I: 77625 0	C: 02207 0	I: 64414 1	C: 03755 0	C: 45576 1	I: 77624 1	C: 45636 0

22,3600	C: 16120 0	C: 00017 1	I: 77625 0	C: 02207 0	C: 00161 1	I: 64414 1	C: 03755 0	C: 45610 1
22,3610	I: 77624 1	C: 45636 0	C: 16122 1	C: 00161 1	I: 51025 1	C: 02205 1	C: 45622 0	I: 52145 0
22,3620	C: 06424 0	C: 45626 1	I: 45145 0	C: 00017 1	C: 57437 0	I: 77676 0	C: 16143 0	C: 02205 1
22,3630	I: 45015 1	C: 02207 0	C: 57442 1	I: 77676 0	C: 36141 0	C: 00051 0	I: 51025 1	C: 05646 0

22,3640	C: 45643 1	I: 43415 0	C: 05646 0	I: 43545 1	C: 05646 0	C: 01065 0	C: 05603 1	I: 51575 1
22,3650	C: 02643 1	C: 24045 0	C: 02651 1	I: 41446 1	I: 50025 0	C: 00045 0	C: 45661 1	I: 45545 1
22,3660	C: 77732 1	I: 51575 1	C: 02657 1	I: 45206 1	C: 00045 0	I: 71240 1	C: 45671 0	I: 77626 0
22,3670	C: 77732 1	I: 66145 1	C: 00045 0	C: 00044 1	I: 62101 0	C: 00047 1	C: 00002 0	I: 53775 1

22,3700	C: 02643 1	C: 20201 0	C: 26643 1	C: 02651 1	I: 77657 0	C: 20201 0	C: 26651 1	C: 02657 1
22,3710	I: 66057 0	C: 20201 0	C: 00045 0	C: 02657 1	I: 54150 1	C: 02103 1	C: 00045 0	I: 77660 1
22,3720	C: 00045 0	I: 70130 1	C: 02103 1	C: 00045 0	I: 40270 0	C: 00044 1	C: 00003 1	I: 77650 1
22,3730	C: 46571 0	C: 03731 1	C: 03732 1	CKSM 15236 1	a	a	a	a

22,3740	a	a	a	a	a	a	a	a
22,3750	a	a	a	a	a	a	a	a
22,3760	a	a	a	a	a	a	a	a
22,3770	a	a	a	a	a	a	a	a

OCTAL LISTING FOR PARAGRAPH # 134, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

23,2000	04645 1	55113 1	34752 0	55052 0	36241 0	55051 0	32037 1	04616 1
23,2010	C: 020231 0	15472 1	12017 1	12006 1	34751 0	05464 1	05155 0	31052 1
23,2020	74752 1	10000 0	12026 0	05504 0	C: 00012 1	12034 0	05516 0	C: 00012 1
23,2030	05504 0	C: 00264 1	05504 0	C: 00126 1	00003 1	31113 0	14640 0	C: 01014 0
23,2040	C: 77757 1	I: 47135 0	C: 03751 1	C: 21465 0	I: 41401 1	C: 00001 0	I: 57556 0	C: 14043 0
23,2050	I: 41546 0	I: 47135 0	C: 03752 1	C: 21465 0	I: 71406 0	I: 72405 0	C: 00001 0	C: 14045 0
23,2060	I: 41356 1	I: 77752 1	C: 24041 1	C: 00041 1	I: 77616 0	35010 0	04616 1	C: 20351 1
23,2070	15472 1	12073 0	12065 1	05504 0	C: 00124 0	04616 1	C: 54101 0	15472 1
23,2100	04645 1	55143 1	05504 0	C: 00024 1	02111 1	04645 1	55143 1	05516 0
23,2110	C: 00024 1	34747 1	70075 1	00006 1	12262 1	06036 1	I: 77775 1	C: 06416 1
23,2120	C: 03761 1	I: 77634 0	C: 21462 1	I: 77615 0	C: 15654 1	C: 34041 0	C: 51151 0	I: 77775 1
23,2130	C: 01102 0	C: 03767 1	I: 77624 1	C: 56016 0	C: 00322 1	I: 77776 1	05353 1	C: 04022 0
23,2140	34747 1	70075 1	00006 1	12262 1	00006 1	00030 1	74742 0	10000 0
23,2150	02255 1	00006 1	00031 0	74736 0	10000 0	02255 1	06036 1	I: 45175 0
23,2160	C: 01102 0	C: 47552 0	I: 65545 0	C: 00162 1	C: 14025 0	C: 06271 0	I: 51021 0	C: 00025 0
23,2170	C: 46206 1	I: 77776 1	32273 0	54006 0	00004 0	00006 1	30322 1	53634 0
23,2200	30323 0	55635 1	00003 1	32274 1	54006 0	02231 0	I: 77776 1	00004 0
23,2210	04674 0	C: 40153 1	04674 0	C: 40140 0	05516 0	C: 00124 0	05504 0	C: 00077 1
23,2220	04616 1	C: 54101 0	00004 0	04674 0	C: 40123 0	05353 1	C: 04022 0	05516 0
23,2230	C: 00077 1	34742 1	70075 1	00006 1	12236 0	02260 1	31743 0	10000 0
23,2240	02242 1	02260 1	55743 1	32272 1	00004 0	05173 1	C: 02250 1	05155 0
23,2250	37713 0	05105 0	C: 02111 1	C: 46067 1	05261 1	04616 1	C: 54244 1	02231 0
23,2260	31143 0	14640 0	32267 0	70074 0	00006 1	15155 1	02231 0	C: 00500 1
23,2270	C: 00707 1	C: 03432 1	C: 01130 1	C: 46066 0	C: 46067 1	C: 00302 0	C: 17755 0	I: 53754 1
23,2300	C: 03376 0	C: 57176 0	C: 26744 1	I: 53750 0	C: 03375 0	C: 57176 0	C: 02655 0	I: 45020 1
23,2310	C: 03461 1	C: 46325 1	C: 37667 1	C: 25675 1	I: 41401 1	C: 00003 1	I: 65225 1	C: 03667 0
23,2320	C: 00001 0	I: 45206 1	C: 03667 0	I: 52006 0	C: 03461 1	I: 41545 0	C: 06276 1	I: 63130 0
23,2330	C: 00047 1	C: 00002 0	I: 46135 1	C: 00050 1	C: 46340 1	I: 51575 1	C: 02023 1	I: 77725 1
23,2340	I: 43545 1	I: 77620 0	C: 03461 1	C: 37572 0	C: 27057 0	I: 77624 1	C: 46357 1	I: 77745 1
23,2350	C: 03572 1	C: 34041 0	C: 27043 0	I: 77624 1	C: 46367 1	I: 77650 1	C: 03461 1	I: 43175 0
23,2360	C: 00001 0	C: 01352 1	C: 46373 1	C: 27534 0	C: 00007 0	C: 03542 1	I: 77616 0	I: 43175 0
23,2370	C: 00001 0	C: 01352 1	C: 46363 0	C: 27550 1	C: 00007 0	C: 03556 1	I: 77616 0	I: 53754 1

OCTAL LISTING FOR PARAGRAPH # 135, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "2" DEMOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRITIVE OPERATOR WORDS) OR "C" (CONSTANTS)

23,2400	C: 03376 0	C: 57176 0	I: 63350 1	C: 03375 0	I: 63257 1	C: 57176 0	I: 77616 0	I: 53754 1
23,2410	C: 03376 0	C: 57576 1	I: 77616 0	C: 10000 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1
23,2420	C: 00000 1	C: 20000 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1
23,2430	C: 00000 1	C: 37777 1	C: 37777 1	I: 77620 0	C: 02772 1	I: 66370 0	C: 00066 1	C: 00051 0
23,2440	C: 00022 1	I: 66374 1	C: 00022 1	C: 00052 0	C: 00006 1	I: 63775 1	C: 03523 0	C: 02467 0
23,2450	C: 12665 1	I: 77775 1	C: 03531 0	I: 52717 1	C: 02555 0	C: 75112 1	C: 12665 1	I: 77775 1
23,2460	C: 03537 0	I: 52717 1	C: 02643 1	C: 75112 1	C: 12665 1	I: 77700 0	C: 46467 0	I: 43104 0
23,2470	C: 46445 0	C: 02706 1	C: 46476 0	I: 77775 1	C: 06424 0	C: 02657 1	I: 77201 1	C: 00001 0
23,2500	C: 02643 1	I: 47036 1	C: 21537 0	I: 47515 0	C: 02651 1	I: 76234 0	C: 21537 0	I: 47515 0
23,2510	C: 02657 1	I: 76234 0	C: 21537 0	I: 77171 0	C: 02707 0	C: 00000 1	C: 02665 0	I: 40151 0
23,2520	C: 02707 0	C: 46522 0	C: 02670 1	I: 77654 0	C: 46533 0	I: 40112 1	C: 46533 0	C: 02670 1
23,2530	I: 52114 1	C: 00001 0	C: 46525 1	I: 61551 1	C: 02665 0	I: 75405 1	C: 02670 1	I: 76257 0
23,2540	C: 57576 1	C: 02665 0	I: 63101 1	C: 00050 1	C: 77775 1	I: 77134 1	C: 02103 1	C: 00242 0
23,2550	I: 40265 1	C: 06414 0	C: 00001 0	C: 03476 1	I: 60351 0	C: 02665 0	C: 00047 1	I: 65345 0
23,2560	C: 00155 0	C: 03545 0	I: 77701 1	C: 00051 0	I: 70460 1	C: 00050 1	I: 41471 0	I: 77650 1
23,2570	C: 45647 0	I: 77731 1	C: 00052 0	C: 00066 1	I: 60775 1	C: 02643 1	C: 75134 0	I: 77206 0
23,2600	C: 02651 1	I: 53303 1	C: 75112 1	I: 77206 0	C: 02657 1	I: 53303 1	C: 75070 1	I: 61006 0
23,2610	C: 46574 0	I: 45575 1	C: 74262 1	I: 45575 1	C: 74270 1	I: 45575 1	C: 74276 1	I: 77214 0
23,2620	C: 02706 1	C: 46624 0	C: 06424 0	C: 03515 0	I: 66374 1	C: 00022 1	C: 00052 0	C: 00006 1
23,2630	I: 77773 1	C: 74254 1	I: 53761 1	C: 00001 0	C: 20201 0	C: 12707 1	I: 77304 0	C: 46630 0
23,2640	C: 02673 1	I: 77732 1	C: 02673 1	I: 77650 1	C: 02772 1	I: 45020 1	C: 02772 1	C: 27412 0
23,2650	I: 74375 0	C: 03501 0	C: 03476 1	C: 26713 0	C: 03507 0	I: 77761 1	C: 03476 1	C: 26721 1
23,2660	C: 03515 0	I: 77761 1	C: 03476 1	C: 02727 1	I: 77776 1	33146 1	55320 0	55321 1
23,2670	34755 1	55322 1	55323 0	05353 1	C: 04022 0	05504 0	C: 00236 0	31321 0
23,2700	55320 0	31323 1	55322 1	06036 1	I: 73150 1	C: 01320 1	C: 01322 0	I: 70731 0
23,2710	C: 00051 0	C: 00006 1	C: 75134 0	I: 60276 1	C: 00052 0	I: 65161 1	C: 02713 0	C: 00051 0
23,2720	I: 57144 1	C: 00047 1	C: 02103 1	I: 65057 0	C: 57576 1	C: 00051 0	I: 77653 1	C: 02467 0
23,2730	C: 02735 1	I: 57543 1	C: 75134 0	I: 74301 0	C: 00052 0	C: 02721 1	I: 71124 0	C: 00051 0
23,2740	C: 00047 1	I: 53674 1	C: 02103 1	C: 57576 1	I: 52724 1	C: 00051 0	C: 02555 0	C: 02743 0
23,2750	I: 77614 1	C: 02746 0	C: 46772 1	I: 57543 1	C: 75134 0	I: 74301 0	C: 00052 0	C: 02727 1
23,2760	I: 71124 0	C: 00051 0	C: 00047 1	I: 53674 1	C: 02103 1	C: 57576 1	I: 52724 1	C: 00051 0
23,2770	C: 02643 1	C: 02751 0	I: 77624 1	C: 11165 0	I: 77776 1	31320 1	63147 0	55321 1

OCTAL LISTING FOR PARAGRAPH # 136, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

23,3000	31322 0	67745 0	55323 0	06036 1	I: 66350 1	C: 01320 1	C: 00051 0	C: 00006 1
23,3010	I: 77775 1	C: 02735 1	C: 06467 1	I: 77775 1	C: 02743 0	C: 06555 1	I: 77214 0	C: 02746 0
23,3020	C: 47030 1	C: 02751 0	C: 06643 0	I: 52100 1	C: 47026 0	C: 47036 1	I: 77634 0	C: 46673 1
23,3030	I: 43335 0	C: 01324 0	C: 07151 0	I: 52030 0	C: 47036 1	C: 47023 0	I: 77624 1	C: 11165 0
23,3040	I: 53375 0	C: 01701 0	C: 02701 0	C: 03470 1	I: 47014 1	C: 00707 1	C: 47136 0	C: 26770 0
23,3050	I: 77004 0	C: 57725 0	C: 00000 1	I: 77014 1	C: 04344 0	C: 47057 0	C: 00002 0	I: 53775 1
23,3060	C: 02665 0	C: 57205 1	I: 40055 0	C: 01521 0	C: 47076 0	C: 25521 0	C: 02673 1	I: 53257 1
23,3070	C: 57202 0	C: 01527 0	I: 77000 1	C: 47102 1	C: 35527 1	C: 47111 0	I: 53375 0	C: 01535 0
23,3100	C: 02665 0	C: 01535 0	I: 53375 0	C: 01543 1	C: 02673 1	C: 01543 1	I: 45134 0	C: 02030 0
23,3110	C: 23345 1	I: 77624 1	C: 11165 0	I: 47014 1	C: 00707 1	C: 47141 0	C: 26747 1	I: 77624 1
23,3120	C: 26070 1	I: 77624 1	C: 11165 0	I: 77214 0	C: 02746 0	C: 47130 0	C: 03470 1	C: 01701 0
23,3130	I: 66150 0	C: 02772 1	C: 00052 0	I: 77776 1	04635 0	C: 27427 0	I: 52034 1	C: 26723 0
23,3140	C: 47050 1	I: 45034 1	C: 26674 0	C: 26114 1	I: 77650 1	C: 47121 0	C: 00066 1	C: 77771 0
23,3150	C: 00014 1	I: 71220 1	C: 00051 0	C: 02665 0	I: 65325 0	C: 06424 0	C: 02671 0	I: 55476 1
23,3160	I: 77656 1	C: 14027 1	C: 00027 1	I: 77742 0	C: 14023 0	C: 00033 1	I: 77742 0	C: 34021 0
23,3170	C: 47222 0	C: 16742 1	C: 02667 1	I: 77742 0	C: 14023 0	C: 00027 1	I: 65205 0	C: 02671 0
23,3200	C: 00033 1	I: 45205 1	C: 02665 0	I: 77626 0	C: 43756 1	C: 47222 0	C: 26744 1	C: 00027 1
23,3210	I: 77641 1	C: 02701 0	C: 24021 1	C: 00027 1	I: 77641 1	C: 02673 1	C: 34023 1	C: 47222 0
23,3220	C: 36740 1	C: 00051 0	I: 51545 1	C: 00023 0	I: 50025 0	C: 07440 0	C: 47235 0	I: 72545 0
23,3230	C: 00021 1	I: 75326 1	C: 00023 0	C: 00025 0	I: 77616 0	I: 72545 0	C: 00023 0	I: 77736 0
23,3240	C: 14025 0	C: 00021 1	I: 77640 0	C: 47246 1	I: 43545 1	C: 00025 0	I: 75345 1	C: 06422 0
23,3250	C: 00023 0	I: 77625 0	C: 00025 0	C: 00025 0	I: 77616 0	I: 77601 0	C: 00001 0	I: 47375 0
23,3260	C: 02665 0	C: 02651 1	I: 41456 0	I: 44041 1	C: 02701 0	C: 00051 0	C: 24021 1	C: 00001 0
23,3270	I: 77641 1	C: 02673 1	C: 34023 1	C: 47222 0	C: 26740 0	C: 00001 0	I: 50235 0	C: 02665 0
23,3300	C: 02651 1	I: 77752 1	C: 24021 1	C: 02651 1	I: 77641 1	C: 02665 0	C: 34023 1	C: 47222 0
23,3310	C: 02744 1	I: 45246 0	C: 07442 1	I: 77644 1	C: 47335 1	I: 50375 0	C: 02657 0	C: 00001 0
23,3320	C: 24021 1	C: 02643 1	I: 45441 1	C: 43754 0	C: 47222 0	C: 26742 1	C: 02740 0	I: 43034 1
23,3330	C: 21524 1	C: 00200 0	C: 00051 0	C: 34322 0	C: 00051 0	I: 77776 1	05567 0	C: 00401 1
23,3340	05504 0	C: 00056 1	06036 1	I: 77650 1	C: 47315 0	I: 66370 0	C: 02714 1	C: 00051 0
23,3350	C: 02700 1	I: 77601 0	C: 00001 0	I: 46773 0	C: 02723 0	C: 02731 0	I: 77656 1	C: 06731 1
23,3360	I: 77773 1	C: 02723 0	I: 76433 1	C: 02731 0	C: 06737 1	I: 77700 0	C: 47353 1	I: 66160 0
23,3370	C: 00006 1	C: 00036 1	I: 66370 0	C: 00022 1	C: 00051 0	C: 00006 1	I: 66374 1	C: 00006 1

HEXACT LISTING FOR PARAGRAPH # 137, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

23,3400	C: 00052 0	C: 00002 0	I: 76720 0	C: 00036 1	C: 00001 0	I: 62757 0	C: 75062 1	C: 00007 0
23,3410	I: 77757 1	C: 75054 1	C: 30031 0	C: 00015 0	I: 53357 0	C: 75046 1	I: 76455 1	C: 00031 0
23,3420	I: 53520 0	C: 00036 1	C: 06707 1	I: 77700 0	C: 47425 1	I: 77704 1	C: 47402 1	I: 77775 1
23,3430	C: 02665 0	C: 26707 0	C: 02673 1	C: 26715 0	C: 02701 0	C: 02723 0	I: 77616 0	C: 05520 0

23,3440	C: 26075 1	C: 05252 1	C: 25253 1	I: 77776 1	03453 0	06036 1	I: 77616 0	I: 77776 1
23,3450	03461 1	06036 1	I: 77616 0	30032 0	54772 1	30033 1	54766 1	30034 0
23,3460	54770 0	00006 0	22142 0	34751 0	76241 1	54143 0	50143 1	30766 0
23,3470	52155 1	52127 1	04713 0	C: 21465 0	00006 1	30155 0	50143 1	52767 0

23,3500	04713 0	C: 01517 0	52155 1	50143 1	52745 0	00006 1	50143 1	30767 1
23,3510	04713 0	C: 01531 1	52127 1	52155 1	50143 1	52737 0	10143 0	13464 0
23,3520	00142 0	00004 0	00006 1	22061 0	34751 0	76241 0	54062 1	50062 0
23,3530	30766 0	05033 1	00006 1	74736 0	50062 0	52737 0	50062 0	30766 0

23,3540	05032 0	00006 1	74736 0	50062 0	52745 0	10062 1	13525 1	30061 0
23,3550	00003 1	00000 0	I: 77776 1	03453 0	13557 1	I: 77776 1	03461 1	07531 0
23,3560	46244 1	03601 0	06036 1	I: 43575 1	C: 00123 1	I: 77776 1	03453 0	13572 0
23,3570	I: 77776 1	03461 1	07531 1	36244 0	13561 1	I: 77776 1	13557 1	I: 77776 1

23,3600	13572 0	54142 1	00006 1	22145 1	10142 1	40142 1	66244 0	00006 1
23,3610	50000 1	33670 0	52144 1	34753 1	54130 1	00006 1	50143 1	40123 0
23,3620	13622 0	52131 0	52155 1	33666 1	60143 1	54116 0	07106 1	10142 1
23,3630	52155 1	13634 1	00006 1	40155 1	52160 1	36241 0	26116 0	00006 1

23,3640	50130 0	50143 1	30123 1	52155 1	07106 1	52155 1	20160 1	52160 1
23,3650	20001 1	50130 0	50143 1	52123 0	52131 0	10000 0	13621 0	00006 1
23,3660	26142 1	10142 1	13604 1	00145 1	13604 1	00145 1	C: 00736 0	C: 00004 0
23,3670	C: 00002 0	C: 00000 1	C: 00004 0	I: 41345 0	C: 01265 1	C: 00745 1	I: 41325 0	C: 01271 1

23,3709	C: 00737 1	I: 77621 1	I: 77671 1	C: 00747 0	C: 03234 1	I: 72405 0	C: 00741 0	I: 77621 1
23,3710	C: 01267 0	C: 17236 0	C: 01265 1	I: 65205 0	C: 00737 1	C: 01271 1	I: 43205 1	C: 00745 1
23,3720	I: 77752 1	C: 03240 1	I: 77616 0	C: 03723 1	C: 03724 0	CKSM 16772 1		
23,3730								

23,3740	৯	৯	৯	৯	৯	৯	৯
23,3750	৯	৯	৯	৯	৯	৯	৯
23,3760	৯	৯	৯	৯	৯	৯	৯
23,3770	৯	৯	৯	৯	৯	৯	৯

OCTAL LISTING FOR PARAGRAPH # 140, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

24,2000	C: 17775 1	C: 01734 0	C: 00333 1	C: 16153 1	C: 77665 1	C: 42175 1	C: 22211 0	C: 00265 0
24,2010	C: 77777 0	C: 77767 1	C: 41215 1	C: 66331 0	C: 15237 0	C: 26751 0	C: 02052 1	C: 35713 1
24,2020	C: 37116 0	C: 32630 0	C: 05327 1	C: 00004 0	C: 05022 1	C: 26000 0	02714 1	02031 1
24,2030	02060 0	05504 0	C: 00026 0	34753 1	55145 1	32342 0	04616 1	C: 20506 0
24,2040	06001 0	02043 1	02035 0	42343 0	61145 0	00006 1	12062 0	32346 1
24,2050	04616 1	C: 20351 1	06001 0	02055 0	02047 0	06036 1	I: 77650 1	C: 64227 1
24,2060	05516 0	C: 00026 0	04616 1	C: 11175 1	05504 0	C: 00027 1	05504 0	C: 00031 0
24,2070	05504 0	C: 00010 0	05516 0	C: 00037 0	05516 0	C: 00040 0	05516 0	C: 00063 1
24,2100	05516 0	C: 00126 1	05516 0	C: 00041 1	05353 1	C: 04022 0	34755 1	55460 0
24,2110	06036 1	I: 77634 0	C: 21462 1	C: 34041 0	C: 51151 0	I: 77624 1	C: 53565 1	I: 77776 1
24,2120	50154 1	02122 1	02132 0	32336 0	04616 1	C: 21451 1	06022 1	02123 0
24,2130	02104 0	05155 0	05353 1	C: 04022 0	02714 1	02140 0	04616 1	C: 46100 1
24,2140	05353 1	C: 05022 1	C: 10000 0	37713 0	05146 1	30075 0	74747 0	00006 1
24,2150	12262 1	34752 0	00006 1	02033 0	00006 1	12211 0	46007 1	61011 0
24,2160	00006 1	12174 0	67745 0	00006 1	12174 0	32340 1	04616 1	C: 21451 1
24,2170	06022 1	02140 0	02140 0	05155 0	32337 1	04616 1	C: 20476 0	06022 1
24,2200	02140 0	02714 1	02207 0	03027 1	05504 0	C: 00040 0	02140 0	04364 1
24,2210	02140 0	40110 0	74737 1	00006 1	12226 1	34355 0	70076 1	00006 1
24,2220	12232 1	05516 0	C: 00037 0	05516 0	C: 00040 0	02262 0	32335 0	04616 1
24,2230	C: 01735 1	02211 1	06036 1	I: 77624 1	C: 50347 1	I: 77214 0	C: 04347 0	C: 50246 1
24,2240	C: 01661 1	I: 77742 0	C: 26356 0	C: 01667 1	I: 77742 0	C: 02364 1	I: 77776 1	05353 1
24,2250	C: 04022 0	30074 1	74745 1	00006 1	15155 1	30075 0	74747 0	00006 1
24,2260	12315 0	02721 1	32335 0	00004 0	05173 1	C: 02275 0	30075 0	74747 0
24,2270	00006 1	15155 1	05353 1	C: 40072 0	05155 0	30074 1	74745 1	00006 1
24,2300	15261 0	30075 0	74747 0	00006 1	12312 1	37713 0	05105 0	C: 02477 1
24,2310	C: 50067 0	05261 1	05221 0	C: 02734 0	02275 0	32712 1	05173 1	C: 02321 0
24,2320	05155 0	30075 0	74747 0	10000 0	12330 1	05221 0	C: 02734 0	02321 0
24,2330	37713 0	05105 0	C: 02232 0	C: 50067 0	05261 1	C: 00372 1	C: 00526 0	C: 00201 1
24,2340	C: 00514 1	C: 00074 1	C: 00012 1	C: 00001 0	C: 10000 0	C: 00000 1	C: 01441 1	I: 45020 1
24,2350	C: 01757 0	C: 27412 0	I: 77624 1	C: 26644 0	I: 43014 0	C: 02756 1	C: 50367 0	C: 01476 0
24,2360	I: 43014 0	C: 04307 1	C: 50364 0	C: 01475 0	I: 77614 1	C: 00747 0	C: 50411 0	I: 47014 1
24,2370	C: 01474 1	C: 21462 1	C: 34041 0	C: 27134 1	I: 77624 1	C: 11165 0	I: 77624 1	C: 27412 0

OCTAL LISTING FOR PARAGRAPH # 141, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

24,2400	I: 43145 0	C: 01571 0	C: 01674 0	I: 77624 1	C: 26644 0	C: 34041 0	C: 27134 1	I: 77650 1
24,2410	C: 01757 0	I: 47014 1	C: 01674 0	C: 21462 1	C: 34041 0	C: 27134 1	I: 77624 1	C: 11165 0
24,2420	I: 77624 1	C: 27412 0	I: 71214 0	C: 01474 1	C: 01643 1	I: 77650 1	C: 50403 0	05327 1
24,2430	C: 00004 0	C: 05022 1	C: 26000 0	04616 1	C: 11175 1	05504 0	C: 00031 0	05504 0
24,2440	C: 00006 1	05353 1	C: 04022 0	34743 0	70074 0	00006 1	15155 1	34747 1
24,2450	70075 1	00006 1	12462 1	34757 0	55743 1	04616 1	C: 46105 1	02441 1
24,2460	05353 1	C: 00112 0	32474 1	00004 0	05173 1	C: 02467 0	05155 0	35024 1
24,2470	05105 0	C: 02441 1	C: 50067 0	05261 1	C: 13560 0	I: 77776 1	02460 1	05353 1
24,2500	C: 04022 0	34745 0	70074 0	00006 1	15155 1	34747 1	70075 1	00006 1
24,2510	12664 0	34736 1	00006 1	02012 0	00006 1	12132 1	34752 0	00006 1
24,2520	02033 0	00006 1	12524 1	02156 1	40110 0	74737 1	00006 1	12655 1
24,2530	05353 1	C: 00152 1	04616 1	C: 64376 1	50154 1	02536 0	02557 1	02247 1
24,2540	32707 0	04616 1	C: 21451 1	06022 1	02547 0	02540 1	05155 0	05353 1
24,2550	C: 04022 0	32710 0	04616 1	C: 20362 1	06022 1	02557 1	02247 1	05353 1
24,2560	C: 04022 0	02714 1	02577 0	30075 0	74747 0	00006 1	12664 0	04616 1
24,2570	C: 51230 1	50154 1	02573 1	02577 0	04616 1	C: 46100 1	02664 1	40075 1
24,2600	74746 1	00006 1	12655 1	30075 0	74745 1	00006 1	12655 1	37713 0
24,2610	55056 1	06036 1	I: 77650 1	C: 54370 1	I: 77776 1	05353 1	C: 04022 0	12650 1
24,2620	I: 77776 1	34755 1	55744 0	05353 1	C: 04022 0	37714 1	05072 1	C: 02670 1
24,2630	C: 50067 0	06036 1	I: 77735 0	C: 03745 1	I: 50054 0	C: 50632 0	C: 50644 1	I: 77776 1
24,2640	02714 1	02664 1	34755 1	02660 0	I: 77624 1	C: 11165 0	I: 77650 1	C: 55374 1
24,2650	25460 1	02714 1	02666 0	34756 1	02660 0	02714 1	02666 0	34752 0
24,2660	55743 1	04616 1	C: 46105 1	02477 1	32712 1	02263 1	35000 1	02263 1
24,2670	32711 1	04616 1	C: 20362 1	06022 1	44753 0	55744 0	05155 0	05353 1
24,2700	C: 00152 1	04616 1	C: 53103 0	04616 1	C: 17667 0	02247 1	02477 1	C: 00525 0
24,2710	C: 01405 1	C: 01461 0	C: 02734 0	C: 10624 0	40104 0	74744 0	10000 0	24002 0
24,2720	00002 0	32341 0	55114 0	02714 1	02731 0	34755 1	55107 1	55110 1
24,2730	02735 1	34735 1	55107 1	44736 0	55110 1	05516 0	C: 00012 1	04616 1
24,2740	C: 52475 0	02742 1	04616 1	C: 17667 0	02777 1	05504 0	C: 00041 1	44736 0
24,2750	00006 1	03012 1	36244 0	55454 1	06036 1	I: 43234 0	C: 21462 1	C: 11026 0
24,2760	C: 34041 0	C: 51151 0	I: 77776 1	05504 0	C: 00012 1	06036 1	I: 77624 1	C: 52373 1
24,2770	I: 77776 1	03016 0	02132 0	04616 1	C: 17667 0	02777 1	03006 1	33014 1

OCTAL LISTING FOR PARAGRAPH # 142, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

24,3000	04616 1	C: 21451 1	06022 1	03011 1	02232 0	05155 0	05516 0	C: 00041 1
24,3010	02262 0	05353 1	C: 04022 0	03100 0	C: 00503 1	C: 00527 1	33015 0	04616 1
24,3020	C: 21451 1	06022 1	02232 0	03016 0	05155 0	C: 00000 1	C: 00062 0	05504 0
24,3030	C: 00126 1	00004 0	04674 0	C: 40140 0	00003 1	34736 1	00006 1	05012 1
24,3040	33077 1	04616 1	C: 20476 0	03070 0	03046 0	03073 0	00004 0	04523 1
24,3050	C: 00035 1	03060 1	04674 0	C: 40123 0	00003 1	05516 0	C: 00126 1	02204 0
24,3060	00003 1	33076 0	04616 1	C: 21451 1	03070 0	03061 0	03073 0	05155 0
24,3070	05516 0	C: 00126 1	06022 1	04616 1	C: 46100 1	03035 1	C: 00501 0	C: 00205 0
24,3100	05504 0	C: 00037 0	05516 0	C: 00041 1	34755 1	55731 1	55732 1	55733 0
24,3110	05353 1	C: 04022 0	33150 0	04616 1	C: 20357 1	06022 1	03122 0	03127 0
24,3120	04616 1	C: 55405 0	00004 0	06027 1	C: 55605 1	06011 1	12104 1	05353 1
24,3130	C: 04022 0	00004 0	06027 1	C: 55605 1	06011 1	00003 1	34774 1	04616 1
24,3140	C: 01735 1	02714 1	03110 1	04616 1	C: 46100 1	34755 1	55306 1	03110 1
24,3150	C: 04120 0	I: 43020 1	C: 01757 0	C: 01343 1	C: 51160 1	I: 77614 1	C: 04307 1	C: 51170 0
24,3160	I: 77624 1	C: 27100 0	I: 77775 1	C: 00001 0	C: 26356 0	C: 00007 0	C: 16364 1	C: 00015 0
24,3170	C: 34041 0	C: 27066 1	I: 52375 1	C: 00007 0	C: 02364 1	I: 76521 0	C: 01734 0	I: 77776 1
24,3200	00004 0	06027 1	C: 52602 1	06036 1	C: 25761 0	C: 00001 0	I: 43051 1	C: 02356 0
24,3210	C: 00350 1	C: 51217 1	I: 77604 0	C: 57725 0	I: 41061 0	C: 20212 1	C: 50123 1	I: 77656 1
24,3220	I: 76521 0	C: 01734 0	C: 15102 0	C: 00045 0	C: 01767 0	I: 77614 1	C: 00231 1	C: 01757 0
24,3230	04645 1	55735 0	06036 1	I: 65545 0	C: 03743 1	I: 50025 0	C: 11252 1	C: 51244 1
24,3240	I: 77776 1	34753 1	54154 0	13247 1	I: 77776 1	34755 1	54154 0	31735 1
24,3250	04640 1	C: 02525 1	C: 12525 0	35031 0	05072 1	C: 02545 1	C: 64063 0	34774 1
24,3260	05224 0	40110 0	74742 0	10000 0	15261 0	40076 1	74740 1	00006 1
24,3270	13273 0	26076 1	13253 1	34753 1	13260 1	37713 0	05072 1	C: 03310 0
24,3300	C: 50067 0	35000 1	05224 0	30077 1	74743 1	10000 0	13275 0	15261 0
24,3310	30077 1	74741 0	10000 0	13372 0	30110 1	74752 1	10000 0	13372 0
24,3320	04616 1	C: 53103 0	04616 1	C: 17667 0	13372 0	53106 0	52155 1	00004 0
24,3330	00006 1	30036 1	52157 0	00006 1	30034 0	52161 0	30032 0	54162 0
24,3340	04616 1	C: 53105 0	04616 1	C: 17667 0	13363 0	00004 0	53334 0	53755 0
24,3350	52155 1	53753 0	52157 0	53751 1	52161 0	53456 0	30162 1	55457 1
24,3360	34753 1	55460 0	15155 1	40101 0	74742 0	10000 0	13372 0	05516 0
24,3370	C: 00120 1	13340 1	34755 1	55460 0	05516 0	C: 00063 1	44736 0	00006 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

24,3740	৯	৯	৯	৯	৯	৯	৯
24,3750	৯	৯	৯	৯	৯	৯	৯
24,3760	৯	৯	৯	৯	৯	৯	৯
24,3770	৯	৯	৯	৯	৯	৯	৯

OCTAL LISTING FOR PARAGRAPH # 144, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKEO "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

25,2000	C: 47777 0	C: 00001 0	C: 01150 1	11761 1	12006 1	15261 0	05203 0	C: 02003 0
25,2010	C: 52064 1	37712 1	05072 1	C: 02023 1	C: 52064 1	34736 1	00006 1	71760 0
25,2020	61757 0	55755 0	15261 0	02047 0	04616 1	C: 17667 0	25762 0	00004 0
25,2030	30101 1	74741 0	10000 0	12037 0	53102 1	51760 1	53605 1	41760 0
25,2040	61756 1	00006 1	12045 0	31760 1	64752 0	55760 0	15155 1	34753 1
25,2050	54133 1	51755 1	32054 1	14622 1	C: 53105 0	C: 53103 0	C: 53101 1	C: 53077 1
25,2060	C: 53075 0	C: 53073 0	02071 0	05221 0	C: 00144 0	44753 0	70110 0	54110 0
25,2070	15261 0	00006 1	23315 1	34753 1	00006 1	05012 1	05221 0	C: 00002 0
25,2100	34755 1	54035 0	54036 0	44753 0	00006 1	03012 1	05221 0	C: 01750 1
25,2110	44737 1	70110 0	54110 0	30035 1	04512 0	C: 57777 1	12121 0	34755 1
25,2120	12122 0	34740 0	56110 1	77740 1	26110 0	04564 1	01315 1	02156 1
25,2130	05221 0	C: 00002 0	34740 0	70110 0	10000 0	34735 1	02241 1	34740 0
25,2140	70110 0	10000 0	44736 0	02244 1	44741 0	70110 0	54110 0	74742 0
25,2150	10000 0	12573 0	44752 1	00006 1	03012 1	15261 0	34752 0	00006 1
25,2160	02012 0	10000 0	00002 0	54112 1	54113 0	34752 0	00006 1	05012 1
25,2170	00002 0	34740 0	70110 0	10000 0	34735 1	02241 1	37737 0	02244 1
25,2200	40110 0	74740 1	10000 0	32232 0	62231 0	02241 1	40110 0	74740 1
25,2210	10000 0	34735 1	02241 1	40110 0	74740 1	10000 0	44736 0	02244 1
25,2220	02233 1	44736 0	70110 0	54110 0	34742 1	70110 0	00006 1	13555 0
25,2230	02602 1	C: 67970 1	C: 61615 1	22110 1	34740 0	00006 1	06001 0	54110 0
25,2240	00002 0	55316 0	34755 1	12246 1	55316 0	34753 1	55317 1	00006 1
25,2250	23315 1	12254 1	05221 0	C: 00062 0	40110 0	77707 1	00006 1	12144 0
25,2260	31316 1	00006 1	51317 0	20035 0	54061 1	00006 1	72305 1	54001 1
25,2270	30110 1	74752 1	56061 0	04512 0	C: 77644 1	10061 1	01315 1	11317 1
25,2300	12302 0	56001 0	53110 1	02306 0	12252 1	C: 22715 1	22002 0	34753 1
25,2310	54062 1	50000 1	31107 0	54061 1	04512 0	C: 77177 0	12335 1	30061 0
25,2320	50062 0	56112 0	40000 0	60061 0	64754 0	50062 0	54053 0	10062 1
25,2330	12310 0	35020 0	00006 1	05014 1	00001 0	10061 1	42315 0	12341 1
25,2340	32315 1	54061 1	12320 0	32372 0	70110 0	10000 0	13530 0	00004 0
25,2350	44737 1	70110 0	64737 0	54110 0	34753 1	05203 0	C: 02370 1	C: 52067 1
25,2360	40110 0	74752 1	10000 0	12366 1	05567 0	C: 00510 0	00003 1	14631 0
25,2370	02071 0	13546 1	C: 02001 1	I: 43020 1	C: 01113 0	C: 00271 0	I: 77624 1	C: 47443 1

OCTAL LISTING FOR PARAGRAPH # 145, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

25,2400	I: 45175 0	C: 01102 0	C: 47575 0	I: 77624 1	C: 26133 1	I: 77776 1	00004 0	04523 1
25,2410	C: 01107 0	02414 1	25113 0	02432 0	40104 0	74744 0	00006 1	12456 0
25,2420	02461 0	40104 0	74744 0	00006 1	12456 0	30074 1	74745 1	10000 0
25,2430	02471 1	15155 1	25113 0	40110 0	74742 0	26110 0	74741 0	10000 0
25,2440	12446 1	02156 1	34752 0	05203 0	C: 02573 1	C: 52067 1	31306 0	00006 1
25,2450	12452 1	05155 0	00003 1	25113 0	31113 0	14640 0	34755 1	55306 1
25,2460	12452 1	02233 1	04523 1	C: 01111 1	12471 0	02233 1	34736 1	26110 0
25,2470	12412 0	02233 1	25113 0	12456 0	C: 00074 1	04645 1	55113 1	05516 0
25,2500	C: 00041 1	32474 1	55114 0	00004 0	02540 1	C: 01107 0	12523 0	00003 1
25,2510	00006 1	31110 0	53751 1	06036 1	I: 77624 1	C: 46041 0	C: 01102 0	I: 77414 0
25,2520	C: 00071 1	00004 0	12433 0	02233 1	02540 1	C: 01107 0	12533 1	02233 1
25,2530	34736 1	26110 0	12507 0	02233 1	05567 0	C: 00502 0	06011 1	05155 0
25,2540	50002 0	30000 1	24002 0	00006 1	50000 1	30001 0	52062 1	22002 0
25,2550	34740 0	70110 0	10000 0	14550 1	30061 0	04512 0	C: 66161 1	00001 0
25,2560	30062 0	00006 1	62570 1	64562 1	04512 0	C: 64420 0	00001 0	04560 0
25,2570	62572 0	12564 0	C: 03512 1	40110 0	74736 0	10000 0	02602 1	02171 1
25,2600	05221 0	C: 00062 0	34741 1	70110 0	10000 0	12623 0	10110 0	12612 1
25,2610	12612 1	12630 1	40110 0	74742 0	10000 0	13546 1	11114 0	12627 1
25,2620	42635 1	00006 1	03012 1	44742 0	70110 0	54110 0	13562 1	55114 0
25,2630	37713 0	05105 0	C: 02636 0	C: 52067 1	12600 1	C: 20002 1	00006 1	30036 1
25,2640	53110 1	06036 1	I: 77201 1	C: 00001 0	C: 01102 0	I: 74214 0	C: 00311 1	C: 52661 1
25,2650	C: 01767 0	I: 63372 1	C: 01761 0	I: 53361 0	C: 13072 0	I: 45056 0	C: 47443 1	I: 77624 1
25,2660	C: 47575 0	C: 14041 1	C: 01111 1	I: 41434 1	C: 21455 0	I: 65356 1	I: 41546 0	I: 65205 0
25,2670	C: 00041 1	C: 00045 0	I: 44205 0	C: 00001 0	I: 77626 0	C: 76666 0	I: 47135 0	C: 01110 0
25,2700	C: 21465 0	I: 71406 0	I: 73525 1	I: 41206 0	C: 00003 1	I: 65352 0	C: 00005 1	I: 41325 0
25,2710	C: 00007 0	C: 00001 0	I: 55552 0	I: 77441 0	C: 00041 1	40154 0	00006 1	73066 0
25,2720	55107 1	40110 0	74740 1	00006 1	12727 0	31110 0	12730 0	41110 1
25,2730	00006 1	73066 0	55110 1	06036 1	I: 41345 0	C: 00003 1	C: 00005 1	I: 65352 0
25,2740	I: 65276 1	C: 00001 0	I: 72405 0	C: 00005 1	I: 43066 0	C: 00311 1	C: 52751 0	I: 77624 1
25,2750	C: 47577 1	I: 77441 0	C: 01102 0	00006 1	43070 1	20155 1	10154 0	34755 1
25,2760	12762 1	34753 1	54155 1	10110 0	12767 1	12767 1	13017 0	10155 1
25,2770	13000 0	40074 0	74747 0	10000 0	13005 0	34736 1	00006 1	05012 1

OCTAL LISTING FOR PARAGRAPH # 146, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

25,3000	34750 1	00006 1	02033 0	10000 0	13017 0	44742 0	70110 0	00004 0
25,3010	54110 0	05516 0	C: 00041 1	44752 1	00006 1	03012 1	15155 1	40074 0
25,3020	74745 1	10000 0	03041 1	06036 1	I: 74375 0	C: 01102 0	C: 01767 0	I: 41572 1
25,3030	I: 74375 0	C: 01761 0	C: 13072 0	I: 53362 0	I: 77656 1	C: 15102 0	C: 00045 0	C: 01767 0
25,3040	I: 77776 1	00004 0	40110 0	74741 0	10000 0	02306 0	30076 0	74740 1
25,3050	00006 1	15155 1	11454 1	03064 0	00004 0	06027 1	C: 52602 1	00003 1
25,3060	10067 1	05122 0	04616 1	C: 50752 1	55454 1	05155 0	C: 21122 0	C: 07777 1
25,3070	C: 33005 1	C: 00310 0	C: 00000 1	03113 1	C: 00017 1	03114 0	C: 00016 0	03114 0
25,3100	C: 00015 0	03114 0	C: 00014 1	03113 1	C: 00012 1	03113 1	C: 00011 1	55105 0
25,3110	34756 1	51105 1	13075 1	34753 1	00004 0	55105 0	00006 1	74751 1
25,3120	53106 0	10000 0	55111 0	64753 1	55100 0	33147 0	00006 1	02033 0
25,3130	55113 1	43074 0	00006 1	03013 0	50002 0	30000 1	00006 1	05013 0
25,3140	00006 1	30325 0	21106 0	34755 1	54001 1	53102 1	12366 1	C: 00230 0
25,3150	00006 1	04007 1	54016 1	00006 1	22012 1	34757 0	00006 1	02013 1
25,3160	55335 1	00006 1	13166 1	30046 0	51335 0	55332 0	11100 0	13211 1
25,3170	13174 1	05567 0	C: 00520 0	05270 1	30107 1	74735 0	00006 1	13206 1
25,3200	40077 0	74743 1	00006 1	13206 1	05567 0	C: 00521 1	44753 0	55100 0
25,3210	03560 1	55100 0	34751 0	00006 1	02013 1	00006 1	13276 0	03364 0
25,3220	30110 1	00006 1	06033 1	74746 1	00006 1	13231 0	05567 0	C: 00522 1
25,3230	03206 0	36244 0	00006 1	06013 0	76244 1	00006 1	13272 1	34733 1
25,3240	70046 1	62000 0	54001 1	30046 0	60000 1	74753 0	52064 1	34744 1
25,3250	03442 0	11111 0	03262 1	44753 0	55100 0	40061 1	70110 0	54110 0
25,3260	03616 0	03553 1	55111 0	11100 0	13266 1	13461 0	34750 1	00006 1
25,3270	05013 0	05270 1	34747 1	54061 1	34743 0	03320 0	34741 1	70110 0
25,3300	10000 0	13206 1	40110 0	74745 1	10000 0	13206 1	34750 1	54061 1
25,3310	34753 1	00006 1	02013 1	54002 1	10000 0	13317 0	13331 1	34751 0
25,3320	54001 1	00006 1	02033 0	56001 0	70110 0	00006 1	06001 0	10000 0
25,3330	03350 1	34733 1	70046 1	54064 1	30046 0	60000 1	74753 0	54063 0
25,3340	10002 1	13402 0	00006 1	42002 0	20064 1	30061 0	03443 1	03253 0
25,3350	22110 1	64753 1	00006 1	06001 0	54110 0	33147 0	00006 1	02033 0
25,3360	55113 1	05504 0	C: 00120 1	13206 1	40101 0	74741 0	10000 0	00002 0
25,3370	43401 0	70110 0	54001 1	33401 1	00006 1	02033 0	60001 0	54110 0

OCTAL LISTING FOR PARAGRAPH # 147, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

25,3400	03553 1	C: 00220 1	10001 1	13405 1	13345 1	31335 0	74751 1	10000 0
25,3410	13417 1	52064 1	20001 1	20001 1	20001 1	52064 1	13345 1	10063 0
25,3420	13431 0	40064 1	63441 0	00006 1	63431 1	40107 0	74751 1	26107 0
25,3430	13434 0	44751 1	70107 0	54107 0	00006 1	30064 0	20001 1	20001 1

25,3440	13344 0	C: 00714 0	54061 1	00006 1	02033 0	54001 1	40061 1	71113 1
25,3450	60001 0	57113 0	70061 1	60001 0	10000 0	03263 0	52064 1	21102 1
25,3460	00002 0	40061 1	70110 0	60061 0	54110 0	52064 1	53102 1	03616 0
25,3470	13174 1	00004 0	40110 0	74746 1	26110 0	34745 0	00006 1	02033 0

25,3500	00006	1	13530	0	34737	0	00006	1	05012	1	33545	0	05203	0	C: 03543	0
25,3510	C: 52067	1	02366	0	55100	0	05221	0	C: 00144	0	34745	0	00006	1	02033	0
25,3520	00006	1	13535	0	11100	0	13512	0	44737	1	00006	1	03012	1	13562	1
25,3530	34753	1	05203	0	C: 03555	1	C: 05207	1	02366	0	35000	1	05224	0	44737	1

25,3540	00006 1	03012 1	13555 0	34317 0	13512 0	C: 01130 1	34745 0	70110 0
25,3550	10000 0	13555 0	13562 1	44755 0	54734 0	34752 0	04635 0	C: 17640 0
25,3560	44755 0	54734 0	34752 0	04635 0	C: 17635 1	I: 45345 1	C: 01767 0	C: 13600 0
25,3570	I: 77644 1	C: 53574 1	I: 43535 0	C: 06424 0	I: 43535 0	C: 13577 0	C: 00001 0	C: 26467 0

25,3600	C: 00000	1	34735	1	02241	1	44741	0	70110	0	54110	0	15261	0	34753	1
25,3610	71303	1	10000	0	14707	1	03630	1	03625	0	14707	1	34753	1	71303	1
25,3620	10000	0	00002	0	44747	0	60061	0	10000	0	44753	0	13664	1	14570	0
25,3630	54065	0	34747	1	54001	1	30107	1	74751	1	10000	0	13656	0	34747	1

25,3640	70110 0	10000 0	13656 0	30107 1	50065 1	74753 0	10000 0	14570 0
25,3650	00006 1	22066 1	04602 1	00006 1	22066 1	14570 0	50065 1	44753 0
25,3660	70107 0	54107 0	30001 0	13650 0	54065 0	34751 0	54001 1	34744 1
25,3670	13640 1	C: 03671 1	C: 03672 1	CKSM 71560 1	а	а	а	а

25,3700	৯	৯	৯	৯	৯	৯	৯
25,3710	৯	৯	৯	৯	৯	৯	৯
25,3720	৯	৯	৯	৯	৯	৯	৯
25,3730	৯	৯	৯	৯	৯	৯	৯

25,3740	৯	৯	৯	৯	৯	৯	৯	৯
25,3750	৯	৯	৯	৯	৯	৯	৯	৯
25,3760	৯	৯	৯	৯	৯	৯	৯	৯
25,3770	৯	৯	৯	৯	৯	৯	৯	৯

OCTAL LISTING FOR PARAGRAPH # 150, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

26,2000	04616 1	C: 11175 1	36244 0	55051 0	34753 1	55052 0	32075 1	04616 1
26,2010	C: 20351 1	05472 0	02014 0	02006 0	06036 1	I: 43234 0	C: 21462 1	C: 14100 0
26,2020	C: 02211 1	C: 34041 0	C: 27066 1	I: 77775 1	C: 00001 0	C: 16213 0	C: 02211 1	C: 34041 0
26,2030	C: 27100 0	I: 52375 1	C: 02213 0	C: 00001 0	I: 47121 0	C: 01734 0	C: 21700 0	C: 03767 1
26,2040	I: 77776 1	41052 0	64753 1	00006 1	12071 1	06036 1	I: 77775 1	C: 06422 0
26,2050	C: 37761 0	C: 56016 0	C: 00322 1	I: 77776 1	04616 1	C: 54244 1	32076 1	04616 1
26,2060	C: 20351 1	05472 0	02064 1	02014 0	05516 0	C: 00124 0	04616 1	C: 54101 0
26,2070	15472 1	06036 1	I: 52755 0	C: 06416 1	C: 54050 0	C: 01014 0	C: 01422 1	C: 00000 1
26,2100	C: 13560 0	04645 1	55164 1	34746 0	70101 0	10000 0	12114 0	06036 1
26,2110	I: 77624 1	C: 56016 0	C: 00322 1	I: 77776 1	04616 1	C: 54244 1	32232 0	04616 1
26,2120	C: 20563 0	02220 0	02126 0	02153 1	02157 0	05155 0	34746 0	70101 0
26,2130	10000 0	12137 1	06036 1	I: 77624 1	C: 56016 0	C: 00322 1	I: 77776 1	04616 1
26,2140	C: 54244 1	02233 1	10000 0	12116 1	32232 0	04616 1	C: 20327 0	02157 0
26,2150	04616 1	C: 17723 1	12116 1	05516 0	C: 00124 0	31164 0	04640 1	40100 1
26,2160	74740 1	10000 0	00002 0	30002 0	54156 1	46244 1	60133 0	55055 1
26,2170	05353 1	C: 00132 1	34745 0	05464 1	00156 0	37713 0	05146 1	34747 1
26,2200	70075 1	10000 0	12215 1	34745 0	70074 0	10000 0	02212 1	05353 1
26,2210	C: 40112 1	05155 0	05353 1	C: 40072 0	05155 0	05504 0	C: 00077 1	01055 0
26,2220	31011 0	00006 1	12153 0	30100 0	74740 1	00006 1	16001 1	06022 1
26,2230	C: 20100 1	C: 00203 0	C: 01422 1	00006 1	00030 1	74742 0	10000 0	00002 0
26,2240	00006 1	00031 0	74736 0	00002 0	04645 1	55342 1	30321 1	54772 1
26,2250	30322 1	54766 1	30323 0	54770 0	06036 1	I: 45001 1	C: 00001 0	C: 47447 0
26,2260	I: 41345 0	C: 00743 1	C: 00747 0	I: 57552 1	I: 65336 1	C: 00741 0	C: 14023 0	C: 00747 0
26,2270	I: 72405 0	C: 00751 1	C: 34021 0	C: 26510 1	I: 41325 0	C: 00741 0	C: 00743 1	I: 41512 1
26,2300	I: 65205 0	C: 00745 1	I: 65205 0	C: 00737 1	C: 00751 1	I: 72405 0	C: 00745 1	I: 45425 0
26,2310	C: 63756 0	C: 00737 1	I: 72405 0	C: 00751 1	I: 45415 0	C: 43754 0	C: 26510 1	I: 55525 0
26,2320	I: 77634 0	C: 21524 1	C: 02351 1	I: 77776 1	31342 0	04640 1	I: 47375 0	C: 03253 0
26,2330	C: 06422 0	I: 47256 0	C: 03761 1	I: 40056 0	C: 54350 0	C: 17267 1	C: 00045 0	I: 50025 0
26,2340	C: 14367 0	C: 54350 0	I: 77775 1	C: 03267 1	C: 17267 1	C: 06422 0	I: 77650 1	C: 56050 1
26,2350	I: 52175 0	C: 06422 0	C: 54344 0	C: 15555 0	C: 35172 0	C: 14113 1	C: 36326 0	C: 07701 0
26,2360	C: 35703 0	C: 04343 1	C: 21616 0	C: 03070 0	C: 34344 0	C: 00000 1	C: 00001 0	C: 00000 1
26,2370	I: 77624 1	C: 11165 0	I: 43014 0	C: 04307 1	C: 55143 1	C: 02466 1	I: 45014 0	C: 00747 0

OCTAL LISTING FOR PARAGRAPH # 151, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

26,2400	C: 54432 0	C: 27412 0	I: 45014 0	C: 01674 0	C: 26644 0	I: 77624 1	C: 55205 0	I: 77624 1
26,2410	C: 11165 0	I: 77624 1	C: 27412 0	I: 43014 0	C: 01676 1	C: 02756 1	C: 54422 1	I: 43014 0
26,2420	C: 01476 0	C: 01475 0	I: 43014 0	C: 01474 1	C: 01673 1	I: 45014 0	C: 01472 1	C: 55205 0
26,2430	I: 77650 1	C: 54462 0	I: 77624 1	C: 27412 0	I: 45014 0	C: 01474 1	C: 26644 0	I: 77624 1
26,2440	C: 55205 0	I: 77624 1	C: 11165 0	I: 77624 1	C: 27412 0	I: 43014 0	C: 01676 1	C: 02756 1
26,2450	C: 54454 0	I: 43014 0	C: 01476 0	C: 01475 0	I: 43014 0	C: 01673 1	C: 01674 0	I: 45014 0
26,2460	C: 01472 1	C: 55205 0	I: 45014 0	C: 02716 0	C: 54474 1	C: 55214 0	I: 77776 1	34755 1
26,2470	55743 1	04616 1	C: 46105 1	06036 1	I: 43174 1	C: 00000 1	C: 04304 1	C: 54502 1
26,2500	I: 77714 0	C: 00002 0	I: 45134 0	C: 03716 1	C: 11165 0	I: 54335 0	C: 01775 0	C: 20635 0
26,2510	I: 77634 0	C: 21537 0	C: 00025 0	I: 77624 1	C: 55276 1	I: 57414 1	C: 00707 1	C: 54520 1
26,2520	C: 27523 0	C: 06424 0	C: 03531 0	C: 17537 0	C: 00045 0	I: 44257 1	C: 56174 0	C: 03755 0
26,2530	I: 77657 0	C: 56574 1	C: 17545 0	C: 00045 0	I: 63501 0	C: 00047 1	I: 53605 1	C: 01771 1
26,2540	C: 20577 0	I: 53657 0	C: 20601 1	C: 57176 0	I: 47057 0	C: 57176 0	C: 21537 0	C: 02707 0
26,2550	I: 76276 0	C: 00025 0	I: 72240 1	C: 54556 0	C: 00025 0	C: 02707 0	I: 77624 1	C: 55344 1
26,2560	I: 77624 1	C: 11165 0	I: 77624 1	C: 55276 1	I: 53725 1	C: 00045 0	C: 57202 0	C: 24045 0
26,2570	I: 57414 1	C: 00707 1	C: 54573 1	I: 77761 1	C: 00045 0	C: 27531 0	C: 01653 0	I: 53257 1
26,2600	C: 57170 0	C: 01667 1	I: 53715 1	C: 01601 1	C: 57170 0	I: 52255 1	C: 01615 1	I: 50315 0
26,2610	C: 00001 0	C: 00007 0	I: 53606 1	C: 56174 0	I: 57316 1	C: 01773 0	C: 02707 0	I: 54335 0
26,2620	C: 01776 0	C: 20621 0	C: 00031 0	I: 50025 0	C: 02707 0	C: 54631 1	I: 77745 1	C: 00031 0
26,2630	C: 02707 0	I: 60545 0	I: 53725 1	C: 03747 0	C: 56577 1	I: 77625 0	I: 77675 0	C: 00045 0
26,2640	C: 27545 0	C: 00001 0	I: 47235 0	I: 57414 1	C: 00707 1	C: 54646 1	I: 77657 0	C: 57200 1
26,2650	C: 27523 0	C: 06424 0	C: 00025 0	C: 27537 0	C: 03523 0	I: 60246 1	C: 00025 0	I: 51575 1
26,2660	C: 03531 0	I: 71301 0	C: 00027 1	C: 00027 1	I: 50025 0	C: 00025 0	C: 54672 0	I: 52150 1
26,2670	C: 00026 0	C: 54674 0	I: 77750 0	C: 00024 1	I: 53775 1	C: 03523 0	C: 20201 0	C: 27523 0
26,2700	C: 03531 0	I: 77657 0	C: 20201 0	C: 17531 0	C: 03545 0	I: 77657 0	C: 20201 0	C: 03545 0
26,2710	I: 53745 1	C: 00045 0	C: 20200 1	I: 41316 0	C: 02707 0	I: 47012 1	C: 21537 0	C: 36707 1
26,2720	C: 55344 1	I: 77624 1	C: 11165 0	I: 77414 0	C: 04307 1	C: 55141 0	33275 1	54006 0
26,2730	31455 1	54766 1	31456 1	54770 0	31457 0	54772 1	06036 1	I: 45175 0
26,2740	C: 06422 0	C: 47570 0	I: 76505 0	C: 01734 0	C: 27675 0	C: 06420 1	I: 77624 1	C: 47577 1
26,2750	I: 76505 0	C: 01734 0	C: 27703 0	C: 06416 1	I: 77624 1	C: 47577 1	I: 76505 0	C: 01734 0
26,2760	C: 37711 1	C: 55324 1	I: 77624 1	C: 11165 0	I: 50375 0	C: 03722 0	C: 03675 0	I: 77752 1
26,2770	C: 24023 0	C: 03722 0	I: 72441 0	C: 03711 0	C: 34021 0	C: 26510 1	I: 41221 0	C: 03734 1

OCTAL LISTING FOR PARAGRAPH # 152, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

26,3000	C: 15404 0	I: 41472 0	I: 52545 1	C: 01701 0	I: 44257 1	C: 56176 1	I: 53605 1	C: 03720 1
26,3010	C: 21601 0	C: 27545 0	C: 03722 0	I: 76435 1	C: 03703 0	I: 77656 1	I: 57414 1	C: 00747 0
26,3020	C: 55021 1	C: 27523 0	C: 06424 0	C: 03531 0	C: 17537 0	C: 03720 1	I: 53657 0	C: 20577 0
26,3030	C: 56176 1	C: 03537 0	I: 77735 0	C: 02011 0	I: 41215 1	C: 15401 0	C: 03720 1	I: 41257 1
26,3040	C: 21601 0	C: 03720 1	I: 53657 0	C: 20577 0	C: 57176 0	I: 47057 0	C: 57176 0	C: 21537 0
26,3050	C: 36707 1	C: 55344 1	I: 77624 1	C: 11165 0	I: 77624 1	C: 55324 1	I: 77624 1	C: 11165 0
26,3060	I: 47375 0	C: 03722 0	C: 03703 0	I: 47372 1	C: 03722 0	I: 77772 0	I: 57414 1	C: 00747 0
26,3070	C: 55071 1	C: 27523 0	C: 06424 0	C: 03531 0	C: 17537 0	C: 03720 1	I: 53657 0	C: 20577 0
26,3100	C: 56176 1	C: 03541 1	I: 77735 0	C: 02012 0	I: 41215 1	C: 15401 0	C: 03720 1	I: 41257 1
26,3110	C: 21601 0	C: 03720 1	I: 53657 0	C: 20577 0	C: 57176 0	I: 47057 0	C: 57176 0	C: 21537 0
26,3120	C: 16707 0	C: 03730 0	I: 44336 1	C: 03732 1	I: 56405 0	C: 15404 0	I: 52525 1	C: 01703 1
26,3130	I: 44257 1	C: 56176 1	I: 53605 1	C: 03720 1	C: 21601 0	C: 37545 1	C: 55344 1	I: 77624 1
26,3140	C: 11165 0	I: 77650 1	C: 50614 1	I: 77624 1	C: 27412 0	I: 43014 0	C: 01472 1	C: 01674 0
26,3150	I: 77624 1	C: 55205 0	I: 77624 1	C: 11165 0	I: 45014 0	C: 02666 0	C: 27412 0	I: 46145 0
26,3160	C: 03461 1	C: 55174 0	I: 43014 0	C: 01675 1	C: 01476 0	I: 43014 0	C: 01474 1	C: 01673 1
26,3170	I: 77624 1	C: 55205 0	I: 77650 1	C: 54474 1	I: 77624 1	C: 55214 0	I: 45014 0	C: 01474 1
26,3200	C: 26644 0	I: 77624 1	C: 55205 0	I: 77650 1	C: 54474 1	I: 71220 1	C: 03673 0	C: 03753 0
26,3210	C: 34041 0	C: 27134 1	I: 77650 1	C: 03673 0	I: 77776 1	33274 0	54006 0	33402 1
26,3220	55257 1	34755 1	51257 0	55400 0	11257 1	03220 1	33275 1	54006 0
26,3230	06036 1	I: 67214 1	C: 04307 1	C: 55237 1	C: 02001 1	I: 77650 1	C: 55241 0	I: 77735 0
26,3240	C: 02007 1	I: 77661 0	C: 20606 0	C: 02401 0	C: 02411 1	C: 02421 1	I: 67214 1	C: 04307 1
26,3250	C: 55254 1	C: 02002 1	I: 77650 1	C: 55256 0	I: 77735 0	C: 02010 1	C: 02511 0	C: 02521 0
26,3260	C: 02531 1	I: 77735 0	C: 02003 0	C: 02621 0	I: 77735 0	C: 02004 1	C: 02631 1	I: 66214 0
26,3270	C: 02476 0	C: 03461 1	C: 00000 1	I: 77616 0	C: 54065 0	C: 54067 1	I: 77201 1	C: 00001 0
26,3300	C: 01645 1	I: 77754 1	C: 03716 1	I: 53257 1	C: 57165 1	C: 01661 1	I: 53715 1	C: 01573 1
26,3310	C: 57165 1	I: 52255 1	C: 01607 1	I: 41434 1	C: 21676 0	C: 17722 0	C: 00045 0	I: 77657 0
26,3320	C: 20201 0	C: 24045 1	C: 03722 0	I: 77616 0	I: 45020 1	C: 03673 0	C: 55276 1	I: 50276 1
26,3330	C: 03703 0	I: 41572 1	C: 03730 0	I: 44316 0	C: 06414 0	I: 41366 1	C: 00045 0	I: 60352 0
26,3340	C: 00047 1	C: 03720 1	I: 77650 1	C: 03673 0	I: 45020 1	C: 03673 0	C: 46433 1	I: 51575 1
26,3350	C: 02673 1	I: 53754 1	C: 03716 1	C: 56174 0	C: 24317 1	C: 02665 0	I: 53646 0	C: 56174 0
26,3360	C: 00315 0	I: 54335 0	C: 02005 0	C: 20613 1	I: 50025 0	C: 00315 0	C: 50620 0	I: 45335 0
26,3370	C: 02006 0	C: 00317 1	I: 77640 0	C: 50620 0	I: 77624 1	C: 46645 1	I: 77650 1	C: 03673 0

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

26,3740	৯	৯	৯	৯	৯	৯	৯	৯
26,3750	৯	৯	৯	৯	৯	৯	৯	৯
26,3760	৯	৯	৯	৯	৯	৯	৯	৯
26,3770	৯	৯	৯	৯	৯	৯	৯	৯

OCTAL LISTING FOR PARAGRAPH # 154, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALIO WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

27,2000	C: 00000 1	C: 07622 0	C: 00000 1	C: 00762 1	C: 00030 1	C: 35104 1	C: 00016 0	C: 36237 1
27,2010	C: 35711 0	C: 35663 1	C: 55340 0	C: 61710 0	C: 24775 1	C: 30424 0	I: 40020 1	C: 03323 0
27,2020	C: 56021 1	I: 47164 1	C: 03244 0	C: 44403 0	C: 34032 1	C: 44410 1	I: 61375 1	C: 03767 1
27,2030	C: 03245 1	I: 77656 1	C: 00035 1	I: 53435 0	C: 03761 1	I: 57400 1	C: 56146 1	C: 17267 1
27,2040	C: 00045 0	I: 50025 0	C: 14367 0	C: 56146 1	I: 50375 0	C: 03761 1	C: 00035 1	I: 65552 0
27,2050	I: 77624 1	C: 44527 1	I: 75160 1	C: 03244 0	C: 02234 0	I: 77624 1	C: 44312 1	I: 51545 1
27,2060	C: 00007 0	I: 50025 0	C: 14354 0	C: 56136 0	I: 51545 1	C: 03761 1	I: 51025 1	C: 14356 1
27,2070	C: 56136 0	I: 77775 1	I: 77626 0	C: 50516 0	I: 77626 0	C: 50524 1	I: 77626 0	C: 50532 0
27,2100	C: 03253 0	I: 57444 1	C: 56103 0	I: 50035 1	C: 03761 1	C: 56112 0	I: 57575 1	C: 03761 1
27,2110	C: 37267 0	C: 56115 1	I: 77775 1	C: 03761 1	C: 03267 1	I: 51545 1	C: 03761 1	I: 51025 1
27,2120	C: 14360 1	C: 56125 1	I: 52145 0	C: 14364 0	C: 56127 0	I: 77745 1	C: 14362 0	I: 77624 1
27,2130	C: 44527 1	I: 75160 1	C: 03244 0	C: 02234 0	I: 77624 1	C: 44312 1	I: 45160 1	C: 00000 1
27,2140	C: 44654 0	I: 40234 0	C: 21524 1	C: 00001 0	I: 77650 1	C: 03323 0	I: 50375 0	C: 00035 1
27,2150	C: 03761 1	I: 72240 1	C: 54326 1	C: 00032 0	I: 77650 1	C: 03323 0	34755 1	55122 0
27,2160	06036 1	I: 70744 1	C: 01122 1	C: 62370 1	C: 03456 0	I: 77743 1	C: 62367 1	C: 03457 1
27,2170	I: 77743 1	C: 62365 0	C: 03753 0	I: 77743 1	C: 62363 0	C: 03755 0	I: 77743 1	C: 62361 1
27,2200	C: 03747 0	I: 77743 1	C: 62357 1	C: 03734 1	I: 77743 1	C: 62355 0	C: 03732 1	I: 77624 1
27,2210	C: 54370 1	I: 77776 1	31122 1	62222 1	55122 0	11123 1	02220 0	30000 1
27,2220	55123 1	02160 1	C: 00015 0	22062 0	24002 0	00006 1	22061 0	54063 0
27,2230	75012 0	64741 1	54064 1	45012 0	70063 0	54063 0	22007 0	50001 0
27,2240	41410 1	60064 0	00006 1	12255 0	44747 0	60001 0	00006 1	12253 0
27,2250	24001 0	24001 0	12237 1	52062 1	52006 0	45012 0	50001 0	71411 0
27,2260	00006 1	60063 1	00006 1	12265 0	12244 0	34353 0	50001 0	55410 1
27,2270	12253 0	I: 44014 1	C: 03264 1	C: 03630 1	I: 77614 1	C: 01347 0	C: 56363 1	I: 77201 1
27,2300	C: 00001 0	C: 03646 0	C: 02335 0	I: 53435 0	C: 03640 0	C: 27677 1	C: 03640 0	C: 02327 0
27,2310	I: 65236 0	C: 00045 0	I: 56205 0	C: 16435 1	I: 41205 0	C: 03662 0	C: 01245 0	I: 77671 1
27,2320	C: 03734 1	C: 24017 1	C: 03654 0	I: 74241 0	C: 03677 1	C: 03677 1	I: 41552 0	I: 65245 1
27,2330	C: 03654 0	C: 00017 1	I: 63356 1	C: 00007 0	I: 53435 0	C: 03677 1	I: 45561 1	C: 50072 1
27,2340	I: 65256 0	C: 00017 1	I: 74346 0	I: 74255 0	C: 03705 0	C: 00045 0	I: 53352 0	I: 77626 0
27,2350	C: 74072 1	I: 77656 1	C: 27677 1	C: 03705 0	I: 45006 0	C: 20021 0	I: 77775 0	C: 06424 0
27,2360	C: 03671 1	I: 77650 1	C: 03630 1	I: 77745 1	C: 03440 1	C: 00041 1	I: 77621 1	C: 03627 1
27,2370	C: 37450 1	C: 27057 0	I: 40375 1	C: 00001 0	C: 00001 0	C: 03640 0	C: 26327 0	C: 00007 0

OCTAL LISTING FOR PARAGRAPH # 155, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

27,2400	C: 03646 0	C: 02335 0	I: 65345 0	C: 06424 0	C: 16431 0	I: 43214 1	C: 03745 1	C: 56411 0
27,2410	C: 16433 1	I: 66006 1	C: 03375 0	I: 45134 0	C: 03376 0	C: 22000 1	I: 41575 0	C: 03366 1
27,2420	C: 03705 0	I: 77656 1	C: 17677 1	C: 00045 0	C: 37662 1	C: 20021 0	I: 77650 1	C: 03630 1
27,2430	C: 00707 1	C: 03434 1	C: 03070 0	C: 34344 0	C: 00024 1	C: 13714 1	I: 77775 1	C: 03677 1
27,2440	I: 76521 0	C: 01734 0	C: 27767 1	C: 06422 0	C: 27761 1	C: 03677 1	C: 03605 1	I: 53435 0
27,2450	C: 03640 0	I: 46125 0	C: 00045 0	C: 56464 1	I: 45575 1	C: 74164 1	I: 76435 1	C: 03605 1
27,2460	I: 77676 0	C: 03621 1	I: 43414 1	C: 01073 1	I: 47375 0	C: 03605 1	C: 03646 0	I: 41456 0
27,2470	I: 77650 1	C: 56454 1	I: 43175 0	C: 03705 0	C: 01307 1	C: 56502 0	I: 53214 0	C: 03344 1
27,2500	C: 56502 0	C: 03671 1	I: 77651 0	C: 03525 0	C: 03714 0	I: 76521 0	C: 01734 0	C: 03252 1
27,2510	I: 77214 0	C: 03304 0	C: 56515 0	C: 06424 0	C: 03671 1	I: 51575 1	C: 03714 0	C: 03662 0
27,2520	I: 77201 1	C: 00001 0	C: 03714 0	C: 27705 0	C: 03525 0	I: 57414 1	C: 01344 0	C: 00052 0
27,2530	I: 77656 1	I: 41441 0	C: 03714 0	I: 56244 0	C: 56562 0	C: 03742 0	I: 41215 1	C: 06422 0
27,2540	I: 56261 1	C: 20613 1	C: 00045 0	I: 43205 1	C: 16571 0	C: 03740 1	C: 03515 0	I: 77615 0
27,2550	C: 01235 1	C: 17440 1	C: 03515 0	I: 51025 1	C: 16573 1	C: 61062 1	I: 43014 0	C: 01066 0
27,2560	C: 01224 1	C: 00052 0	I: 77776 1	05567 0	C: 01407 0	06036 1	I: 77650 1	C: 61062 1
27,2570	C: 77715 1	C: 77777 0	C: 00000 1	C: 00620 0	06036 1	I: 43001 1	C: 00001 0	C: 01266 1
27,2600	I: 51575 1	C: 03705 0	I: 41325 0	C: 16742 1	C: 34017 0	I: 62471 1	C: 01245 0	I: 41421 0
27,2610	I: 43014 0	C: 05342 1	C: 56662 0	C: 02463 1	I: 56345 0	C: 16001 1	C: 01245 0	I: 50021 1
27,2620	C: 00001 0	C: 56644 1	I: 41325 0	C: 03736 0	C: 16734 0	I: 65221 0	C: 01245 0	C: 03734 1
27,2630	I: 60405 0	C: 16736 1	I: 41471 0	I: 51021 0	C: 00003 1	C: 56662 0	I: 55345 0	I: 43205 1
27,2640	C: 16736 1	C: 16732 0	I: 77650 1	C: 56652 0	I: 41345 0	C: 01245 0	I: 41542 1	I: 56215 1
27,2650	C: 16003 0	C: 16005 0	I: 77414 0	C: 01066 0	07256 1	30154 1	56001 0	34755 1
27,2660	53515 0	12704 1	I: 41345 0	C: 00001 0	C: 01245 0	I: 43006 0	C: 05302 0	C: 56725 1
27,2670	I: 43071 0	C: 16007 1	C: 02663 0	I: 41400 0	C: 56707 1	I: 51025 1	C: 16740 0	C: 56715 1
27,2700	I: 52015 1	C: 16740 0	C: 56652 0	I: 77776 1	05353 1	C: 00003 1	05155 0	I: 40545 1
27,2710	I: 77671 1	C: 16011 0	C: 03515 0	I: 77776 1	12704 1	I: 51025 1	C: 16744 1	C: 56722 0
27,2720	I: 77614 1	C: 02463 1	I: 77745 1	I: 77776 1	12654 0	I: 62471 1	C: 34007 1	I: 77650 1
27,2730	C: 56723 1	C: 00144 0	C: 00000 1	C: 01274 1	C: 00000 1	C: 00764 1	C: 00000 1	C: 01130 1
27,2740	C: 00000 1	C: 00053 1	C: 30000 1	C: 21304 0	C: 00000 1	06036 1	I: 77201 1	C: 00001 0
27,2750	C: 01221 1	C: 26327 0	C: 01227 1	C: 16335 0	C: 01235 1	C: 03730 0	I: 77621 1	C: 03627 1
27,2760	C: 03450 0	I: 71214 0	C: 01072 0	C: 06424 0	I: 77725 1	C: 16431 0	I: 43214 1	C: 03745 1
27,2770	C: 56772 0	C: 16433 1	I: 77606 1	I: 45014 0	C: 03044 1	C: 57102 0	C: 22002 0	I: 52375 1

OCTAL LISTING FOR PARAGRAPH # 156, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

27,3000	C: 02343 1	C: 03722 0	I: 45325 1	C: 03730 0	C: 03732 1	I: 74265 0	C: 17101 1	I: 76451 0
27,3010	C: 01237 0	C: 03671 1	I: 53135 0	C: 03377 1	C: 57020 1	I: 52175 0	C: 03366 1	C: 57034 1
27,3020	I: 53575 0	C: 01221 1	I: 45345 1	C: 01235 1	C: 03510 0	I: 56205 0	C: 16013 1	C: 00043 0
27,3030	I: 53361 0	C: 03517 1	C: 03366 1	C: 03366 1	I: 77646 0	C: 17662 0	C: 03730 0	C: 03732 1
27,3040	I: 77776 1	05353 1	C: 05022 1	C: 14000 1	06036 1	I: 77775 1	C: 02343 1	C: 03722 0
27,3050	I: 77776 1	05353 1	C: 04022 0	06036 1	I: 77214 0	C: 01305 0	C: 57064 1	C: 03366 1
27,3060	C: 03705 0	I: 52014 0	C: 01065 0	C: 57074 0	I: 53375 0	C: 03366 1	C: 03671 1	I: 77651 0
27,3070	C: 03525 0	C: 03705 0	I: 77646 0	C: 03662 0	I: 77776 1	05353 1	C: 00002 0	05155 0
27,3100	C: 00000 1	C: 00144 0	I: 77624 1	C: 22002 0	I: 77650 1	C: 57012 0	05516 0	C: 00137 1
27,3110	45017 0	00006 1	03012 1	35014 1	00006 1	05012 1	05221 0	C: 13560 0
27,3120	45014 0	00006 1	03012 1	35017 1	00006 1	05012 1	31402 0	05173 1
27,3130	C: 03147 0	31401 0	05224 0	44740 1	00006 1	03012 1	30102 1	74742 0
27,3140	00006 1	13153 1	34737 0	05072 1	C: 02320 1	C: 02067 1	05261 1	44742 0
27,3150	00006 1	03012 1	13136 1	05504 0	C: 00137 1	05261 1	I: 76521 0	C: 01734 0
27,3160	I: 77650 1	C: 47552 0	I: 77614 1	C: 06466 0	I: 74345 0	C: 02361 1	C: 02277 1	I: 74325 0
27,3170	C: 02365 0	C: 02305 0	I: 53455 0	I: 50206 0	C: 02154 0	I: 45246 0	C: 21052 0	I: 71244 0
27,3200	C: 57205 1	C: 02313 1	I: 51025 1	C: 21034 0	C: 61002 1	I: 45575 1	C: 50517 1	C: 03535 1
27,3210	C: 37252 0	C: 60730 0	I: 77634 0	C: 21462 1	I: 43225 0	C: 01235 1	C: 03452 1	I: 77476 1
27,3220	07256 1	35016 0	54003 0	00004 0	10155 1	13230 1	13230 1	34755 1
27,3230	64753 1	55644 1	05173 1	C: 03245 1	05353 1	C: 47014 1	C: 76133 1	C: 03245 1
27,3240	C: 56067 0	06036 1	I: 52014 0	C: 03470 1	C: 60457 1	04674 0	C: 75551 1	35027 1
27,3250	05105 0	C: 03261 1	C: 56067 0	05353 1	C: 07024 0	C: 17000 1	C: 03261 1	C: 56067 0
27,3260	15261 0	05504 0	C: 00214 0	33330 1	04616 1	C: 20351 1	13306 0	13271 1
27,3270	13263 1	00004 0	04674 0	C: 40153 1	04674 0	C: 40140 0	05353 1	C: 04024 0
27,3300	33331 0	04616 1	C: 20351 1	13306 0	13306 0	13300 0	05353 1	C: 04024 0
27,3310	00004 0	04674 0	C: 40123 0	05516 0	C: 00215 1	16001 1	I: 50375 0	C: 03535 1
27,3320	C: 03716 1	I: 47552 1	I: 41205 0	C: 03627 1	C: 15404 0	I: 77652 0	C: 02341 0	I: 77616 0
27,3330	C: 04077 0	C: 04125 0	C: 00037 0	I: 53575 0	C: 02213 0	I: 77725 1	C: 00045 0	C: 00015 0
27,3340	I: 77701 1	C: 00047 1	C: 24041 1	C: 02221 1	I: 77761 1	C: 00037 0	C: 02170 0	I: 47361 0
27,3350	C: 00041 1	I: 47572 1	C: 14035 1	C: 06414 0	I: 63271 0	C: 00041 1	C: 02170 0	I: 57436 1
27,3360	C: 00025 0	I: 43257 0	C: 20573 1	I: 77626 0	C: 77744 0	I: 41457 1	C: 20173 0	I: 75446 0
27,3370	I: 77701 1	C: 00050 1	C: 00031 0	I: 75316 1	I: 55254 1	C: 57377 0	C: 06414 0	C: 00027 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

27,3740	C: 00305 1	C: 11205 0	C: 37777 1	C: 37777 1	C: 03744 0	C: 03745 1	CKSM 53676 0	а
27,3750	а	а	а	а	а	а	а	а
27,3760	а	а	а	а	а	а	а	а
27,3770	а	а	а	а	а	а	а	а

OCTAL LISTING FOR PARAGRAPH # 160, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

30,2000	C: 02445 0	C: 00274 0	C: 00072 1	C: 16206 1	C: 00344 1	C: 24331 0	05353 1	C: 04024 0
30,2010	04616 1	C: 11175 1	05504 0	C: 00141 0	05504 0	C: 00307 0	05504 0	C: 00015 0
30,2020	05516 0	C: 00010 0	36000 1	55251 1	34751 0	55513 0	34755 1	55460 0
30,2030	33044 1	04616 1	C: 20351 1	16001 1	12036 1	12030 1	05353 1	C: 04024 0
30,2040	06036 1	I: 77624 1	C: 60264 1	I: 45014 0	C: 04464 0	C: 60204 1	I: 77745 1	C: 25604 1
30,2050	C: 17515 0	C: 03440 1	C: 34041 0	C: 27057 0	I: 64375 1	C: 00007 0	C: 01734 0	I: 77772 0
30,2060	C: 27577 1	C: 00001 0	I: 52521 0	C: 01734 0	C: 37517 0	C: 67162 0	I: 53575 0	C: 03517 1
30,2070	C: 37535 0	C: 57316 1	I: 57461 0	C: 20606 0	C: 17641 1	C: 20312 0	C: 03643 0	I: 77776 1
30,2100	05353 1	C: 04024 0	33043 0	04616 1	C: 20351 1	16001 1	12110 1	12102 1
30,2110	32306 0	55453 0	05353 1	C: 04024 0	06036 1	I: 54345 1	C: 03641 1	C: 20206 1
30,2120	I: 77615 0	C: 02341 0	C: 17631 0	C: 03643 0	I: 77661 0	C: 20206 1	I: 41415 1	C: 02337 1
30,2130	I: 65205 0	C: 20003 0	I: 41215 1	C: 03627 1	C: 03627 1	I: 75465 1	I: 77626 0	C: 51504 1
30,2140	C: 03535 1	I: 53361 0	C: 20310 1	C: 03577 1	C: 03525 0	I: 77614 1	C: 04421 1	C: 60313 0
30,2150	I: 77745 1	C: 02365 0	I: 65316 0	C: 02361 1	I: 43316 1	I: 75454 0	C: 60162 1	I: 55352 0
30,2160	C: 02361 1	I: 77736 0	C: 26367 1	C: 03252 1	I: 50256 0	C: 03535 1	I: 65552 0	I: 77676 0
30,2170	C: 02371 0	I: 77776 1	05353 1	C: 04024 0	05516 0	C: 00213 1	00004 0	04674 0
30,2200	C: 40142 1	00003 1	04635 0	C: 74124 0	I: 77745 1	C: 24001 0	C: 03637 0	C: 03635 1
30,2210	C: 17633 1	C: 24005 1	C: 16257 0	C: 24007 0	C: 16265 1	C: 34013 1	I: 54276 0	C: 20214 1
30,2220	C: 02263 1	I: 57535 0	C: 26001 1	I: 77702 1	C: 02261 0	I: 43414 1	C: 04747 1	C: 60230 0
30,2230	I: 43345 1	C: 25602 1	C: 02337 1	C: 17627 1	C: 06424 0	C: 03654 0	C: 03631 0	C: 02267 0
30,2240	C: 26271 1	C: 01563 0	I: 64235 1	C: 01555 0	C: 01734 0	I: 77656 1	C: 17716 1	C: 02506 0
30,2250	C: 02273 0	I: 77614 1	C: 04704 0	C: 60263 0	I: 45335 0	C: 02503 0	C: 03515 0	I: 71240 1
30,2260	C: 60263 0	C: 02504 1	C: 02273 0	I: 77616 0	I: 40220 0	C: 01164 0	C: 00001 0	I: 41575 0
30,2270	C: 06416 1	I: 41434 1	C: 21462 1	I: 45135 1	C: 20312 0	C: 51504 1	I: 74321 1	C: 01734 0
30,2300	C: 20005 0	C: 26331 1	C: 02023 1	I: 52446 0	C: 36337 0	C: 01164 0	C: 02022 0	C: 00046 0
30,2310	C: 07374 0	C: 00001 0	C: 26227 1	I: 51575 1	C: 03517 1	C: 26275 0	C: 03535 1	I: 53435 0
30,2320	C: 03716 1	C: 02305 0	I: 72441 0	C: 03525 0	C: 26317 0	C: 02305 0	I: 76435 1	C: 03535 1
30,2330	C: 02277 1	I: 72441 0	C: 03525 0	C: 26315 1	C: 03535 1	I: 72441 0	C: 03525 0	C: 36313 0
30,2340	C: 57316 1	I: 77775 1	C: 03561 0	I: 50341 1	C: 27201 1	C: 03535 1	I: 47315 0	C: 03535 1
30,2350	C: 03525 0	I: 56236 0	C: 02275 0	I: 43352 1	I: 77626 0	C: 61456 1	C: 02273 0	I: 77625 0
30,2360	C: 02317 0	C: 02347 0	I: 65361 0	C: 02305 0	C: 02271 1	I: 77625 0	C: 02315 1	C: 02345 1
30,2370	I: 65361 0	C: 02277 1	C: 02267 0	I: 77625 0	C: 02313 1	C: 02343 1	I: 53361 0	C: 03535 1

OCTAL LISTING FOR PARAGRAPH # 161, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

30,2400	I: 76455 1	I: 77626 0	C: 74131 1	I: 77614 1	C: 04711 1	C: 65442 0	I: 77624 1	C: 61011 0
30,2410	I: 41345 0	C: 03515 0	C: 02321 0	I: 76561 1	C: 03535 1	I: 77645 0	C: 03646 0	C: 03646 0
30,2420	I: 76521 0	C: 02146 0	C: 27500 1	C: 03646 0	I: 43046 1	C: 04745 0	C: 60433 0	I: 77671 1
30,2430	C: 20001 1	C: 37515 1	C: 60763 0	I: 41471 0	C: 02261 0	I: 44205 0	C: 21046 0	C: 17743 1
30,2440	I: 41205 0	C: 02265 1	I: 77625 0	C: 02263 1	C: 03515 0	I: 57461 0	C: 20614 0	C: 17452 1
30,2450	C: 03515 0	I: 45214 1	C: 03710 1	C: 60457 1	C: 21026 0	I: 77640 0	C: 57212 1	I: 77745 1
30,2460	C: 03515 0	I: 50025 0	C: 21030 1	C: 60620 0	I: 45345 1	C: 02265 1	C: 03515 0	I: 45071 0
30,2470	C: 02265 1	C: 65613 0	I: 41461 1	C: 20206 1	I: 44265 0	C: 03515 0	C: 02265 1	I: 43006 0
30,2500	C: 04703 1	C: 60510 0	I: 45345 1	C: 03515 0	C: 21032 0	I: 43044 0	C: 60516 0	C: 04463 1
30,2510	I: 77745 1	C: 60424 0	C: 02355 0	C: 02357 1	I: 77650 1	C: 60600 1	I: 45345 1	C: 03515 0
30,2520	C: 00003 1	I: 72406 0	I: 52421 1	C: 03515 0	I: 41325 0	C: 03515 0	C: 02313 1	I: 45215 0
30,2530	C: 02275 0	C: 03627 1	I: 41325 0	C: 02343 1	C: 00005 1	I: 62415 0	I: 56271 0	C: 00007 0
30,2540	C: 03515 0	C: 02355 0	I: 71240 1	C: 60547 1	C: 06424 0	C: 36355 1	C: 60561 0	I: 56202 1
30,2550	C: 02265 1	I: 51025 1	C: 21050 1	C: 60561 0	I: 41345 0	C: 21050 1	C: 02265 1	I: 77612 1
30,2560	C: 02355 0	I: 77745 1	C: 03515 0	I: 43205 1	C: 02315 1	C: 02341 0	I: 65225 1	C: 03631 0
30,2570	C: 02345 1	I: 43205 1	C: 00005 1	I: 56271 0	C: 03515 0	I: 40312 0	C: 00005 1	C: 02357 1
30,2600	I: 41345 0	C: 02355 0	C: 00003 1	I: 56325 0	C: 02343 1	C: 00001 0	I: 45302 1	I: 77626 0
30,2610	C: 61426 0	C: 02357 1	I: 65205 0	I: 60465 0	C: 02345 1	I: 77625 0	C: 00001 0	C: 02353 0
30,2620	I: 77624 1	C: 61011 0	I: 71201 1	C: 00001 0	C: 27201 1	I: 77605 1	C: 02355 0	I: 56215 1
30,2630	C: 02351 1	C: 02265 1	I: 45352 1	C: 02321 0	C: 16363 0	C: 27201 1	I: 43205 1	C: 02357 1
30,2640	C: 02353 0	I: 72471 0	C: 02265 1	C: 02361 1	I: 65361 0	C: 02277 1	C: 02363 0	I: 53361 0
30,2650	C: 03535 1	I: 41572 1	I: 65246 1	C: 02257 0	I: 45316 1	C: 00043 0	I: 41525 0	C: 02757 0
30,2660	I: 45316 1	C: 00043 0	I: 71240 1	C: 60667 0	C: 00011 1	I: 52166 1	C: 60675 0	I: 55345 0
30,2670	C: 00007 0	I: 77761 1	C: 00001 0	C: 14001 0	C: 06424 0	I: 77765 0	C: 02347 0	C: 02365 0
30,2700	I: 77761 1	C: 02305 0	I: 53372 1	C: 00001 0	C: 03252 1	I: 43001 1	C: 00001 0	C: 04704 0
30,2710	C: 60150 0	I: 77624 1	C: 61011 0	I: 77614 1	C: 04701 0	C: 60774 0	I: 57575 1	C: 03535 1
30,2720	C: 17260 0	C: 03654 0	I: 51025 1	C: 01235 1	C: 60730 0	I: 43014 0	C: 01664 1	C: 06666 1
30,2730	I: 77776 1	00006 1	34755 1	52757 0	30105 0	74742 0	10000 0	12766 0
30,2740	06036 1	I: 77624 1	C: 61062 1	I: 77776 1	00006 1	34755 1	52757 0	30105 0
30,2750	74742 0	10000 0	12766 0	30104 1	74742 0	10000 0	12766 0	33042 1
30,2760	04616 1	C: 20327 0	12766 0	I: 77776 1	05353 1	C: 00003 1	15155 1	I: 77776 1
30,2770	00004 0	04674 0	C: 40153 1	12744 0	I: 45345 1	C: 02275 0	C: 02337 1	I: 50025 0

OCTAL LISTING FOR PARAGRAPH # 162, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

30,3000	C: 26732 0	C: 57162 0	I: 43345 1	C: 01235 1	C: 25574 0	C: 03654 0	I: 77614 1	C: 04621 0
30,3010	C: 60716 1	I: 77420 1	C: 01164 0	34741 1	64746 0	70105 1	10000 0	13022 0
30,3020	05353 1	C: 04023 1	06036 1	I: 77650 1	C: 01164 0	C: 00062 0	C: 00000 1	C: 00031 0
30,3030	C: 00000 1	C: 00175 1	C: 00000 1	C: 00017 1	C: 23305 0	C: 00045 0	C: 20000 0	C: 00010 0
30,3040	C: 14400 0	C: 00000 1	C: 01477 1	C: 01514 0	C: 01441 1	C: 20000 0	C: 00000 1	C: 75751 0
30,3050	C: 41775 1	C: 00545 0	C: 00171 0	C: 00022 1	C: 07212 1	I: 77775 1	C: 06422 0	C: 03266 0
30,3060	C: 03260 0	I: 77616 0	I: 77775 1	C: 03252 1	I: 40200 1	C: 61064 1	C: 00023 0	I: 77420 1
30,3070	C: 03245 1	33732 1	56003 1	55644 1	30111 0	74737 1	10000 0	34753 1
30,3100	55646 0	34743 0	55650 1	70111 1	55647 1	00004 0	30032 0	54772 1
30,3110	30033 1	54766 1	30034 0	54770 0	34742 1	00006 1	02030 0	10000 0
30,3120	13135 1	34736 1	00006 1	02031 1	10000 0	13135 1	55650 1	31633 0
30,3130	54772 1	31634 1	54766 1	31635 0	54770 0	06036 1	I: 77634 0	C: 21700 0
30,3140	C: 24001 0	C: 03260 0	I: 47034 0	C: 21700 0	C: 47521 1	C: 24015 0	C: 00325 0	I: 53404 1
30,3150	C: 61721 1	I: 45000 0	C: 61166 1	C: 47575 0	I: 77776 1	31667 1	22157 1	03454 1
30,3160	55667 0	31671 0	22161 1	03454 1	55671 1	06036 1	I: 46135 1	C: 03250 0
30,3170	C: 61174 1	I: 45175 0	C: 00015 0	C: 61474 1	I: 77775 1	C: 02162 0	C: 34015 1	C: 61474 1
30,3200	I: 57575 1	C: 02146 0	C: 00015 0	I: 47375 0	C: 00015 0	C: 00001 0	I: 41456 0	I: 76435 1
30,3210	C: 00001 0	C: 00015 0	I: 63361 0	C: 03272 0	I: 51361 1	C: 03270 1	I: 53372 1	C: 00001 0
30,3220	I: 77656 1	C: 00001 0	I: 76435 1	C: 00015 0	C: 00007 0	I: 47276 1	C: 00001 0	I: 77772 0
30,3230	C: 00015 0	I: 77624 1	C: 61504 1	I: 77776 1	30156 0	54001 1	33744 0	03700 0
30,3240	56156 0	00006 1	20156 1	00006 1	13246 0	13727 1	00004 0	22007 0
30,3250	34752 0	54142 1	30001 0	00006 1	70000 0	64350 0	00006 1	63262 1
30,3260	34755 1	55647 1	50142 0	30154 1	50142 0	54321 0	00006 1	50142 0
30,3270	21633 1	40000 0	50142 0	55673 0	54001 1	10142 1	13251 0	11650 1
30,3300	13723 0	30101 1	74745 1	00006 1	13723 0	23675 1	51646 1	33740 1
30,3310	03700 0	55675 0	31674 0	00006 1	70746 0	54001 1	51646 1	33742 0
30,3320	03700 0	00006 1	10746 0	57674 0	00006 1	70740 0	20001 1	40000 0
30,3330	00006 1	21673 0	54001 1	51646 1	33740 1	03700 0	55673 0	11647 1
30,3340	41673 0	55673 0	41674 1	00006 1	70740 0	20001 1	27673 0	41673 0
30,3350	55641 1	41674 1	00006 1	70740 0	20001 1	27641 1	27641 1	41674 1
30,3360	00006 1	70750 1	00001 1	00006 1	70746 0	55642 1	41675 0	00006 1
30,3370	70742 1	27642 1	27642 1	27642 1	31674 0	00006 1	70742 1	20001 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

30,3740	C: 03434 1	C: 00266 0	C: 01616 1	C: 00133 0	C: 14344 1	C: 01463 1	C: 03746 1	C: 03747 0
30,3750	CKSM 74427 0	0	0	0	0	0	0	0
30,3760	0	0	0	0	0	0	0	0
30,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 164, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

31,2000	C: 00233 0	C: 15340 1	C: 07432 0	C: 07012 0	C: 00024 1	C: 00317 1	C: 31157 0	C: 77765 0
31,2010	C: 53556 1	06036 1	I: 77624 1	C: 62114 1	I: 77776 1	00006 1	31605 0	53611 1
31,2020	00006 1	31607 1	53613 0	32171 1	04616 1	C: 20231 0	15472 1	12034 0
31,2030	12023 0	34751 0	05464 1	05155 0	22007 0	36244 0	54002 1	50002 0
31,2040	41604 0	50002 0	61610 1	26001 1	10002 1	12036 1	22000 1	00006 1
31,2050	12053 1	05504 0	C: 00160 0	06036 1	I: 77414 0	C: 03707 1	C: 62060 0	15472 1
31,2060	I: 41345 0	C: 02205 1	C: 22170 1	I: 72412 0	C: 14001 0	C: 02207 0	I: 77605 1	C: 22170 1
31,2070	C: 00003 1	I: 72014 1	C: 04307 1	C: 62103 1	C: 00000 1	I: 72130 0	C: 02000 0	C: 00002 0
31,2100	I: 52130 1	C: 02001 1	C: 62111 1	I: 66150 0	C: 00000 1	C: 02006 0	I: 66150 0	C: 00002 0
31,2110	C: 02007 1	I: 77414 0	C: 02676 1	15472 1	I: 40020 1	C: 00051 0	C: 62117 1	I: 45014 0
31,2120	C: 03667 0	C: 27412 0	I: 71331 0	C: 00051 0	C: 00006 1	C: 06424 0	C: 02205 1	C: 02207 0
31,2130	I: 77770 1	C: 00066 1	I: 47573 0	C: 02467 0	I: 77615 0	C: 02205 1	C: 02205 1	I: 47573 0
31,2140	C: 02555 0	I: 77615 0	C: 02207 0	C: 02207 0	I: 75500 0	C: 62132 0	C: 16207 0	C: 02205 1
31,2150	I: 77766 0	C: 02205 1	I: 52000 0	C: 62155 1	C: 62161 0	I: 77745 1	C: 06432 1	C: 02205 1
31,2160	C: 02207 0	I: 66150 0	C: 00051 0	C: 00052 0	I: 77776 1	04635 0	C: 27427 0	C: 22363 1
31,2170	C: 11620 0	C: 01543 1	05353 1	C: 04024 0	00004 0	04616 1	C: 40153 1	04616 1
31,2200	C: 40127 1	06036 1	I: 43014 0	C: 04067 1	C: 04666 0	I: 43014 0	C: 05062 0	C: 03664 0
31,2210	I: 77214 0	C: 05460 0	C: 01221 1	C: 16032 1	C: 01235 1	I: 45014 0	C: 01463 1	C: 26351 1
31,2220	I: 77201 1	C: 00001 0	C: 01221 1	I: 65352 0	C: 01235 1	I: 45006 0	C: 51531 1	C: 02023 1
31,2230	I: 77776 1	32246 0	04616 1	C: 20351 1	16001 1	12237 1	12231 1	06036 1
31,2240	I: 77775 1	C: 06422 0	C: 36235 0	C: 33470 1	I: 77776 1	16001 1	C: 01453 1	31246 0
31,2250	00006 1	72444 0	00006 1	23605 0	02425 0	53563 1	00006 1	31574 0
31,2260	02425 0	55613 0	53561 0	41615 0	60025 0	74733 0	40000 0	65002 0
31,2270	00006 1	62275 0	00006 1	31607 1	21563 1	35014 1	54003 0	00006 1
31,2300	31477 1	52131 0	35016 0	54003 0	44755 0	55604 0	40131 0	61616 1
31,2310	00006 1	62323 1	40130 1	61560 0	00006 1	62320 1	31562 1	12337 0
31,2320	42002 0	61562 1	12341 1	40131 0	61560 0	00006 1	62342 0	30102 1
31,2330	74745 1	00006 1	12336 1	30131 1	55560 1	12342 1	32003 0	53561 0
31,2340	34737 0	55604 0	03721 0	00006 1	31561 1	55616 0	53611 1	00006 1
31,2350	41563 1	21611 1	31610 1	61604 1	55612 1	54055 0	34750 1	00006 1
31,2360	05014 1	30025 0	55615 0	35003 1	54002 1	41235 0	60025 0	62004 1
31,2370	74357 0	22007 0	00006 1	10002 1	00006 1	71610 0	60000 1	53607 0

OCTAL LISTING FOR PARAGRAPH # 165, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

31,2400	37715 0	54002 1	11610 0	64753 1	12406 0	64753 1	00006 1	71610 0
31,2410	00006 1	10002 1	22007 0	21607 0	01605 0	34737 0	55604 0	44755 0
31,2420	55616 0	55610 0	00006 1	23605 0	12352 0	00006 1	22130 0	00006 1
31,2430	71244 0	52155 1	07102 0	C: 02005 0	07256 1	30154 1	00006 1	12442 0
31,2440	34733 1	00130 0	52156 1	00130 0	C: 04143 0	12657 0	12657 0	12643 0
31,2450	12627 1	12647 1	12616 0	13025 1	13035 0	13035 0	12725 1	13035 0
31,2460	13035 0	13107 0	13107 0	13101 0	13107 0	13101 0	13477 1	13240 0
31,2470	13240 0	13270 0	13240 0	13270 0	13411 1	13304 1	13325 1	13325 1
31,2500	13333 0	13333 0	13441 1	13441 1	13445 0	13445 0	13475 0	C: 00000 1
31,2510	C: 00000 1	C: 00000 1	C: 00030 1	C: 00030 1	I: 77776 1	34752 0	55645 0	12600 1
31,2520	55645 0	13025 1	05353 1	C: 00035 1	05353 1	C: 05023 0	C: 21000 1	00006 1
31,2530	00030 1	74747 0	10000 0	12564 0	05321 1	C: 00103 0	12570 0	03721 0
31,2540	05311 1	C: 00102 1	00006 1	31625 1	53643 0	34755 1	55644 1	55645 0
31,2550	34751 0	55617 1	55620 0	04616 1	C: 40165 1	05516 0	C: 00311 1	05516 0
31,2560	C: 00143 1	05516 0	C: 00142 0	12600 1	05311 1	C: 00103 0	34363 0	12547 1
31,2570	34737 0	00006 1	02031 1	10000 0	12600 1	05321 1	C: 00102 1	12537 0
31,2600	00006 1	31623 1	53572 1	03721 0	00006 1	31557 1	53623 0	00006 1
31,2610	31641 0	53551 0	11621 1	12657 0	51620 1	12446 1	05311 1	C: 00101 1
31,2620	44752 1	55645 0	05516 0	C: 00311 1	05516 0	C: 00142 0	12657 0	33743 1
31,2630	27550 1	05311 1	C: 00100 0	34752 0	55620 0	34740 0	00006 1	05013 0
31,2640	05516 0	C: 00143 1	12624 1	30102 1	74743 1	00006 1	12631 0	03667 0
31,2650	I: 51775 0	C: 02271 1	C: 02417 1	I: 70322 0	C: 03551 0	C: 02277 1	I: 77776 1	06036 1
31,2660	I: 45345 1	C: 03623 0	C: 03572 1	I: 41461 1	C: 21214 0	I: 47361 0	C: 03633 1	C: 02331 1
31,2670	I: 47045 0	C: 03633 1	C: 21700 0	I: 76561 1	C: 02337 1	C: 03543 0	I: 51451 0	C: 03517 1
31,2700	C: 16532 1	I: 77776 1	52155 1	21551 0	03721 0	00006 1	31551 1	53641 1
31,2710	00006 1	31543 1	53633 1	00006 1	31545 1	53635 1	00006 1	31547 0
31,2720	53637 0	03674 1	03721 0	12454 1	30102 1	74746 1	74746 1	00006 1
31,2730	13035 0	31664 1	00006 1	13035 0	00004 0	31642 0	55552 0	31643 1
31,2740	55554 0	03721 0	34755 1	55642 1	55643 0	00003 1	55553 1	55555 1
31,2750	30120 1	54166 1	06036 1	I: 52375 1	C: 03633 1	C: 03517 1	I: 41434 1	C: 21700 0
31,2760	I: 76435 1	C: 02154 0	I: 65361 0	C: 03553 1	C: 03555 1	I: 52361 1	C: 02154 0	I: 41455 0
31,2770	I: 45345 1	C: 00001 0	C: 23762 0	I: 71240 1	C: 62777 1	C: 23762 0	C: 00001 0	I: 45345 1

OCTAL LISTING FOR PARAGRAPH # 166, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

31,3000	C: 03633 1	C: 03517 1	I: 74271 0	C: 00001 0	I: 53455 0	C: 03517 1	I: 76561 1	C: 02337 1
31,3010	C: 03543 0	I: 77776 1	03721 0	00006 1	31543 1	53633 1	00006 1	31545 1
31,3020	53635 1	00006 1	31547 0	53637 0	13035 0	06036 1	I: 64375 1	C: 00025 0
31,3030	C: 01734 0	I: 53362 0	C: 03252 1	C: 03525 0	I: 77776 1	06036 1	I: 47375 0	C: 03517 1
31,3040	C: 02331 1	I: 70455 1	C: 03525 0	C: 02305 0	I: 77721 0	C: 02510 1	C: 03625 0	I: 55525 0
31,3050	C: 06424 0	I: 52446 0	C: 26267 0	C: 03517 1	I: 41451 1	C: 03633 1	I: 76521 0	C: 02510 1
31,3060	C: 26544 0	I: 50234 1	C: 21700 0	C: 02146 0	I: 77776 1	30120 1	54166 1	30154 1
31,3070	60000 1	04616 1	C: 61643 1	63742 0	00006 1	73741 1	55665 1	51620 1
31,3100	12462 1	03667 0	I: 74375 0	C: 02277 1	C: 03641 1	I: 52132 0	C: 63171 0	03667 0
31,3110	I: 77743 1	C: 02431 0	C: 23567 1	C: 02427 1	C: 17565 1	C: 03631 0	I: 42605 1	C: 23755 1
31,3120	C: 02425 0	C: 23563 0	C: 02407 0	I: 41225 1	C: 02550 0	C: 23753 1	C: 03561 0	I: 77776 1
31,3130	34744 1	55570 0	00006 1	31641 0	52155 1	34752 0	54001 1	33733 0
31,3140	03543 0	05652 0	C: 01406 1	00006 1	30155 0	53641 1	03674 1	33732 1
31,3150	61640 1	00006 1	63155 0	05504 0	C: 00142 0	03667 0	I: 52373 1	C: 02403 1
31,3160	C: 02544 0	I: 70541 0	C: 03641 1	I: 53253 0	C: 02411 1	C: 03625 0	I: 74341 1	C: 03641 1
31,3170	C: 23755 1	I: 77653 1	C: 02417 1	C: 02271 1	I: 76505 0	C: 02510 1	I: 70315 1	C: 01237 0
31,3200	C: 23751 0	I: 45445 0	C: 74525 0	I: 77646 0	C: 03574 1	I: 71214 0	C: 03306 1	C: 63231 1
31,3210	C: 03252 1	I: 65316 0	C: 03254 1	I: 65316 0	C: 23735 1	I: 63471 0	C: 01245 0	I: 45225 0
31,3220	I: 71244 0	C: 63223 1	C: 06424 0	I: 43366 0	C: 03256 0	I: 44244 0	C: 63231 1	C: 03256 0
31,3230	C: 03256 0	I: 77776 1	03721 0	31620 1	55617 1	25621 0	51620 1	12470 1
31,3240	06036 1	I: 53575 0	C: 03633 1	C: 26510 1	C: 02305 0	I: 53361 0	C: 03641 1	C: 03633 1
31,3250	I: 47051 0	C: 03517 1	C: 21700 0	I: 47035 1	C: 03633 1	C: 21700 0	C: 26516 1	C: 02510 1
31,3260	I: 76435 1	C: 02516 1	C: 02524 0	I: 77776 1	11620 0	50000 1	31425 0	13271 1
31,3270	33727 0	61640 1	00006 1	51620 1	62476 0	03721 0	31617 0	64753 1
31,3300	22007 0	53621 1	51617 0	12476 1	06036 1	I: 47175 1	C: 03252 1	C: 21700 0
31,3310	I: 74361 0	C: 03425 1	C: 22001 0	C: 03252 1	I: 77776 1	11645 0	12520 0	11644 0
31,3320	13323 1	05567 0	C: 01412 1	04635 0	C: 65075 0	06036 1	I: 77775 1	C: 03535 1
31,3330	C: 03260 0	I: 77776 1	13405 1	06036 1	I: 52375 1	C: 03633 1	C: 03517 1	I: 77634 0
31,3340	C: 21700 0	C: 03260 0	I: 50235 0	C: 02146 0	C: 02516 1	I: 77776 1	40154 0	63763 0
31,3350	64733 1	54130 1	40130 1	26130 1	43764 0	60154 1	64733 1	54131 0
31,3360	40131 0	26131 0	34751 0	76241 1	54002 1	35014 1	54003 0	30130 0
31,3370	00006 1	50002 0	71523 0	24006 1	50002 0	53660 1	00006 1	70131 0

OCTAL LISTING FOR PARAGRAPH # 167, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

31,3400	51402 0	21660 1	10002 1	13363 0	24006 1	30076 0	74741 0	00006 1
31,3410	13416 0	30121 0	00006 1	13421 1	05567 0	C: 01410 0	04616 1	C: 40165 1
31,3420	13426 0	02247 1	06036 1	I: 77624 1	C: 61062 1	I: 77776 1	00006 1	34755 1
31,3430	52757 0	40104 0	74742 0	00006 1	13444 1	51617 0	12502 0	05353 1
31,3440	C: 00035 1	33765 0	04616 1	C: 20346 1	15155 1	31664 1	00006 1	13471 1
31,3450	40102 0	74746 1	00006 1	13473 0	33766 0	04616 1	C: 20340 1	16001 1
31,3460	13463 1	13445 0	13444 1	34755 1	55642 1	55643 0	05504 0	C: 00143 1
31,3470	15155 1	05516 0	C: 00143 1	33766 0	13442 1	33767 1	13442 1	11645 0
31,3500	13426 0	13516 1	00006 1	43760 1	53643 0	06036 1	I: 65375 0	C: 06424 0
31,3510	C: 03643 0	I: 52266 1	C: 03625 0	I: 52141 1	C: 23745 0	C: 63174 0	57644 0	00006 1
31,3520	73756 1	21643 0	03721 0	06036 1	I: 45345 1	C: 03643 0	C: 03625 0	I: 45271 1
31,3530	C: 23747 1	C: 22010 0	I: 50315 0	C: 02146 0	C: 03535 1	I: 45465 1	C: 74203 0	I: 77404 1
31,3540	C: 63414 0	02247 1	13426 0	00006 1	22132 1	54117 1	52160 1	33666 1
31,3550	54141 1	54161 0	10160 1	54162 0	34755 1	54163 1	00006 1	30155 0
31,3560	52127 1	50157 1	30005 1	07306 0	04713 0	C: 01226 0	52155 1	52125 0
31,3570	00006 1	50117 0	30004 0	52155 1	30160 0	54140 0	64753 1	07315 1
31,3600	00006 1	50117 0	30002 0	52155 1	50141 0	52004 1	44752 1	26117 1
31,3610	44752 1	26141 1	10140 0	13575 1	00006 1	30127 0	52155 1	00006 1
31,3620	30162 1	07214 1	00006 1	30127 0	52155 1	52131 0	00006 1	30160 0
31,3630	07214 1	04713 0	C: 00353 1	00006 1	40155 1	20127 1	04713 0	C: 01226 0
31,3640	00006 1	40125 0	20155 1	24163 0	30163 0	74750 0	10000 0	00132 1
31,3650	10154 0	13614 0	13654 1	13660 0	10155 1	13614 0	13660 0	13660 0
31,3660	52127 1	52155 1	30163 0	54156 1	50132 1	10002 1	C: 00147 0	51620 1
31,3670	42510 0	50120 1	54046 1	16036 0	31640 1	00006 1	74750 0	53474 0
31,3700	31640 1	00006 1	73740 0	54001 1	63736 0	00006 1	63717 0	40001 1
31,3710	63737 1	00006 1	63715 1	55664 0	00002 0	34755 1	13713 0	33736 0
31,3720	13710 0	35007 0	56003 1	52002 1	55442 0	22003 1	00000 1	C: 00046 0
31,3730	C: 00175 1	C: 00372 1	C: 00567 0	C: 01563 0	C: 00021 1	C: 11422 0	C: 00167 1	C: 77753 0
31,3740	C: 02437 0	C: 00264 1	C: 00056 1	C: 74110 1	C: 01130 1	C: 00000 1	C: 02260 1	C: 00000 1
31,3750	C: 01440 0	C: 00000 1	C: 14000 1	C: 00000 1	C: 30000 1	C: 00000 1	C: 01437 0	C: 00000 1
31,3760	C: 04535 0	C: 77656 1	C: 42436 0	C: 01542 0	C: 01022 0	C: 01477 1	C: 01500 0	C: 01474 1
31,3770	C: 03770 1	C: 03771 0	CKSM 56353 1	a	a	a	a	a

OCTAL LISTING FOR PARAGRAPH # 170, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

32,2000	C: 03631 0	C: 23146 0	C: 33226 1	C: 14632 0	C: 05306 1	C: 15503 0	C: 26337 1	C: 30000 1
32,2010	C: 00044 1	C: 70123 0	C: 40702 0	C: 13337 1	C: 10776 0	34737 0	70077 0	10000 0
32,2020	02027 0	05567 0	C: 00220 1	05472 0	00006 1	30014 1	53421 0	00006 1
32,2030	31421 1	53052 0	32202 0	04616 1	C: 20212 1	05472 0	02046 1	44746 1
32,2040	60154 1	00006 1	12024 1	00006 1	31052 1	02026 1	06036 1	I: 77614 1
32,2050	C: 01076 1	I: 77414 0	C: 02076 1	32202 0	04616 1	C: 20473 0	06036 1	I: 77634 0
32,2060	C: 21462 1	C: 34041 0	C: 27057 0	I: 77624 1	C: 64142 1	C: 16205 1	C: 00015 0	C: 34041 0
32,2070	C: 27043 0	I: 77624 1	C: 64142 1	C: 16213 0	C: 00015 0	I: 56225 1	C: 02021 0	C: 24205 0
32,2100	C: 02221 1	I: 77776 1	34753 1	54332 1	32206 1	04616 1	C: 01735 1	31324 0
32,2110	54332 1	34744 1	70074 0	10000 0	02132 0	11304 0	12121 0	12125 1
32,2120	12121 0	34363 0	04616 1	C: 01735 1	12115 1	04616 1	C: 16667 1	04616 1
32,2130	C: 17671 1	02132 0	05516 0	C: 00054 0	32203 1	04616 1	C: 20220 0	15472 1
32,2140	15472 1	05472 0	I: 64375 1	C: 00025 0	C: 01734 0	I: 72561 0	C: 24212 0	I: 53255 0
32,2150	C: 24214 0	C: 24222 0	I: 77634 0	C: 21744 0	C: 24025 0	C: 00017 1	I: 74321 1	C: 01734 0
32,2160	C: 24210 1	I: 53212 0	C: 24214 0	I: 47055 1	C: 24222 0	C: 21744 0	I: 77750 0	C: 00024 1
32,2170	I: 72130 0	C: 00155 0	C: 00026 0	I: 72130 0	C: 00160 0	C: 00030 1	I: 43530 0	C: 00162 1
32,2200	C: 00216 1	C: 14400 0	C: 01420 0	C: 14420 1	C: 03100 0	C: 00000 1	C: 03720 1	C: 15077 0
32,2210	C: 05041 1	C: 24402 1	C: 25724 1	C: 00000 1	C: 60000 1	C: 00000 1	C: 60000 1	C: 00000 1
32,2220	C: 60000 1	C: 00000 1	C: 37777 1	C: 00000 1	C: 37777 1	C: 00000 1	C: 37777 1	I: 77624 1
32,2230	C: 27412 0	I: 77745 1	C: 03440 1	C: 03657 0	C: 00041 1	I: 43014 0	C: 01674 0	C: 01673 1
32,2240	I: 43014 0	C: 01676 1	C: 01675 1	I: 77624 1	C: 27134 1	I: 77624 1	C: 11165 0	I: 77775 1
32,2250	C: 00017 1	C: 17627 1	C: 00015 0	C: 34041 0	C: 27412 0	I: 43014 0	C: 01474 1	C: 01673 1
32,2260	I: 43014 0	C: 01676 1	C: 02756 1	C: 64267 0	I: 43014 0	C: 01476 0	C: 01475 0	I: 77624 1
32,2270	C: 27134 1	I: 77624 1	C: 11165 0	I: 77775 1	C: 00025 0	C: 25761 0	C: 00017 1	C: 01102 0
32,2300	I: 53435 0	C: 01761 0	C: 24025 0	C: 03627 1	I: 53435 0	C: 00025 0	C: 27635 1	C: 01102 0
32,2310	I: 50256 0	C: 03635 1	I: 77752 1	C: 02732 0	I: 44316 0	C: 10345 1	I: 77766 0	C: 26730 1
32,2320	C: 01102 0	C: 26655 0	C: 01761 0	I: 77676 0	C: 02744 1	I: 45014 0	C: 03666 1	C: 24745 1
32,2330	I: 77676 0	C: 03643 0	I: 77745 1	C: 00037 0	C: 27661 0	C: 03643 0	I: 77646 0	C: 24025 0
32,2340	C: 00001 0	C: 03651 0	I: 53435 0	C: 03627 1	I: 53435 0	C: 03651 0	I: 76561 1	C: 00025 0
32,2350	C: 37663 0	C: 11165 0	I: 77624 1	C: 27412 0	I: 44345 0	C: 03661 0	C: 03657 0	C: 25517 0
32,2360	C: 03651 0	C: 01535 0	C: 25503 0	C: 03663 1	C: 35511 1	C: 23361 1	I: 45174 1	C: 00002 0
32,2370	C: 26661 1	I: 77624 1	C: 27425 1	I: 77776 1	04616 1	C: 50062 0	04645 1	55735 0

OCTAL LISTING FOR PARAGRAPH # 171, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

32,2400	05516 0	C: 00120 1	00004 0	34751 0	00006 1	02033 0	54001 1	44751 1
32,2410	70110 0	60001 0	54110 0	00003 1	04616 1	C: 53103 0	04616 1	C: 17667 0
32,2420	12540 0	00004 0	53106 0	53753 0	53102 1	53745 1	00006 1	30034 0
32,2430	53456 0	30932 0	55457 1	00006 1	30025 0	52155 1	00006 1	30036 1
32,2440	53110 1	00003 1	04616 1	C: 53105 0	04616 1	C: 17667 0	02534 1	06036 1
32,2450	C: 14025 0	C: 03745 1	I: 57261 0	C: 20217 1	C: 24012 1	C: 17747 0	C: 01110 0	C: 03751 1
32,2460	I: 47135 0	C: 01110 0	C: 21465 0	C: 03732 1	I: 47135 0	C: 01111 1	C: 21465 0	C: 17734 1
32,2470	C: 01102 0	I: 66405 0	C: 24014 1	C: 37755 1	C: 46041 0	C: 17737 1	C: 00025 0	C: 34041 0
32,2500	C: 51151 0	I: 77776 1	31455 1	54766 1	31456 1	54770 0	31457 0	54772 1
32,2510	06036 1	I: 45175 0	C: 01102 0	C: 47555 1	I: 77641 1	C: 03737 1	I: 65552 0	C: 01046 1
32,2520	I: 50025 0	C: 24544 1	C: 64527 0	I: 77776 1	34752 0	54154 0	12532 0	I: 77776 1
32,2530	34755 1	54154 0	31735 1	04640 1	30101 1	74742 0	10000 0	12414 0
32,2540	34753 1	54154 0	02532 1	C: 00210 1	C: 21042 1	34753 1	55107 1	34756 1
32,2550	10000 0	54002 1	11107 1	12561 0	00006 1	50002 0	31761 0	50002 0
32,2560	21102 1	00006 1	50002 0	31102 0	50002 0	52156 1	11107 1	12575 0
32,2570	00006 1	50002 0	31761 0	50002 0	20156 1	10002 1	12550 1	52156 1
32,2600	52155 1	32770 0	54120 0	04713 0	C: 01023 1	07531 1	11107 1	12611 1
32,2610	12625 0	00004 0	00006 1	30036 1	53767 1	30033 1	54766 1	30034 0
32,2620	54770 0	30032 0	54772 1	04616 1	C: 47521 1	46244 1	04616 1	C: 47601 0
32,2630	11107 1	12633 1	12676 0	55107 1	31766 1	05032 0	54166 1	41766 0
32,2640	05033 1	54163 1	00006 1	70124 1	52155 1	31767 0	05033 1	55766 0
32,2650	00006 1	70166 1	00006 1	70122 1	20155 1	31767 0	05032 0	55767 1
32,2660	00006 1	70166 1	00006 1	70126 0	20155 1	00006 1	30155 0	20155 1
32,2670	10000 0	34736 1	12673 0	00006 1	05012 1	12547 1	31767 0	00006 1
32,2700	70122 1	53110 1	41766 0	00006 1	70126 0	21110 1	40163 1	00006 1
32,2710	71766 0	00006 1	70122 1	52155 1	30166 0	00006 1	70124 1	20155 1
32,2720	40163 1	00006 1	71767 1	00006 1	70126 0	20155 1	30154 1	00006 1
32,2730	72771 0	57107 0	00006 1	72771 0	55110 1	34750 1	00006 1	02033 0
32,2740	00004 0	00006 1	12746 1	04616 1	C: 52306 0	12764 1	44742 0	70110 0
32,2750	54110 0	44752 1	00006 1	03012 1	34743 0	26077 0	11056 1	44776 1
32,2760	64777 1	05203 0	C: 03275 1	C: 50067 0	44740 1	70076 1	54076 1	15155 1
32,2770	C: 00052 0	C: 56655 1	05353 1	C: 04024 0	04616 1	C: 11175 1	33246 1	55453 0

OCTAL LISTING FOR PARAGRAPH # 172, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALIO WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKEO "I" (INTERPRETIVE OPERATOR WOROS) OR "C" (CONSTANTS)

32,3000	32010 1	55251 1	34751 0	55513 0	44753 0	22007 0	53621 1	44736 0
32,3010	00006 1	03012 1	06036 1	I: 43014 0	C: 02663 0	C: 03271 0	I: 43014 0	C: 05660 1
32,3020	C: 03067 0	I: 43014 0	C: 00266 0	C: 00270 1	I: 77201 1	C: 00001 0	C: 02023 1	I: 41525 0
32,3030	C: 02401 0	C: 37523 1	C: 51504 1	I: 64312 0	C: 01734 0	C: 37633 0	C: 60264 1	I: 45345 1
32,3040	C: 02401 0	C: 25254 0	C: 34041 0	C: 27057 0	I: 77331 0	C: 03645 0	C: 00050 1	C: 06422 0
32,3050	C: 26510 1	C: 06420 1	C: 26516 1	C: 06416 1	C: 16524 0	C: 25252 0	C: 27663 1	C: 06424 0
32,3060	C: 17252 1	C: 06424 0	C: 03641 1	I: 77745 1	C: 00015 0	C: 27557 0	C: 00017 1	I: 64312 0
32,3070	C: 01734 0	C: 37517 0	C: 67162 0	C: 35237 1	C: 62514 0	55644 1	06036 1	I: 57345 1
32,3100	C: 03625 0	C: 02471 1	I: 44232 1	C: 03631 0	I: 45325 1	C: 02467 0	C: 02550 0	I: 65222 0
32,3110	C: 02546 1	I: 57316 1	C: 02473 0	I: 65232 1	C: 02544 0	I: 57225 0	C: 02465 1	C: 02471 1
32,3120	I: 51515 1	C: 03625 0	I: 57225 0	C: 02463 1	C: 02475 0	I: 43215 0	I: 56215 1	I: 77661 0
32,3130	C: 21613 0	I: 43206 1	C: 03557 0	C: 14041 1	I: 45246 0	C: 25256 1	I: 45040 1	C: 65156 0
32,3140	C: 27412 0	I: 43014 0	C: 01473 0	C: 00063 1	I: 77745 1	C: 03557 0	C: 25517 0	C: 00017 1
32,3150	C: 25535 0	C: 00025 0	C: 35543 0	C: 27107 1	I: 77650 1	C: 65063 1	I: 54335 0	C: 03425 1
32,3160	C: 20617 0	I: 77621 1	C: 00041 1	C: 27440 1	C: 03525 0	I: 53435 0	C: 03517 1	I: 72441 0
32,3170	C: 03633 1	C: 26534 1	C: 03252 1	C: 02536 0	I: 77776 1	05353 1	C: 04024 0	43247 1
32,3200	04616 1	C: 74667 0	15155 1	06036 1	I: 47131 1	C: 02747 1	C: 65210 1	C: 30776 1
32,3210	I: 53575 0	C: 02536 0	C: 27767 1	C: 06422 0	C: 03761 1	I: 77776 1	35016 0	54003 0
32,3220	00004 0	04674 0	C: 40142 1	00003 1	04616 1	C: 54101 0	05353 1	C: 04024 0
32,3230	34746 0	00006 1	02033 0	00006 1	13242 1	33250 0	04616 1	C: 20476 0
32,3240	16001 1	13230 1	04616 1	C: 67704 0	04635 0	C: 74124 0	C: 02074 0	C: 00027 1
32,3250	C: 00500 1	C: 00035 1	C: 30373 0	C: 00003 1	C: 37214 1	C: 00000 1	C: 00010 0	06036 1
32,3260	I: 77624 1	C: 61055 0	I: 77776 1	34751 0	55513 0	33607 0	55453 0	05516 0
32,3270	C: 00214 0	05516 0	C: 00175 1	05516 0	C: 00161 1	05504 0	C: 00307 0	05321 1
32,3300	C: 00106 0	13525 1	06036 1	I: 77624 1	C: 65555 1	I: 54345 1	C: 34003 0	C: 20205 1
32,3310	I: 77665 1	C: 01245 0	C: 16265 1	C: 01245 0	I: 70471 1	C: 24003 1	C: 03633 1	C: 03635 1
32,3320	C: 03637 0	I: 77665 1	C: 25606 0	C: 16257 0	C: 34005 0	I: 54276 0	C: 20214 1	C: 02263 0
32,3330	I: 57535 0	C: 26002 1	I: 77702 1	C: 02261 0	I: 45014 0	C: 04467 0	C: 60230 0	I: 77650 1
32,3340	C: 65371 1	05321 1	C: 00106 0	33572 1	64753 1	55644 1	05173 1	C: 03356 1
32,3350	05353 1	C: 47014 1	C: 76133 1	C: 03356 1	C: 64067 1	15155 1	04674 0	C: 75551 1
32,3360	33407 1	55260 0	05516 0	C: 00163 0	05516 0	C: 00162 1	05353 1	C: 00004 0
32,3370	15261 0	I: 77414 0	C: 04461 0	03564 0	05353 1	C: 04024 0	04616 1	C: 73707 0

OCTAL LISTING FOR PARAGRAPH # 173, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

32,3400	03564 0	00006 1	33611 1	53253 0	05353 1	C: 00004 0	15155 1	C: 65410 1
32,3410	05327 1	C: 00002 0	C: 05024 1	C: 25000 0	06036 1	I: 43234 0	C: 21462 1	C: 25576 1
32,3420	C: 03557 0	C: 34041 0	C: 27057 0	I: 77775 1	C: 00007 0	C: 03551 0	I: 76521 0	C: 01734 0
32,3430	C: 27525 0	C: 00001 0	C: 03543 0	I: 52521 0	C: 01734 0	C: 37517 0	C: 67162 0	I: 45014 0
32,3440	C: 04471 1	C: 60313 0	I: 77776 1	05353 1	C: 04024 0	06036 1	I: 77214 0	C: 04671 0
32,3450	C: 03646 0	I: 76505 0	C: 01734 0	C: 03654 0	I: 77646 0	C: 27662 0	C: 03543 0	C: 27640 0
32,3460	C: 03551 0	C: 17646 0	C: 03557 0	C: 03440 1	I: 43014 0	C: 01067 1	C: 04666 0	I: 77776 1
32,3470	36241 0	55325 0	35023 0	05146 1	33612 1	54332 1	55324 1	05321 1
32,3500	C: 00106 0	13515 1	33521 1	55566 1	33523 0	55567 0	05353 1	C: 05024 1
32,3510	C: 13000 0	31567 1	05314 1	31566 0	04640 1	33522 1	55566 1	33524 1
32,3520	13505 0	C: 75147 1	C: 75410 0	C: 00050 1	C: 00052 0	05516 0	C: 00215 1	36000 1
32,3530	55251 1	06036 1	I: 45014 0	C: 04707 0	C: 65542 1	C: 65555 1	I: 52131 0	C: 00053 1
32,3540	C: 65337 0	C: 60204 1	I: 72545 0	C: 03515 0	C: 37643 1	C: 60204 1	I: 77776 1	05353 1
32,3550	C: 04024 0	00006 1	31643 1	53515 0	13376 1	I: 45234 0	C: 21462 1	C: 03440 1
32,3560	I: 77614 0	C: 20214 1	C: 03515 0	I: 77616 0	34737 0	54055 0	34750 1	00006 1
32,3570	05014 1	00002 0	C: 00453 0	C: 00000 1	C: 01750 1	C: 00000 1	C: 21450 0	C: 01161 0
32,3600	C: 00000 1	C: 00021 1	C: 33400 0	C: 11021 1	C: 00000 1	C: 00507 0	C: 25605 0	C: 02110 0
32,3610	C: 03637 0	C: 70067 1	C: 00003 1	I: 44301 0	C: 00163 0	C: 17743 1	I: 77776 1	07221 1
32,3620	C: 00006 1	C: 00000 1	C: 00002 0	C: 76777 1	C: 77175 1	C: 77400 0	C: 75416 0	C: 77507 0
32,3630	C: 65515 0	C: 77741 0	C: 63547 1	C: 77052 0	C: 55373 0	C: 01167 0	C: 30361 0	C: 76520 1
32,3640	C: 75267 0	34755 1	54156 1	00006 1	33660 1	52155 1	52132 0	30162 1
32,3650	07306 0	52156 1	52155 1	52132 0	20155 1	06036 1	I: 43476 0	C: 00542 1
32,3660	C: 34414 1	31235 1	55075 0	05504 0	C: 00036 1	04616 1	C: 17263 0	44743 1
32,3670	00006 1	03011 1	05327 1	C: 00005 1	C: 05022 1	C: 20000 0	06036 1	I: 43014 0
32,3700	C: 01464 0	C: 03664 0	I: 45014 0	C: 03267 1	C: 27513 0	I: 77414 0	C: 03671 1	31260 1
32,3710	04640 1	00006 1	33747 0	53253 0	40103 1	74745 1	26103 1	34735 1
32,3720	54107 0	00006 1	34755 1	52753 1	30102 1	74744 0	10000 0	13733 1
32,3730	00006 1	34755 1	52755 1	00006 1	34755 1	52757 0	00006 1	34755 1
32,3740	52765 1	34764 0	54001 1	40000 0	52761 0	15644 0	C: 03525 0	C: 76067 1
32,3750	00006 1	30025 0	53657 0	00006 1	30033 1	53661 0	30034 0	55662 0
32,3760	30037 0	55663 1	00006 1	30041 1	53665 1	05261 1	C: 03766 0	C: 03767 1
32,3770	CKSM 73541 0	a	a	a	a	a	a	a

OCTAL LISTING FOR PARAGRAPH # 174, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "Q" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

33,2000	C: 41545 0	C: 42365 1	C: 61000 0	C: 71210 1	C: 00000 1	C: 00000 1	C: 72333 1	C: 45546 1
33,2010	C: 65363 1	C: 64451 0	C: 21241 0	C: 03216 1	C: 30153 0	C: 23101 0	C: 63105 0	C: 61733 1
33,2020	C: 01507 1	C: 00321 1	C: 26706 1	C: 00150 0	C: 33343 0	C: 02630 0	C: 25010 1	C: 24402 1
33,2030	C: 26003 0	C: 61377 0	C: 55754 1	C: 77644 1	C: 65556 1	C: 64453 1	C: 55670 0	C: 00002 0
33,2040	C: 11777 0	C: 01023 1	C: 37155 1	C: 00065 1	C: 06244 0	40110 0	74742 0	00006 1
33,2050	12123 1	00004 0	26110 0	44736 0	00006 1	03012 1	44740 1	70076 1
33,2060	54076 1	44753 0	70074 0	54074 0	04616 1	C: 52156 1	34740 0	70110 0
33,2070	10000 0	12104 1	35031 0	05072 1	C: 02113 0	C: 66067 0	44742 0	70110 0
33,2100	54110 0	34736 1	26110 0	12623 0	34753 1	05203 0	C: 03601 0	C: 52067 1
33,2110	34741 1	26110 0	12623 0	34753 1	05203 0	C: 02171 1	C: 52067 1	04616 1
33,2120	C: 17667 0	15155 1	15155 1	00006 1	41235 0	52155 1	00006 1	30025 0
33,2130	20155 1	54163 1	30155 0	00006 1	74740 1	52155 1	06036 1	I: 52315 1
33,2140	C: 01726 0	C: 03525 0	I: 74325 0	I: 52255 1	C: 01720 0	C: 03517 1	I: 77414 0	C: 01043 1
33,2150	C: 66152 1	12623 0	C: 25102 0	C: 00001 0	I: 77761 1	C: 26177 1	C: 01761 0	I: 77414 0
33,2160	C: 01263 1	40074 0	74753 0	00006 1	12623 0	00004 0	26074 0	11056 1
33,2170	44776 1	64777 1	05203 0	C: 03253 0	C: 50067 0	12623 0	C: 00006 1	C: 10000 0
33,2200	05353 1	C: 16035 0	C: 20000 0	C: 02211 1	C: 66067 0	37715 0	55075 0	04616 1
33,2210	C: 15263 1	06036 1	I: 51575 1	C: 00325 0	I: 77776 1	30154 1	55246 1	00006 1
33,2220	72020 0	53512 1	00006 1	31245 0	53567 0	40104 0	74744 0	00006 1
33,2230	12251 1	30106 0	74737 1	10000 0	00006 1	32001 1	54002 1	00006 1
33,2240	31512 0	00006 1	10002 1	00006 1	71244 0	53567 0	00006 1	31245 0
33,2250	21567 0	32021 0	07306 0	52155 1	21506 1	37711 1	05146 1	02473 0
33,2260	04616 1	C: 47521 1	06036 1	I: 45160 1	C: 02145 0	C: 31271 1	I: 77776 1	34736 1
33,2270	05146 1	06036 1	I: 45014 0	C: 03307 0	C: 67064 1	C: 67030 0	I: 77776 1	03535 1
33,2300	02456 1	55160 0	55161 1	55162 1	44741 0	70076 1	54076 1	34745 0
33,2310	70103 1	10000 0	12345 0	40102 0	74752 1	10000 0	12351 0	41251 1
33,2320	61246 0	00006 1	62355 0	40076 1	74741 0	26076 1	34753 1	55513 0
33,2330	30106 0	74737 1	10000 0	12400 0	34743 0	00006 1	02032 1	00006 1
33,2340	12400 0	44736 0	70111 1	54111 1	12403 0	44752 1	70102 0	54102 0
33,2350	12400 0	40102 0	74752 1	26102 0	12400 0	03535 1	11513 0	12371 1
33,2360	10761 0	12403 0	05353 1	C: 00374 1	37712 1	05072 1	C: 02574 0	C: 74067 0
33,2370	12403 0	55566 1	03535 1	31566 0	55513 0	00004 0	04674 0	C: 40165 1

OCTAL LISTING FOR PARAGRAPH # 175, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

33,2400	40111 1	74736 0	26111 1	00003 1	04616 1	C: 40457 0	35016 0	54003 0
33,2410	30167 1	75004 1	54166 1	22007 0	52121 1	03535 1	00006 1	31253 1
33,2420	52006 0	06036 1	I: 43175 0	C: 03543 0	C: 03347 1	C: 66450 0	I: 64252 0	C: 01734 0
33,2430	C: 37517 0	C: 67162 0	I: 76575 1	C: 03551 0	I: 77721 0	C: 01734 0	C: 27525 0	C: 01726 0
33,2440	I: 53435 0	C: 01720 0	C: 03716 1	I: 77776 1	00006 1	34755 1	52755 1	12453 0
33,2450	I: 77624 1	C: 66762 1	I: 77776 1	32472 1	02457 0	05155 0	36007 0	00004 0
33,2460	77746 1	54061 1	00006 1	50061 0	31543 1	50061 0	53221 0	10061 1
33,2470	12460 0	00002 0	C: 00022 1	31156 1	54766 1	31157 0	54770 0	31155 1
33,2500	54772 1	00002 0	00004 0	45015 1	70107 0	65015 0	54107 0	37717 1
33,2510	05105 0	C: 03653 1	C: 66067 0	12573 1	I: 77776 1	40107 0	74735 0	00006 1
33,2520	12601 0	34746 0	70107 0	00006 1	12753 0	34743 0	70107 0	00006 1
33,2530	12742 0	34741 1	70107 0	00006 1	12550 1	34745 0	00006 1	02033 0
33,2540	00006 1	13205 1	34737 0	00006 1	02012 0	00006 1	12571 1	12573 0
33,2550	31640 1	61427 1	00006 1	62564 1	34741 1	56003 1	54001 1	41545 0
33,2560	22003 1	61430 1	00006 1	62502 1	34746 0	00006 1	02033 0	00006 1
33,2570	13205 1	05567 0	C: 00511 1	00004 0	43204 0	70107 0	54107 0	04674 0
33,2600	C: 53607 0	03535 1	30077 1	75014 0	10000 0	12617 1	30110 1	72242 0
33,2610	10000 0	12617 1	30110 1	77707 1	10000 0	12623 0	12045 0	00004 0
33,2620	44742 0	70110 0	54110 0	06036 1	I: 51575 1	C: 03571 1	I: 45206 1	C: 02337 1
33,2630	C: 03533 1	I: 47075 0	C: 26026 1	C: 21516 0	C: 27740 1	C: 03535 1	I: 76435 1	C: 03716 1
33,2640	C: 27724 0	C: 03571 1	I: 60505 1	C: 01734 0	C: 27543 0	C: 03577 1	I: 76505 0	C: 01734 0
33,2650	C: 27551 0	C: 03535 1	I: 51435 1	C: 03577 1	I: 63552 0	I: 77671 1	I: 47075 0	C: 26030 0
33,2660	C: 21516 0	I: 77776 1	00004 0	31534 1	55741 0	31536 0	55742 0	31540 1
33,2670	55743 1	30154 1	55714 0	00006 1	31571 0	53517 1	00006 1	31573 1
33,2700	53521 1	00006 1	31575 1	53523 0	00006 1	31577 0	53525 0	00006 1
33,2710	31601 1	53527 1	00006 1	31603 0	53531 0	12300 1	00006 1	50000 1
33,2720	32732 0	52156 1	00006 1	41533 1	20156 1	06726 1	34755 1	24133 0
33,2730	14631 0	C: 00007 0	C: 16100 1	C: 00016 0	C: 34200 1	C: 00000 1	C: 00364 0	C: 00010 0
33,2740	C: 35600 1	C: 01414 1	36241 0	04616 1	C: 66716 1	12531 0	05504 0	C: 00311 1
33,2750	05504 0	C: 00253 0	12531 0	34752 0	04616 1	C: 66716 1	12573 0	05504 0
33,2760	C: 00256 0	12573 0	I: 41456 0	C: 03535 1	I: 67340 1	C: 03376 0	C: 03377 1	I: 50076 0
33,2770	C: 67017 0	I: 50375 0	C: 06416 1	C: 03535 1	I: 41552 0	I: 44316 0	C: 27061 0	I: 56325 0

OCTAL LISTING FOR PARAGRAPH # 176, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

33,3000	C: 26040 1	C: 00043 0	C: 00041 1	I: 41205 0	C: 26042 0	I: 65361 0	C: 03535 1	I: 41205 0
33,3010	C: 26044 0	C: 00041 1	I: 76561 1	C: 06416 1	I: 45455 1	C: 74260 0	I: 41455 0	I: 60345 0
33,3020	C: 00043 0	C: 00050 1	I: 53663 1	C: 26032 1	C: 56623 0	I: 45561 1	C: 74216 1	I: 77616 0
33,3030	I: 61375 1	C: 00325 0	C: 01734 0	I: 76561 1	C: 26022 0	C: 03525 0	I: 41562 0	I: 41455 0
33,3040	C: 01237 0	I: 65255 0	C: 01227 1	C: 01250 1	I: 74261 1	C: 20207 0	I: 44055 1	C: 01221 1
33,3050	C: 00037 0	C: 37543 1	C: 66762 1	I: 53255 0	I: 77655 1	C: 01227 1	C: 37551 1	C: 00037 0
33,3060	C: 01463 1	C: 06315 0	C: 00010 0	C: 00000 1	I: 41575 0	C: 02323 1	I: 65255 0	C: 01726 0
33,3070	C: 01250 1	I: 74271 0	C: 27063 1	I: 77655 1	C: 01720 0	C: 37571 0	C: 67162 0	I: 53255 0
33,3100	C: 01726 0	I: 77626 0	C: 74200 0	I: 77776 1	03535 1	06036 1	I: 77775 1	C: 03561 0
33,3110	C: 26323 1	C: 03571 1	C: 25720 0	C: 03577 1	C: 01726 0	I: 77776 1	03535 1	06036 1
33,3120	I: 74375 0	C: 00325 0	C: 26024 0	I: 53206 0	C: 01237 0	I: 53206 0	C: 03525 0	I: 56325 0
33,3130	C: 01250 1	C: 27063 1	I: 77761 1	I: 77655 1	C: 03517 1	C: 37571 0	C: 67162 0	I: 53255 0
33,3140	I: 77655 1	C: 03525 0	C: 03577 1	I: 77646 0	C: 27470 1	C: 03535 1	I: 72441 0	C: 03577 1
33,3150	C: 27472 0	C: 03571 1	I: 72435 0	C: 02331 1	C: 17732 1	C: 00045 0	I: 77625 0	C: 02337 1
33,3160	C: 37533 0	C: 66514 1	I: 77656 1	C: 17535 1	C: 00043 0	I: 55261 1	C: 20207 0	C: 26036 0
33,3170	I: 74205 0	C: 27063 1	C: 03535 1	C: 03561 0	I: 77616 0	C: 00303 1	C: 00005 1	C: 33212 0
33,3200	C: 00014 1	C: 20000 0	C: 00000 1	C: 00310 0	C: 00110 1	34742 1	70107 0	10000 0
33,3210	12573 0	34750 1	70107 0	00006 1	13320 1	06036 1	I: 54345 1	C: 03653 1
33,3220	C: 20210 0	I: 74205 0	C: 26011 0	C: 02313 1	I: 77705 0	C: 02146 0	I: 45241 1	C: 03535 1
33,3230	C: 03533 1	C: 03663 1	I: 77776 1	30107 1	74741 0	00006 1	13253 1	06036 1
33,3240	I: 45246 0	C: 02501 1	I: 45252 0	C: 03533 1	I: 77776 1	25666 0	06722 0	13543 1
33,3250	13543 1	05516 0	C: 00263 0	40107 0	74744 0	10000 0	13320 1	06036 1
33,3260	I: 40545 1	C: 03533 1	I: 77776 1	00006 1	31663 0	52155 1	07543 1	00006 1
33,3270	13272 1	13320 1	54156 1	40001 1	61416 0	00006 1	63320 0	00006 1
33,3300	71420 1	00006 1	11416 1	54135 1	07312 0	06036 1	I: 77752 1	I: 53361 0
33,3310	C: 03535 1	C: 03571 1	C: 37655 0	C: 67162 0	I: 77776 1	03535 1	34755 1	03517 1
33,3320	03535 1	40107 0	74745 1	10000 0	13475 0	41647 1	54001 1	26001 1
33,3330	60001 0	60001 0	50120 1	52047 0	34741 1	54003 0	31661 1	54766 1
33,3340	31662 1	54770 0	31660 0	54772 1	04616 1	C: 47521 1	30120 1	54166 1
33,3350	06036 1	I: 45173 0	C: 02235 1	C: 47577 1	I: 54325 1	C: 03651 0	C: 20215 0	I: 41403 0
33,3360	C: 51764 0	I: 77776 1	44753 0	54163 1	31663 0	22007 0	52155 1	31664 1
33,3370	22007 0	52160 1	31665 0	22007 0	52162 0	35016 0	54003 0	06036 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

33,3740	C: 06422 0	I: 77624 1	C: 47575 0	C: 02251 0	I: 76435 1	C: 02243 0	C: 26235 1	C: 26003 0
33,3750	I: 77624 1	C: 47575 0	C: 02313 1	I: 77776 1	01646 1	C: 03755 0	C: 03756 0	CKSM 64155 1
33,3760	0	0	0	0	0	0	0	0
33,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 200, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

34,2000	I: 71220 1	C: 03630 1	C: 03440 1	C: 34041 0	C: 27057 0	I: 67175 0	C: 00001 0	C: 03376 0
34,2010	C: 03640 0	I: 57456 1	C: 27654 0	C: 00007 0	C: 03646 0	I: 53435 0	C: 03640 0	I: 66001 0
34,2020	C: 00001 0	C: 03375 0	I: 47206 0	C: 03654 0	I: 63372 1	I: 63315 0	C: 03654 0	C: 03432 1
34,2030	I: 76505 0	C: 00001 0	C: 03654 0	I: 77646 0	C: 27662 0	C: 03640 0	I: 53315 0	C: 03646 0
34,2040	C: 03654 0	I: 77624 1	C: 46277 1	I: 77624 1	C: 46407 0	I: 77624 1	C: 45636 0	C: 16325 1
34,2050	C: 00005 1	I: 77624 1	C: 46407 0	I: 77624 1	C: 45636 0	C: 36323 0	C: 03630 1	C: 00000 1
34,2060	C: 00020 0	C: 00003 1	C: 34661 1	C: 00606 1	C: 04467 0	C: 00601 0	C: 33216 1	C: 10000 0
34,2070	C: 00000 1	C: 00000 1	C: 00001 0	C: 00004 0	C: 31566 0	C: 00000 1	C: 01177 1	C: 00002 0
34,2100	C: 27311 1	C: 77754 1	C: 57611 0	C: 00000 1	C: 12326 0	C: 00116 1	C: 00730 0	C: 00000 1
34,2110	C: 06433 0	C: 00003 1	C: 25140 0	I: 43014 0	C: 03260 0	C: 03061 0	I: 43014 0	C: 03262 1
34,2120	C: 03063 1	I: 77745 1	C: 32364 1	C: 03604 0	C: 03612 1	I: 77201 1	C: 00001 0	C: 02307 1
34,2130	I: 41446 1	I: 70501 1	C: 00050 1	I: 51515 1	C: 03550 1	I: 55301 0	C: 00047 1	I: 53664 0
34,2140	C: 00046 0	C: 57175 0	I: 41215 1	C: 30070 0	I: 65301 0	C: 00047 1	C: 02325 1	I: 56342 1
34,2150	I: 75457 0	C: 20172 1	I: 53515 0	C: 02307 1	I: 47315 0	C: 02265 1	I: 77656 1	I: 72441 0
34,2160	C: 03470 1	I: 45421 1	C: 60205 0	C: 30062 0	C: 03610 0	I: 43345 1	C: 03604 0	C: 30072 1
34,2170	C: 03604 0	I: 77025 0	C: 30060 1	C: 00006 1	I: 77644 1	C: 70776 0	I: 77601 0	C: 00001 0
34,2200	I: 51545 1	C: 03572 1	I: 50025 0	C: 30064 0	C: 70224 1	I: 43174 1	C: 00007 0	C: 03300 1
34,2210	C: 70776 0	I: 43014 0	C: 03342 1	C: 70216 0	C: 03303 1	C: 70776 0	I: 71214 0	C: 03060 1
34,2220	C: 30066 1	I: 77765 0	C: 03572 1	C: 03572 1	I: 41575 0	C: 02307 1	I: 63256 0	C: 02265 1
34,2230	I: 53435 0	I: 76561 1	C: 03572 1	C: 02273 0	I: 40055 0	C: 03470 1	C: 70237 0	C: 37564 1
34,2240	C: 46377 0	C: 26744 1	I: 77614 1	C: 03466 0	C: 26655 0	C: 32360 0	C: 36730 0	C: 24745 1
34,2250	I: 72142 0	C: 03375 0	C: 37602 1	C: 46307 1	I: 77624 1	C: 46407 0	C: 17600 1	C: 03617 1
34,2260	I: 52054 1	C: 70263 1	C: 70372 0	I: 77745 1	C: 02752 0	I: 50025 0	C: 30110 1	C: 70372 0
34,2270	I: 45145 0	C: 00041 1	C: 46407 0	I: 60201 1	C: 00003 1	C: 00047 1	I: 50315 0	C: 02307 1
34,2300	C: 03564 0	I: 56246 1	C: 00003 1	I: 45257 0	C: 20201 0	C: 30100 0	I: 71240 1	C: 70372 0
34,2310	C: 02740 0	I: 45312 0	C: 30070 0	C: 14017 1	C: 02323 1	I: 56342 1	I: 41325 0	C: 02740 0
34,2320	C: 00041 1	I: 77624 1	C: 46407 0	I: 72412 0	I: 41366 1	I: 52414 1	C: 04343 1	C: 70330 0
34,2330	I: 50315 0	C: 02307 1	C: 03564 0	C: 03615 0	I: 77646 0	I: 41301 0	C: 00050 1	I: 53660 1
34,2340	C: 00047 1	C: 20204 0	C: 14015 0	C: 32364 1	C: 00021 1	I: 53575 0	C: 00015 0	C: 26730 1
34,2350	C: 02307 1	I: 75315 1	C: 03564 0	C: 03615 0	I: 45076 1	C: 46377 0	C: 26744 1	I: 77614 1
34,2360	C: 03466 0	C: 36655 1	C: 24745 1	I: 51125 0	C: 03615 0	C: 70376 1	I: 45345 1	C: 03602 0
34,2370	I: 52006 0	C: 70376 1	I: 71201 1	C: 00001 0	C: 32364 1	I: 77606 1	I: 41345 0	C: 03465 0

OCTAL LISTING FOR PARAGRAPH # 201, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "0" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

34,2400	C: 03602 0	I: 45261 0	C: 20217 1	I: 77615 0	C: 03632 0	C: 03374 1	I: 77021 1	C: 03634 0
34,2410	C: 00005 1	I: 40240 0	C: 70776 0	C: 00001 0	I: 63375 0	C: 03564 0	C: 02307 1	I: 77624 1
34,2420	C: 71062 0	C: 26315 1	C: 00007 0	C: 27512 1	C: 03504 0	I: 63201 1	C: 00001 0	C: 03476 1
34,2430	I: 77624 1	C: 71062 0	C: 27520 0	C: 00007 0	C: 37526 1	C: 71133 0	I: 40375 1	C: 02315 1
34,2440	C: 00001 0	I: 45115 0	C: 03542 1	C: 46277 1	I: 77624 1	C: 46407 0	C: 27602 0	C: 03542 1
34,2450	I: 63201 1	C: 00001 0	C: 02315 1	I: 65325 0	C: 03374 1	C: 03634 0	I: 41525 0	C: 33671 1
34,2460	I: 77624 1	C: 73422 1	I: 77624 1	C: 46363 0	I: 77745 1	C: 02263 1	I: 73401 0	C: 00007 0
34,2470	I: 53515 0	C: 03534 0	C: 00001 0	I: 47315 0	C: 02265 1	I: 77656 1	I: 71525 0	C: 02263 1
34,2500	I: 45561 1	C: 77754 1	I: 74345 0	I: 76455 1	C: 00023 0	I: 50206 0	C: 03534 0	I: 41552 0
34,2510	I: 72316 0	C: 00155 0	I: 50315 0	C: 03534 0	C: 03534 0	I: 57551 1	C: 00155 0	I: 50315 0
34,2520	C: 03550 1	C: 03550 1	I: 76371 0	I: 71244 0	C: 70542 0	C: 03604 0	I: 77025 0	C: 30072 1
34,2530	C: 00001 0	I: 77654 0	C: 72036 1	I: 70545 1	C: 03610 0	C: 03610 0	I: 77621 1	C: 03574 1
34,2540	C: 37572 0	C: 70165 1	I: 41566 1	I: 45276 0	C: 00007 0	C: 14013 0	I: 45425 0	C: 77762 1
34,2550	I: 77646 0	C: 14017 1	C: 00013 0	I: 45246 0	C: 00017 1	I: 71240 1	C: 70561 1	C: 00015 0
34,2560	C: 00013 0	I: 77745 1	C: 00013 0	I: 76561 1	I: 53455 0	C: 03534 0	I: 53515 0	C: 03550 1
34,2570	I: 53515 0	C: 03556 1	I: 63235 0	C: 00007 0	C: 00007 0	I: 50235 0	C: 00001 0	I: 77626 0
34,2600	C: 53762 1	I: 72441 0	I: 75326 1	C: 00015 0	I: 41542 1	I: 71214 0	C: 03301 0	C: 70644 0
34,2610	C: 00001 0	I: 65225 1	C: 03606 1	C: 03572 1	I: 60225 1	C: 03574 1	C: 00047 1	I: 65265 0
34,2620	C: 00003 1	C: 03572 1	C: 03574 1	I: 43014 0	C: 03342 1	C: 70656 0	C: 03343 0	C: 70656 0
34,2630	I: 41345 0	C: 00003 1	C: 03606 1	I: 71244 0	C: 70663 0	C: 30062 0	I: 77765 0	C: 03610 0
34,2640	C: 03610 0	I: 43014 0	C: 03062 0	C: 03263 0	I: 77745 1	C: 00001 0	C: 17606 1	C: 03572 1
34,2650	C: 03574 1	I: 43025 1	C: 03610 0	C: 03261 1	C: 37572 0	C: 70165 1	I: 43014 0	C: 03302 0
34,2660	C: 70702 0	C: 03303 1	C: 70702 0	I: 75345 1	C: 30102 1	C: 00005 1	I: 77765 0	C: 03606 1
34,2670	C: 03610 0	I: 43276 0	C: 03572 1	C: 17572 1	C: 00001 0	I: 43014 0	C: 03063 1	C: 03062 0
34,2700	C: 37606 0	C: 70176 0	I: 60345 0	C: 00005 1	C: 00050 1	I: 54065 0	C: 00001 0	C: 00047 1
34,2710	I: 77657 0	C: 20601 1	C: 17610 0	C: 00001 0	C: 03606 1	I: 51545 1	C: 03610 0	I: 45206 1
34,2720	C: 30076 0	I: 71240 1	C: 70737 0	I: 50025 0	C: 30106 0	C: 70732 0	I: 75345 1	C: 30106 0
34,2730	C: 03610 0	C: 03610 0	I: 45345 1	C: 03572 1	C: 03610 0	C: 37572 0	C: 70165 1	I: 77145 1
34,2740	C: 03600 1	C: 00002 0	I: 77750 0	C: 03375 0	I: 50023 0	C: 30072 1	C: 70776 0	I: 71374 1
34,2750	C: 00003 1	C: 03602 0	I: 50023 0	C: 30072 1	C: 70776 0	I: 45345 1	C: 03374 1	C: 03632 0
34,2760	C: 02257 0	I: 45374 0	C: 00004 0	C: 30112 0	I: 77040 0	C: 70776 0	C: 00005 1	I: 45345 1
34,2770	C: 03634 0	C: 03374 1	C: 02261 0	I: 51025 1	C: 30112 0	C: 72116 1	I: 43014 0	C: 03302 0

OCTAL LISTING FOR PARAGRAPH # 202, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

34,3000	C: 72040 0	C: 03343 0	C: 72040 0	I: 71334 0	C: 03611 1	C: 32364 1	I: 43014 0	C: 03260 0
34,3010	C: 03061 0	I: 43014 0	C: 03262 1	C: 03263 0	C: 37604 1	C: 70125 0	I: 71220 1	C: 03466 0
34,3020	C: 03440 1	C: 34041 0	C: 46341 0	I: 77214 0	C: 01067 1	C: 03556 1	C: 03526 0	C: 27504 0
34,3030	C: 03550 1	C: 03520 0	C: 03476 1	I: 47256 0	C: 03504 0	I: 77656 1	C: 26265 1	C: 03534 0
34,3040	C: 37640 1	C: 71052 0	C: 02315 1	C: 26307 1	C: 03542 1	C: 37646 1	C: 71052 0	C: 03512 1
34,3050	C: 37470 0	C: 03466 0	I: 41406 0	I: 74241 0	C: 02265 1	C: 02265 1	I: 51352 1	I: 63256 0
34,3060	I: 74246 1	I: 43572 0	I: 65325 0	C: 03632 0	C: 03374 1	I: 41525 0	C: 33671 1	I: 77650 1
34,3070	C: 73422 1	I: 65325 0	C: 03374 1	C: 03634 0	I: 41525 0	C: 32364 1	I: 77650 1	C: 73422 1
34,3100	I: 76020 1	C: 03466 0	C: 01521 0	I: 77624 1	C: 72334 0	I: 77624 1	C: 71120 1	I: 61375 1
34,3110	C: 03432 1	C: 00001 0	I: 77772 0	C: 03654 0	I: 51406 1	C: 27662 0	I: 77650 1	C: 03466 0
34,3120	I: 77201 1	C: 00007 0	C: 02265 1	I: 63276 1	C: 02307 1	I: 57456 1	I: 47206 0	C: 02265 1
34,3130	I: 77772 0	C: 00001 0	I: 77616 0	I: 77220 1	C: 03466 0	C: 02315 1	I: 53406 0	C: 27542 1
34,3140	C: 03520 0	I: 50256 0	C: 03542 1	I: 72406 0	C: 16732 0	I: 65316 0	C: 06414 0	I: 45302 1
34,3150	I: 72566 1	I: 57515 1	I: 77635 1	C: 03520 0	I: 65241 0	C: 02265 1	I: 45565 0	C: 51047 0
34,3160	C: 03520 0	I: 45115 0	C: 03526 0	C: 46377 0	C: 26744 1	I: 77614 1	C: 03666 1	C: 36655 1
34,3170	C: 24745 1	I: 53754 1	C: 03376 0	C: 57576 1	C: 00023 0	I: 76441 1	C: 03542 1	I: 51515 1
34,3200	I: 63257 1	C: 57576 1	C: 02315 1	I: 65246 1	I: 77625 0	C: 00003 1	C: 17576 0	C: 02742 1
34,3210	I: 65301 0	C: 00047 1	C: 00041 1	I: 77624 1	C: 46407 0	I: 56362 0	I: 41457 1	C: 20174 1
34,3220	I: 65225 1	C: 03576 0	I: 56302 0	C: 00005 1	I: 75406 1	I: 41275 1	C: 00007 0	C: 00001 0
34,3230	I: 65272 0	C: 00003 1	I: 65301 0	C: 00047 1	C: 02325 1	I: 56342 1	I: 65257 1	C: 20174 1
34,3240	C: 00005 1	I: 65301 0	C: 00050 1	C: 02325 1	I: 56342 1	I: 44257 1	C: 57604 1	I: 63525 0
34,3250	C: 00011 1	I: 75421 1	I: 47315 0	C: 02265 1	C: 03542 1	I: 74256 0	C: 00013 0	I: 74315 0
34,3260	C: 03542 1	C: 00011 1	I: 76455 1	I: 77626 0	C: 74235 0	I: 77651 0	C: 03512 1	C: 36301 0
34,3270	C: 03466 0	04616 1	C: 72313 0	03276 1	04616 1	C: 72320 0	04616 1	C: 72325 0
34,3300	33630 1	03617 1	33631 0	04616 1	C: 20510 1	16001 1	13313 1	13302 1
34,3310	36244 0	05464 1	15155 1	34756 1	55144 0	34753 1	55145 1	33632 0
34,3320	04616 1	C: 20510 1	16001 1	13330 0	13317 0	34751 0	05464 1	15155 1
34,3330	06036 1	I: 70535 0	C: 01146 0	I: 71230 0	C: 71342 1	C: 03627 1	C: 02307 1	I: 77614 1
34,3340	C: 01230 1	C: 71373 0	I: 43014 0	C: 01070 1	C: 00670 0	I: 77624 1	C: 71552 0	I: 43015 1
34,3350	C: 03440 1	C: 00470 1	C: 03627 1	I: 77776 1	33633 1	04616 1	C: 20510 1	16001 1
34,3360	13365 0	13354 1	36241 0	05464 1	15155 1	00006 1	31627 0	53046 0
34,3370	33634 0	03617 1	06036 1	I: 45014 0	C: 04266 1	C: 20041 0	I: 77624 1	C: 71552 0

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

34,3740	31155 1	55457 1	40107 0	74750 0	26107 0	05155 0	30101 1	74742 0
34,3750	00006 1	13755 1	05516 0	C: 00120 1	05155 0	34752 0	55672 1	05155 0
34,3760	C: 03760 0	C: 03761 1	CKSM 67165 1	a	a	a	a	a
34,3770	a	a	a	a	a	a	a	a

OCTAL LISTING FOR PARAGRAPH # 204, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

35,2000	05504 0	C: 00027 1	05504 0	C: 00031 0	32025 1	03651 0	33666 1	03651 0
35,2010	05516 0	C: 00027 1	06036 1	I: 77624 1	C: 70000 0	I: 77414 0	C: 00470 1	32026 1
35,2020	03651 0	06036 1	I: 77614 1	C: 01027 0	C: 72504 0	C: 01441 1	C: 01452 0	02313 1
35,2030	02032 1	02320 1	00006 1	32364 1	53617 1	02053 0	I: 77734 1	C: 03611 1
35,2040	I: 77740 1	C: 03611 1	I: 77533 1	C: 32367 1	30154 1	05735 0	35006 1	04616 1
35,2050	C: 20351 1	06001 0	02046 1	02325 1	32363 0	55465 0	32354 1	03651 0
35,2060	33663 1	04616 1	C: 20351 1	06001 0	02066 0	02060 0	33662 0	03651 0
35,2070	06036 1	I: 77745 1	C: 03632 0	C: 37440 0	C: 20041 0	I: 77624 1	C: 71016 0	I: 77201 1
35,2100	C: 00001 0	C: 03504 0	I: 65315 0	C: 03476 1	C: 03632 0	I: 65325 0	C: 03634 0	C: 33671 1
35,2110	I: 45006 0	C: 73422 1	I: 77624 1	C: 46373 1	I: 77624 1	C: 70113 0	I: 43014 0	C: 01311 0
35,2120	C: 72122 0	C: 00470 1	I: 77745 1	C: 02257 0	C: 02257 0	I: 51025 1	C: 32366 0	C: 72124 0
35,2130	I: 77745 1	C: 02261 0	C: 02261 0	I: 51025 1	C: 32366 0	C: 72132 1	I: 77776 1	32356 0
35,2140	03651 0	06036 1	I: 45175 0	C: 02273 0	C: 71100 0	C: 26273 0	C: 02315 1	C: 26307 1
35,2150	C: 02301 1	I: 45170 0	C: 01522 0	C: 72334 0	I: 77745 1	C: 03634 0	C: 37636 0	C: 73542 0
35,2160	I: 77650 1	C: 72075 0	02313 1	02165 1	02320 1	02325 1	32355 0	03651 0
35,2170	06036 1	I: 77745 1	C: 03636 1	C: 17634 0	C: 03374 1	C: 37440 0	C: 20041 0	I: 77624 1
35,2200	C: 71016 0	I: 77624 1	C: 71133 0	I: 77201 1	C: 00001 0	C: 03542 1	I: 45115 0	C: 02315 1
35,2210	C: 71071 1	I: 77624 1	C: 46363 0	I: 77201 1	C: 00001 0	C: 03526 0	I: 45115 0	C: 03520 0
35,2220	C: 71071 1	I: 77624 1	C: 46373 1	I: 43145 0	C: 32364 1	C: 03460 0	C: 36323 0	C: 72726 1
35,2230	I: 77454 1	C: 72246 1	05567 0	C: 00611 1	35006 1	04616 1	C: 20351 1	06001 0
35,2240	02242 1	02165 1	06036 1	I: 77745 1	C: 32364 1	C: 02323 1	I: 43014 0	C: 01311 0
35,2250	C: 72252 1	C: 00470 1	I: 43345 1	C: 02323 1	C: 03634 0	C: 03634 0	I: 77625 0	C: 03374 1
35,2260	I: 51025 1	C: 32366 0	C: 72260 0	I: 77615 0	C: 32366 0	C: 16257 0	C: 03634 0	I: 41425 1
35,2270	C: 03636 1	I: 45246 0	C: 32366 0	I: 43244 1	C: 72271 0	C: 32366 0	I: 45565 0	C: 75516 1
35,2300	I: 77776 1	32356 0	03651 0	06036 1	I: 45175 0	C: 02301 1	C: 71100 0	C: 36301 0
35,2310	C: 73542 0	I: 77650 1	C: 72177 0	00006 1	23466 1	05504 0	C: 00050 1	01466 1
35,2320	00006 1	23466 1	05516 0	C: 00050 1	01466 1	00006 1	23466 1	05504 0
35,2330	C: 00027 1	05504 0	C: 00031 0	01466 1	C: 03432 1	I: 45020 1	C: 03461 1	C: 71120 1
35,2340	I: 64375 1	C: 03432 1	C: 00001 0	I: 66172 0	C: 03613 0	C: 03432 1	I: 77776 1	31613 1
35,2350	03651 0	06036 1	I: 77650 1	C: 03461 1	C: 01413 0	C: 01415 0	C: 01513 1	C: 77776 1
35,2360	C: 62460 1	C: 17777 0	C: 37776 0	C: 00000 1	C: 00000 1	C: 00025 0	C: 37100 1	C: 00600 1
35,2370	C: 00601 0	C: 00602 0	C: 00603 1	C: 00604 0	C: 00605 1	C: 00606 1	00006 1	23463 1

OCTAL LISTING FOR PARAGRAPH # 205, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "3" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

35,2400	34755 1	55163 0	34752 0	00004 0	05203 0	C: 02722 1	C: 74067 0	05327 1
35,2410	C: 40036 0	C: 05024 1	C: 13000 0	01463 1	02325 1	32025 1	03651 0	06036 1
35,2420	I: 71214 0	C: 00670 0	C: 03440 1	C: 34041 0	C: 27057 0	I: 40375 1	C: 00001 0	C: 00001 0
35,2430	C: 03640 0	C: 26327 0	C: 00007 0	C: 03646 0	C: 16335 0	C: 32364 1	I: 65206 0	C: 03450 0
35,2440	I: 66015 0	C: 03440 1	C: 03375 0	C: 03627 1	I: 45134 0	C: 03376 0	C: 22000 1	I: 41575 0
35,2450	C: 03366 1	C: 03654 0	I: 43046 1	C: 01267 0	C: 37662 1	C: 20021 0	I: 63375 0	C: 03640 0
35,2460	C: 02343 1	I: 77624 1	C: 46277 1	I: 77624 1	C: 46407 0	I: 77624 1	C: 45636 0	C: 16325 1
35,2470	C: 00005 1	I: 77624 1	C: 46407 0	I: 77624 1	C: 45636 0	C: 02323 1	I: 77776 1	33666 1
35,2500	03651 0	32026 1	03651 0	06036 1	I: 45014 0	C: 01071 0	C: 73542 0	I: 77650 1
35,2510	C: 72504 0	02313 1	02514 0	02320 1	02325 1	33662 0	03651 0	00006 1
35,2520	33706 0	53617 1	03630 1	06036 1	I: 71214 0	C: 01270 0	C: 03634 0	C: 17440 1
35,2530	C: 02263 1	I: 43054 1	C: 72534 0	C: 01070 1	I: 77624 1	C: 20041 0	I: 43145 0	C: 06424 0
35,2540	C: 03460 0	I: 43014 0	C: 01310 1	C: 72545 0	C: 03660 1	C: 02323 1	I: 43345 1	C: 03634 0
35,2550	C: 02323 1	C: 34041 0	C: 46341 0	I: 77624 1	C: 72726 1	I: 77454 1	C: 72567 0	05567 0
35,2560	C: 00611 1	35006 1	04616 1	C: 20351 1	06001 0	02514 0	02557 1	I: 43014 0
35,2570	C: 03600 1	C: 72546 0	C: 01310 1	C: 72577 1	I: 77776 1	03630 1	02602 1	I: 77776 1
35,2600	33662 0	03651 0	06036 1	I: 71201 1	C: 00001 0	C: 03376 0	C: 14047 1	C: 03617 1
35,2610	I: 71406 0	C: 16732 0	I: 77756 0	C: 26730 1	C: 03550 1	I: 77657 0	C: 57176 0	C: 26655 0
35,2620	C: 03556 1	I: 43057 1	C: 57176 0	C: 03466 0	C: 36744 0	C: 24745 1	I: 77745 1	C: 03634 0
35,2630	C: 03606 1	I: 77615 0	C: 00037 0	C: 37627 0	C: 73250 1	I: 51575 1	C: 03366 1	C: 27574 1
35,2640	C: 03504 0	I: 51451 0	C: 03564 0	C: 26354 1	C: 03534 0	I: 45115 0	C: 02343 1	C: 46277 1
35,2650	I: 77624 1	C: 46407 0	C: 17604 0	C: 03634 0	C: 03440 1	I: 77776 1	33664 0	03651 0
35,2660	06036 1	I: 77624 1	C: 73456 1	I: 77624 1	C: 73542 0	I: 77650 1	C: 72536 1	02313 1
35,2670	00006 1	31401 0	02676 1	02320 1	00006 1	31403 1	53574 1	02325 1
35,2700	06036 1	I: 77624 1	C: 20041 0	I: 77634 0	C: 21462 1	C: 03610 0	I: 77615 0	C: 03574 1
35,2710	C: 03440 1	C: 03606 1	C: 34041 0	C: 46341 0	I: 77624 1	C: 73236 1	I: 77624 1	C: 73250 1
35,2720	I: 77624 1	C: 73456 1	I: 77624 1	C: 73542 0	I: 77650 1	C: 72703 0	I: 66220 1	C: 03461 1
35,2730	C: 03612 1	C: 40000 0	I: 40345 1	C: 33673 0	C: 00001 0	C: 27572 1	C: 03534 0	C: 27476 1
35,2740	C: 03542 1	C: 27504 0	C: 03550 1	C: 27520 0	C: 03556 1	C: 03526 0	I: 77624 1	C: 73236 1
35,2750	I: 63235 0	C: 03534 0	I: 53515 0	C: 03534 0	I: 46315 1	I: 51352 1	C: 02315 1	I: 63256 0
35,2760	I: 63241 0	C: 00001 0	I: 75241 1	C: 02315 1	I: 65552 0	I: 50315 0	C: 02315 1	C: 03534 0
35,2770	I: 71244 0	C: 72774 0	C: 06432 1	I: 41425 1	I: 71214 0	C: 03740 1	C: 73223 0	C: 03574 1

OCTAL LISTING FOR PARAGRAPH # 206, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

35,3000	C: 14033 1	I: 77625 0	C: 02263 1	C: 03574 1	I: 45246 0	C: 33677 1	I: 77640 0	C: 73233 1
35,3010	I: 70535 0	C: 03612 1	I: 72030 1	C: 03461 1	C: 00154 1	I: 77330 1	C: 03611 1	C: 03550 1
35,3020	I: 65256 0	C: 00045 0	I: 53515 0	C: 03534 0	I: 77725 1	I: 41525 0	C: 00045 0	I: 77621 1
35,3030	C: 00015 0	C: 14037 0	C: 06422 0	I: 41425 1	C: 02263 1	I: 50165 0	C: 00037 0	C: 03461 1
35,3040	I: 71545 0	I: 56205 0	C: 00017 1	C: 00015 0	I: 77676 0	C: 00035 1	I: 44246 1	C: 06422 0
35,3050	I: 77240 1	C: 03461 1	C: 02265 1	I: 53435 0	C: 00007 0	I: 41241 0	C: 03542 1	C: 00015 0
35,3060	I: 47315 0	C: 00001 0	C: 03556 1	I: 53435 0	C: 00001 0	I: 41241 0	C: 03556 1	C: 00017 1
35,3070	I: 77621 1	I: 63301 0	C: 00047 1	C: 00007 0	C: 50235 0	C: 00001 0	C: 02265 1	I: 50315 0
35,3100	C: 00001 0	C: 00007 0	I: 65552 0	I: 77765 0	I: 43225 0	C: 06422 0	C: 02263 1	I: 65525 0
35,3110	C: 00035 1	I: 75221 1	C: 06422 0	C: 00037 0	I: 77615 0	I: 56205 0	C: 33671 1	I: 77605 1
35,3120	I: 41257 1	C: 20176 0	I: 51406 1	I: 50025 0	C: 03572 1	C: 73131 0	I: 75345 1	C: 03572 1
35,3130	I: 77606 1	I: 51135 1	C: 03612 1	C: 73141 1	I: 71331 0	C: 03612 1	C: 37777 1	I: 77650 1
35,3140	C: 73177 1	I: 41345 0	C: 03574 1	C: 00033 1	I: 71244 0	C: 73155 1	C: 03572 1	I: 77605 1
35,3150	C: 33675 0	C: 17572 1	I: 70446 0	I: 52076 1	C: 73165 1	I: 51545 1	C: 03574 1	I: 51525 1
35,3160	C: 00033 1	I: 77625 0	I: 71240 1	C: 73170 0	I: 77646 0	I: 52165 1	C: 03604 0	C: 73177 1
35,3170	I: 57545 1	C: 03604 0	I: 70406 1	C: 03604 0	I: 77615 0	I: 77650 1	C: 73200 1	C: 03604 0
35,3200	I: 77615 0	C: 02323 1	C: 02323 1	I: 63375 0	C: 03504 0	C: 03476 1	I: 77624 1	C: 73416 0
35,3210	I: 77624 1	C: 46363 0	I: 63375 0	C: 03526 0	C: 03520 0	I: 77624 1	C: 73416 0	I: 77624 1
35,3220	C: 46373 1	I: 77650 1	C: 72746 1	I: 43345 1	C: 03634 0	C: 02323 1	C: 17634 0	I: 77614 1
35,3230	C: 01310 1	C: 73233 1	C: 02263 1	I: 52145 0	C: 06424 0	C: 03461 1	I: 52375 1	C: 03550 1
35,3240	C: 03534 0	I: 41456 0	C: 26315 1	C: 03534 0	I: 53435 0	C: 03542 1	C: 02265 1	I: 77616 0
35,3250	I: 77220 1	C: 03466 0	C: 03556 1	I: 65315 0	C: 03550 1	C: 03606 1	I: 65325 0	C: 03627 0
35,3260	C: 06424 0	I: 45006 0	C: 73422 1	C: 27442 0	C: 00007 0	C: 27504 0	C: 03442 0	I: 63256 0
35,3270	C: 03534 0	I: 41456 0	I: 50235 0	C: 00001 0	C: 02265 1	I: 77715 1	I: 72441 0	C: 00001 0
35,3300	I: 75326 1	I: 43244 1	C: 73304 1	C: 06432 1	C: 15756 1	C: 03627 1	I: 77625 0	C: 03606 1
35,3310	C: 03450 0	I: 40335 0	C: 33701 1	C: 00001 0	I: 63325 0	C: 33704 1	C: 03534 0	C: 26327 0
35,3320	C: 03542 1	C: 36335 1	C: 22000 1	I: 77624 1	C: 73403 1	I: 64375 1	C: 03366 1	C: 00001 0
35,3330	I: 77772 0	C: 37432 0	C: 03466 0	I: 45020 1	C: 03461 1	C: 73403 1	I: 61375 1	C: 03432 1
35,3340	C: 00001 0	I: 77772 0	C: 03366 1	I: 63255 0	C: 03542 1	C: 03534 0	I: 65325 0	C: 03440 1
35,3350	C: 03627 1	I: 41525 0	C: 06432 1	I: 77624 1	C: 73422 1	I: 77775 1	C: 00001 0	C: 03442 0
35,3360	I: 41575 0	C: 02315 1	I: 57435 1	C: 02265 1	I: 41456 0	I: 76435 1	C: 02315 1	I: 77715 1
35,3370	I: 64315 1	C: 03366 1	C: 00001 0	I: 77772 0	C: 36307 0	C: 03461 1	I: 40220 0	C: 03461 1

OCTAL LISTING FOR PARAGRAPH # 207, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

35,3400	C: 00001 0	I: 77650 1	C: 73360 0	I: 57575 1	C: 02265 1	C: 24007 0	C: 03534 0	I: 57456 1
35,3410	C: 00015 0	I: 76435 1	C: 02265 1	C: 00001 0	I: 43401 0	C: 00023 0	I: 65325 0	C: 06424 0
35,3420	C: 02323 1	I: 41406 0	I: 45020 1	C: 03463 0	C: 27412 0	I: 71214 0	C: 01673 1	I: 43054 1
35,3430	C: 73432 0	C: 01473 0	I: 45545 1	C: 63736 0	I: 73014 0	C: 00063 1	C: 03376 0	I: 43014 0

35,3440	C: 04303 0	C: 73443 0	C: 00263 0	C: 25517 0	I: 77657 0	C: 57176 0	C: 25535 0	I: 77657 0
35,3450	C: 57176 0	C: 35543 0	C: 27107 1	I: 52175 0	C: 00001 0	C: 03463 0	I: 43020 1	C: 03466 0
35,3460	C: 01311 0	C: 73465 1	I: 52014 0	C: 00470 1	C: 73532 1	I: 77214 0	C: 03274 0	C: 03432 1
35,3470	C: 01237 0	I: 77776 1	33666 1	04616 1	C: 20351 1	06001 0	03500 1	03472 0

35,3500	35016 0	54003 0	22007 0	34756 1	54002 1	50002 0	41431 1	50002 0
35,3510	61236 1	26001 1	10002 1	13504 1	22000 1	00006 1	13521 0	05504 0
35,3520	C: 00146 1	06036 1	1: 45014 0	C: 03354 0	C: 73526 1	C: 73333 0	1: 77214 0	C: 01267 0
35,3530	C: 03366 1	C: 03654 0	1: 77624 1	C: 73376 1	1: 77776 1	33665 1	03651 0	06036 1

35,3540	I: 77650 1	C: 03466 0	I: 71220 1	C: 03466 0	C: 33702 1	C: 02257 0	I: 71214 0	C: 01351 1
35,3550	C: 73570 1	C: 33702 1	I: 77615 0	C: 33702 1	C: 02257 0	I: 77414 0	C: 01742 1	C: 73570 1
35,3560	03643 0	03563 1	03571 1	06036 1	I: 41575 0	C: 03654 0	I: 77624 1	C: 20005 0
35,3570	I: 77776 1	02376 1	31466 1	55462 1	34777 1	04616 1	C: 01735 1	33667 0

35,3600	04616	1	C:	20351	1	03605	1	03610	0	03620	0	30005	1	55163	0	06001	0				
35,3610	40076	1		74746	1	00006	1	13605	0	05353	1	C:	04024	0	05504	0	C:	00047	1		
35,3620	30005	1		55163	0	05353	1	C:	04024	0	06036	1	I:	52014	0	C:	00670	0	C:	03462	1
35,3630	00006	1		23461	0	33663	1	04616	1	C:	20510	1	16001	1	01461	0				13632	1

35,3640	34753 1	05464 1	15155 1	37743 0	71011 1	00006 1	13650 0	24002 0
35,3650	00002 0	00006 1	23463 1	55613 0	31613 1	04616 1	C: 20351 1	16001 1
35,3660	01463 1	13654 1	C: 01445 0	C: 01467 0	C: 01472 1	C: 01473 0	C: 01521 0	C: 04055 0
35,3670	C: 14441 0	C: 37325 1	C: 00001 0	C: 20650 0	C: 12525 0	C: 12525 0	C: 00004 0	C: 21505 1

35,3700	C: 00002 0	C: 77777 0	C: 61337 1	C: 01252 0	C: 25253 1	C: 13434 0	C: 16162 0	04645 1
35,3710	55164 1	04616 1	C: 54233 1	10000 0	13726 0	34737 0	70106 1	10000 0
35,3720	13733 1	34747 1	000006 1	02030 0	000006 1	13733 1	33735 0	04616 1
35,3730	C: 20476 0	16001 1	13711 1	31164 0	04640 1	C: 00203 0	C: 03736 0	C: 03737 1

35,3740	CKSM 54546 1	၁	၁	၁	၁	၁	၁	၁
35,3750	၁	၁	၁	၁	၁	၁	၁	၁
35,3760	၁	၁	၁	၁	၁	၁	၁	၁
35,3770	၁	၁	၁	၁	၁	၁	၁	၁

OCTAL LISTING FOR PARAGRAPH # 210, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

36,2000	C: 01056 0	C: 37167 0	C: 00457 1	C: 03250 0	C: 77777 0	C: 77731 1	C: 00307 0	C: 11040 0
36,2010	C: 00151 1	C: 05214 0	C: 77777 0	C: 77765 0	C: 00026 0	C: 30605 1	C: 00013 0	C: 14303 1
36,2020	C: 00030 1	C: 00014 1	C: 01512 0	C: 01512 0	12615 0	13072 0	15261 0	12144 0
36,2030	C: 00000 1	C: 03525 0	C: 76067 1	12364 0	12541 1	12506 1	C: 01450 1	C: 01450 1
36,2040	12617 1	13057 1	12564 0	12144 0	C: 04300 0	C: 03641 1	C: 74066 1	12360 1
36,2050	12541 1	12467 1	12147 0	C: 77776 1	C: 03376 0	C: 74066 1	15261 0	12545 0
36,2060	C: 01450 1	C: 01450 1	12617 1	13057 1	15261 0	12144 0	C: 05120 1	C: 03641 1
36,2070	C: 74066 1	12360 1	12541 1	12516 0	C: 01476 0	C: 01475 0	12615 0	13006 0
36,2100	12556 1	12147 0	C: 04300 0	C: 03525 0	C: 76067 1	12364 0	12541 1	12440 1
36,2110	C: 01477 1	12112 0	12615 0	13072 0	15261 0	12116 1	12117 0	12120 1
36,2120	12121 0	12364 0	12541 1	12503 1	05353 1	C: 04024 0	34755 1	55505 1
36,2130	55506 1	04616 1	C: 73707 0	00006 1	31440 0	53510 0	00004 0	04674 0
36,2140	C: 75564 1	00003 1	51453 1	10005 0	44747 0	04616 1	C: 74667 0	06036 1
36,2150	I: 45345 1	C: 03440 1	C: 35143 1	C: 34041 0	C: 61055 0	I: 45014 0	C: 03347 1	C: 74176 1
36,2160	C: 27043 0	I: 64375 1	C: 00025 0	C: 01734 0	I: 77762 1	C: 25726 0	C: 00017 1	I: 64312 0
36,2170	C: 01734 0	C: 35720 1	C: 67162 0	C: 16323 1	C: 00015 0	C: 00041 1	I: 77624 1	C: 27603 1
36,2200	12207 1	00006 1	31557 1	53440 1	00006 1	33143 1	21440 1	52155 1
36,2210	53476 1	00006 1	43741 1	21476 1	00006 1	31476 0	05277 0	C: 02236 1
36,2220	C: 74067 0	05353 1	C: 20254 0	05321 1	C: 00077 1	15155 1	44747 0	55163 0
36,2230	06036 1	I: 51575 1	C: 03551 0	C: 03470 1	I: 77776 1	15155 1	33741 0	05173 1
36,2240	C: 02274 1	05353 1	C: 40154 0	44752 1	55163 0	51453 1	40006 0	00006 1
36,2250	65261 1	33145 1	05173 1	C: 02264 0	35027 1	05072 1	C: 02261 0	C: 74067 0
36,2260	15261 0	04616 1	C: 20334 1	15155 1	35027 1	05072 1	C: 02271 1	C: 74067 0
36,2270	15261 0	33744 0	04616 1	C: 20343 1	33144 0	05173 1	C: 02343 1	44747 0
36,2300	55163 0	51453 1	30006 1	00006 1	62316 1	55475 1	05173 1	C: 02337 1
36,2310	36244 0	54001 1	46244 1	52753 1	40025 1	55053 1	00006 1	51453 1
36,2320	30010 0	53253 0	34752 0	54001 1	44752 1	52761 0	40025 1	55061 0
36,2330	00006 1	34755 1	52755 1	10763 1	15261 0	04635 0	C: 77374 1	02662 1
36,2340	05353 1	C: 00001 0	15261 0	33741 0	05173 1	C: 02367 1	05516 0	C: 00153 0
36,2350	05516 0	C: 00154 1	05327 1	C: 40074 0	C: 05013 0	C: 77777 0	51453 1	10011 0
36,2360	34736 1	05105 0	C: 02574 0	C: 56067 0	45742 1	55163 0	15261 0	40103 1
36,2370	74737 1	26103 1	05321 1	C: 00077 1	12404 1	31424 1	05173 1	C: 02554 1

OCTAL LISTING FOR PARAGRAPH # 211, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

36,2400	05327 1	C: 40033 0	C: 05014 1	C: 77777 0	34740 0	70103 1	00006 1	51453 1
36,2410	10012 0	40101 0	74745 1	26101 0	44355 1	00006 1	02011 0	64737 0
36,2420	00006 1	01011 0	00006 1	30025 0	53345 0	00006 1	31515 1	53440 1
36,2430	00006 1	30025 0	21440 1	44742 0	70104 0	54104 0	51453 1	10013 1
36,2440	00006 1	33135 0	53253 0	30005 1	55163 0	40105 1	74743 1	26105 1
36,2450	40103 1	74741 0	26103 1	44735 0	70111 1	54111 1	00006 1	30025 0
36,2460	53440 1	34755 1	55620 0	55617 1	34752 0	55621 1	12516 0	40101 0
36,2470	74740 1	00006 1	12516 0	31424 1	05173 1	C: 02554 1	05327 1	C: 40033 0
36,2500	C: 05014 1	C: 77777 0	12516 0	05321 1	C: 00107 1	12516 0	30005 1	55163 0
36,2510	00006 1	33141 0	53253 0	40103 1	74741 0	26103 1	44744 0	44744 0
36,2520	70111 1	54111 1	34743 0	70076 1	10000 0	13522 0	05516 0	C: 00153 0
36,2530	05516 0	C: 00154 1	05516 0	C: 00161 1	05353 1	C: 40054 1	05221 0	C: 00062 0
36,2540	02656 0	00006 1	34755 1	52761 0	15261 0	35026 0	05072 1	C: 03241 0
36,2550	C: 74067 0	05353 1	C: 00006 1	15261 0	51453 1	10004 1	00006 1	33137 1
36,2560	53253 0	04674 0	C: 62415 0	12571 1	34737 0	54055 0	34750 1	00006 1
36,2570	05014 1	05353 1	C: 00003 1	15261 0	05504 0	C: 00161 1	05504 0	C: 00175 1
36,2600	34751 0	55513 0	10765 1	12606 1	04616 1	C: 74666 1	44242 0	55163 0
36,2610	05353 1	C: 00004 0	15155 1	51453 1	10002 1	30005 1	12620 0	44747 0
36,2620	55163 0	05516 0	C: 00161 1	05516 0	C: 00175 1	15155 1	05353 1	C: 00003 1
36,2630	00004 0	06027 1	C: 74554 0	04674 0	C: 75561 1	05504 0	C: 00312 1	02650 0
36,2640	C: 00310 0	05504 0	C: 00314 1	34753 1	00004 0	05173 1	C: 02343 1	15155 1
36,2650	30002 0	05522 1	40000 0	00006 1	06001 0	15511 0	44746 1	70111 1
36,2660	54111 1	00002 0	40111 1	74746 1	26111 1	00002 0	34755 1	55163 0
36,2670	04645 1	55061 0	00006 1	31440 0	52155 1	00006 1	40025 1	20155 1
36,2700	07256 1	34777 1	54002 1	52155 1	74346 0	00006 1	10002 1	30001 0
36,2710	64752 0	00004 0	05173 1	C: 02722 1	05327 1	C: 40036 0	C: 05024 1	C: 13000 0
36,2720	31061 1	04640 1	40025 1	55065 1	11163 0	12736 0	12727 0	37714 1
36,2730	05072 1	C: 02742 1	C: 74067 0	05221 0	C: 00144 0	12722 0	00006 1	34755 1
36,2740	52765 1	15261 0	00006 1	41440 1	53452 1	00006 1	30025 0	21452 1
36,2750	00004 0	11163 0	15155 1	15155 1	40000 0	00003 1	50000 1	13021 0
36,2760	30371 1	04616 1	C: 20510 1	13023 1	12613 0	12626 0	44755 0	55067 0
36,2770	33146 1	05464 1	15155 1	51453 1	30001 0	04616 1	C: 20335 0	13023 1

OCTAL LISTING FOR PARAGRAPH # 212, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

36,3000	13040 1	12773 1	51453 1	30000 1	04616 1	C: 20343 1	51453 1	30000 1
36,3010	04616 1	C: 20510 1	13023 1	13051 1	13054 1	44743 1	12767 1	13020 1
36,3020	04616 1	C: 20334 1	15155 1	03025 0	16001 1	00004 0	00006 1	23142 1
36,3030	02656 0	06027 1	C: 74337 0	05353 1	C: 00001 0	30005 1	55163 0	01142 1
36,3040	05353 1	C: 04024 0	34755 1	55163 0	35023 0	05105 0	C: 03203 0	C: 64065 0
36,3050	15155 1	05504 0	C: 00154 1	13112 1	00004 0	51453 1	10003 0	34644 0
36,3060	05105 1	C: 03223 1	C: 74067 0	00004 0	04674 0	C: 40204 0	03025 0	05353 1
36,3070	C: 00134 1	15155 1	35027 1	05105 0	C: 03261 1	C: 56067 0	05516 0	C: 00175 1
36,3100	00004 0	04674 0	C: 40204 0	03025 0	05353 1	C: 07024 0	C: 17000 1	C: 03261 1
36,3110	C: 56067 0	15155 1	40103 1	74737 1	10000 0	13126 0	34753 1	00004 0
36,3120	05173 1	C: 02411 1	34360 0	54001 1	40000 0	52761 0	44747 0	55163 0
36,3130	15155 1	C: 02036 0	C: 02045 1	C: 02060 1	C: 03437 1	C: 62067 1	C: 02522 0	C: 62067 1
36,3140	C: 03637 0	C: 70067 1	C: 00000 1	C: 05656 1	C: 04672 0	C: 00752 1	C: 24020 0	05353 1
36,3150	C: 04024 0	33131 1	55453 0	30106 0	74737 1	10000 0	13722 1	04616 1
36,3160	C: 11175 1	40111 1	74737 1	10000 0	32020 1	62021 0	55251 1	34751 0
36,3170	55513 0	06036 1	I: 43175 0	C: 34001 1	C: 02663 0	C: 03734 1	I: 77735 0	C: 26002 1
36,3200	I: 70476 0	C: 37742 1	C: 56271 0	I: 77624 1	C: 56436 0	I: 77776 1	00004 0	04674 0
36,3210	C: 40142 1	03213 1	12124 0	00006 1	23142 1	00003 1	05516 0	C: 00124 0
36,3220	04616 1	C: 54101 0	01142 1	30005 1	55163 0	00006 1	32055 0	53253 0
36,3230	33743 1	04616 1	C: 20510 1	03256 0	13241 1	03223 1	05353 1	C: 00014 1
36,3240	15155 1	00004 0	04674 0	C: 40153 1	04674 0	C: 40140 0	00003 1	33744 0
36,3250	04616 1	C: 20340 1	03256 0	13256 1	03247 0	13236 1	00006 1	32104 0
36,3260	53253 0	34755 1	55460 0	30005 1	55163 0	00004 0	04674 0	C: 40123 0
36,3270	00003 1	06001 0	33132 1	55453 0	04616 1	C: 11175 1	06036 1	I: 71214 0
36,3300	C: 00700 0	C: 75305 0	C: 34015 1	C: 37734 0	C: 75310 1	I: 77745 1	C: 34017 0	C: 03734 1
36,3310	I: 77624 1	C: 56271 0	I: 77624 1	C: 56436 0	I: 77776 1	00004 0	04674 0	C: 40153 1
36,3320	04674 0	C: 40140 0	03213 1	06036 1	I: 45175 0	C: 03705 0	C: 57156 1	C: 03500 1
36,3330	I: 77776 1	33744 0	04616 1	C: 20324 0	35017 1	55163 0	05105 0	C: 03361 0
36,3340	C: 74067 0	05327 1	C: 00076 0	C: 04024 0	12133 0	34777 1	04616 1	C: 01735 1
36,3350	31163 1	64752 0	00006 1	13345 1	33744 0	04616 1	C: 20324 0	35017 1
36,3360	05146 1	31163 1	00006 1	65155 0	06036 1	I: 45175 0	C: 03705 0	C: 57156 1
36,3370	C: 03500 1	I: 77776 1	34777 1	04616 1	C: 01735 1	13361 1	06036 1	I: 77624 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

36,3400	C: 75611 0	I: 45175 0	C: 03705 0	C: 57156 1	C: 03500 1	I: 77776 1	04635 0	C: 77525 0
36,3410	05353 1	C: 04024 0	33133 0	55453 0	40106 1	74737 1	10000 0	03722 0
36,3420	04616 1	C: 11175 1	36000 1	55251 1	34751 0	55513 0	06036 1	I: 77274 0
36,3430	C: 01072 0	C: 34007 1	C: 03734 1	I: 52135 1	C: 26001 1	C: 75200 1	04616 1	C: 11175 1
36,3440	06036 1	I: 77624 1	C: 27577 1	30155 0	05173 1	C: 03447 0	15155 1	05353 1
36,3450	C: 05014 1	C: 77777 0	00006 1	33747 0	53253 0	34736 1	05105 0	C: 03513 0
36,3460	C: 74067 0	12333 1	06036 1	I: 53375 0	C: 03500 1	C: 03525 0	C: 03654 0	I: 77624 1
36,3470	C: 57156 1	C: 03621 1	I: 77776 1	05353 1	C: 10035 0	06036 1	I: 77775 1	C: 03654 0
36,3500	C: 03500 1	I: 77776 1	04635 0	C: 77525 0	33745 1	04616 1	C: 20510 1	06001 0
36,3510	06001 0	13513 1	13236 1	06036 1	I: 77775 1	C: 06424 0	C: 03621 1	C: 03500 1
36,3520	I: 77776 1	03504 0	31515 1	03710 1	05173 1	C: 03542 1	05516 0	C: 00153 0
36,3530	05516 0	C: 00154 1	05516 0	C: 00044 1	05353 1	C: 40114 1	05221 0	C: 00062 0
36,3540	02656 0	05261 1	04674 0	C: 75545 1	05261 1	34644 0	05105 0	C: 03223 1
36,3550	C: 74067 0	34753 1	05203 0	C: 03606 1	C: 74066 1	40103 1	74745 1	26103 1
36,3560	02656 0	00006 1	30025 0	53345 0	44745 1	70101 0	54101 0	44355 1
36,3570	00006 1	02011 0	64736 1	00006 1	01011 0	40111 1	74736 0	26111 1
36,3600	44737 1	54055 0	34750 1	00006 1	05014 1	04707 0	04674 0	C: 40204 0
36,3610	05261 1	I: 45020 1	C: 03663 1	C: 56472 0	I: 43014 0	C: 01307 1	C: 03663 1	C: 01045 1
36,3620	C: 03663 1	I: 77776 1	10755 1	13636 0	34737 0	00004 0	05105 0	C: 02745 0
36,3630	C: 56067 0	05327 1	C: 00172 0	C: 10035 0	05516 0	C: 00043 0	06036 1	I: 77650 1
36,3640	C: 03663 1	06036 1	I: 77624 1	C: 75611 0	I: 77776 1	00004 0	35016 0	54003 0
36,3650	40076 1	74743 1	10000 0	13660 0	40103 1	74745 1	10000 0	13662 1
36,3660	04635 0	C: 77525 0	04674 0	C: 40165 1	05516 0	C: 00044 1	05504 0	C: 00161 1
36,3670	00004 0	00006 1	31440 0	52155 1	00006 1	40025 1	20155 1	07256 1
36,3700	30155 0	03710 1	05173 1	C: 03542 1	05327 1	C: 40114 1	C: 00035 1	15155 1
36,3710	10000 0	13714 1	13714 1	34755 1	64753 1	56001 0	34755 1	53515 0
36,3720	31515 1	00002 0	05567 0	C: 01706 1	35006 1	04616 1	C: 20351 1	16001 1
36,3730	13724 1	13724 1	C: 00000 1	C: 02734 0	C: 00000 1	C: 05670 0	C: 00000 1	C: 10624 0
36,3740	C: 00000 1	C: 00764 1	C: 05050 1	C: 04050 0	C: 04125 0	C: 04123 0	C: 03462 1	C: 74067 0
36,3750	C: 03750 0	C: 03751 1	CKSM 73523 1	0	0	0	0	0
36,3760	0	0	0	0	0	0	0	0
36,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 214, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

37,2000	C: 07623 1	C: 26552 1	05311 1	C: 00007 0	02325 1	34755 1	55414 0	55440 1
37,2010	55441 0	55576 0	34361 1	55571 1	32476 0	02367 1	34736 1	55664 0
37,2020	06036 1	I: 62545 1	C: 02403 1	C: 15047 0	C: 02401 0	I: 77434 1	C: 21520 0	56154 1
37,2030	55045 0	32473 0	04616 1	C: 20351 1	02270 0	02037 1	02031 1	06036 1
37,2040	I: 47135 0	C: 01046 1	C: 21465 0	C: 02401 0	I: 60535 1	C: 01047 0	C: 02403 1	I: 57546 1
37,2050	I: 77752 1	C: 16437 0	C: 02403 1	I: 72556 1	C: 16435 1	C: 02401 0	I: 73406 1	C: 02675 1
37,2060	C: 16705 1	I: 77746 1	C: 02677 0	I: 77676 0	C: 36703 0	C: 47255 0	I: 77776 1	04616 1
37,2070	C: 16753 1	34736 1	70077 0	00006 1	12076 0	25414 1	05516 0	C: 00056 1
37,2100	02315 1	11414 0	02126 0	02320 1	00006 1	31575 1	05277 0	C: 02113 0
37,2110	C: 76065 0	32116 0	05133 0	32116 0	05137 1	05261 1	C: 76500 0	34755 1
37,2120	55050 1	31504 1	55051 0	51416 0	55420 1	02457 0	51414 1	02130 1
37,2130	02447 1	34361 1	55476 1	32474 1	55412 0	34753 1	55537 0	34755 1
37,2140	51415 0	54037 1	55472 0	02332 1	00004 0	34752 0	05173 1	C: 02151 0
37,2150	05155 0	00006 1	27412 0	31412 1	00006 1	62161 0	34742 1	05173 1
37,2160	C: 02151 0	34736 1	05105 0	C: 02166 1	C: 76065 0	05261 1	51414 1	02170 0
37,2170	02447 1	31412 1	00006 1	62175 0	05155 0	34756 1	55537 0	02332 1
37,2200	11473 1	02205 1	05677 1	41476 1	55476 1	00006 1	41473 1	21477 0
37,2210	06036 1	I: 45345 1	C: 02501 1	C: 02475 0	I: 45044 0	C: 76217 1	C: 76275 0	I: 56325 0
37,2220	C: 02477 1	I: 47075 0	C: 37056 0	C: 21516 0	C: 01051 1	I: 77776 1	11414 0	02301 1
37,2230	02457 0	32471 1	55412 0	51416 0	41417 0	55442 0	11415 1	12245 1
37,2240	44747 0	27565 1	34747 1	27567 0	12251 1	44747 0	27565 1	34747 1
37,2250	27563 1	02447 1	34755 1	55404 1	55405 0	34733 1	55440 1	55441 0
37,2260	30032 0	55413 1	02500 0	31502 1	55051 0	34755 1	55050 1	02457 0
37,2270	05516 0	C: 00007 0	44755 0	05314 1	05472 0	I: 43215 0	C: 06432 1	C: 37064 1
37,2300	I: 77616 0	00006 1	23571 0	34755 1	54321 0	54322 0	54323 1	04616 1
37,2310	C: 16753 1	04616 1	C: 17671 1	03047 1	01571 0	00006 1	23571 0	02311 0
37,2320	00006 1	23571 0	04616 1	C: 17163 0	02311 0	00006 1	23571 0	04616 1
37,2330	C: 16667 1	02311 0	00006 1	23417 1	02342 0	00003 1	30067 0	00006 1
37,2340	62346 1	05122 0	00004 0	51415 0	40037 1	55571 1	00004 0	51415 0
37,2350	30037 0	61571 0	00006 1	12335 1	51415 0	30037 0	51537 1	55472 0
37,2360	04102 0	51537 1	55473 1	51537 1	23474 1	00003 1	01417 1	54001 1
37,2370	12372 1	55571 1	34755 1	50001 0	54000 0	24001 0	11571 1	12371 1

OCTAL LISTING FOR PARAGRAPH # 215, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

37,2400	00002 0	I: 65345 0	C: 37057 1	C: 02403 1	I: 57546 1	I: 73525 1	C: 02403 1	I: 74266 0
37,2410	C: 36001 0	C: 02405 1	I: 77634 0	C: 21462 1	C: 26433 1	C: 37057 1	C: 02564 1	I: 77616 0
37,2420	I: 47020 0	C: 00051 0	C: 21462 1	C: 02431 0	I: 51025 1	C: 02433 1	C: 76431 0	I: 77624 1
37,2430	C: 76275 0	I: 74261 1	C: 20212 1	C: 02405 1	I: 53321 1	C: 02643 1	C: 02564 1	C: 16564 1
37,2440	C: 02431 0	C: 02433 1	I: 47170 1	C: 02563 0	C: 21625 0	I: 77650 1	C: 00051 0	00006 1
37,2450	23420 0	06036 1	I: 77624 1	C: 76420 0	I: 77776 1	02315 1	01420 0	00006 1
37,2460	23417 1	31416 0	55052 0	32472 1	04616 1	C: 20351 1	02270 0	01417 1
37,2470	12461 1	C: 07626 1	C: 01542 0	C: 01451 0	C: 00072 1	C: 02737 0	C: 01664 1	C: 01642 0
37,2500	00004 0	31572 0	05173 1	C: 02536 0	34755 1	54037 1	54040 1	54041 0
37,2510	00003 1	33075 0	55571 1	33076 0	02367 1	06036 1	I: 77735 0	C: 37057 1
37,2520	C: 25477 1	C: 37070 1	C: 26445 0	C: 37057 1	C: 00325 0	C: 01472 1	I: 77735 0	C: 02441 1
37,2530	I: 50076 0	C: 76534 1	I: 77624 1	C: 76401 0	I: 77776 1	03035 1	31576 1	00006 1
37,2540	12542 1	05261 1	11530 1	30000 1	55531 0	40000 0	55530 1	44753 0
37,2550	61562 1	00006 1	12556 1	31412 1	00006 1	62562 1	31572 0	05173 1
37,2560	C: 02536 0	34755 1	56037 0	54324 0	34755 1	56040 0	54326 1	34755 1
37,2570	56041 1	54330 0	34736 1	05105 0	C: 02577 0	C: 76065 0	05261 1	11562 0
37,2600	02602 1	02604 1	04616 1	C: 15263 1	06036 1	I: 77745 1	C: 37066 0	C: 24051 0
37,2610	C: 00325 0	I: 76505 0	C: 02643 1	I: 57545 1	C: 00160 0	C: 16523 1	C: 00162 1	C: 02527 0
37,2620	I: 76001 1	C: 00001 0	C: 00010 0	I: 57535 0	C: 02563 0	I: 77640 0	C: 76772 1	I: 50135 0
37,2630	C: 02532 1	C: 76644 0	I: 72174 0	C: 00014 1	C: 02444 1	I: 62143 0	C: 02243 0	C: 77775 1
37,2640	C: 12545 0	I: 66104 1	C: 76635 0	C: 02444 1	I: 77770 1	C: 00010 0	I: 41343 0	C: 02533 0
37,2650	C: 37100 1	I: 43661 1	C: 21212 0	C: 02501 1	C: 06501 0	I: 40725 0	C: 37102 0	C: 02521 0
37,2660	I: 77732 1	I: 45425 0	C: 71216 1	C: 06563 1	I: 77100 0	C: 76646 1	C: 00004 0	I: 56743 1
37,2670	C: 75324 0	C: 75240 0	C: 12453 0	I: 77104 1	C: 76667 1	C: 00010 0	I: 66140 1	C: 02445 0
37,2700	C: 02445 0	I: 56743 1	C: 02450 1	C: 75216 0	I: 77613 0	C: 75276 0	C: 12501 0	I: 42743 1
37,2710	C: 75314 0	C: 75230 1	C: 12463 0	I: 42673 0	C: 75216 0	C: 75266 1	C: 12511 1	I: 40743 0
37,2720	C: 37105 1	C: 75216 0	I: 42772 0	C: 75256 1	C: 12521 1	I: 76104 0	C: 76676 1	C: 00010 0
37,2730	I: 64743 0	C: 02523 1	C: 02521 0	I: 55523 0	C: 02531 1	I: 76521 0	C: 02001 1	I: 77745 1
37,2740	C: 00155 0	C: 06531 0	I: 77745 1	C: 00160 0	C: 06521 1	I: 77745 1	C: 00162 1	C: 06523 0
37,2750	I: 77700 0	C: 76730 1	I: 76174 1	C: 00006 1	C: 00002 0	I: 57343 1	C: 02503 0	C: 37110 0
37,2760	I: 77722 0	I: 73406 1	I: 56072 1	C: 00046 0	C: 10021 0	I: 77745 1	I: 77746 1	C: 10027 0
37,2770	I: 77704 1	C: 76755 1	I: 77776 1	35016 0	54003 0	01400 1	11412 0	03034 0

OCTAL LISTING FOR PARAGRAPH # 216, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

37,3000	11440 1	13003 0	03005 1	30032 0	55414 0	06036 1	I: 65345 0	C: 02473 0
37,3010	C: 02477 1	I: 55525 0	C: 02501 1	I: 74276 1	C: 37110 0	I: 74521 1	C: 02643 1	C: 02740 0
37,3020	I: 77776 1	32475 0	04616 1	C: 17276 1	02315 1	11440 1	02263 1	06036 1
37,3030	I: 77624 1	C: 76401 0	I: 77776 1	02117 1	55412 0	11440 1	02447 1	05155 0
37,3040	35014 1	54003 0	34753 1	55576 0	05567 0	C: 01600 0	02270 0	33054 0
37,3050	C: 05735 0	05516 0	C: 00007 0	05155 0	C: 01601 1	C: 06200 0	C: 00000 1	C: 00000 1
37,3060	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00001 0	C: 00004 0	C: 00002 0	C: 00220 1
37,3070	C: 77776 1	C: 35730 0	C: 00035 1	C: 10317 0	C: 17550 1	C: 00115 1	C: 01443 0	C: 04133 1
37,3100	C: 02265 1	C: 57223 0	C: 66451 1	C: 05477 0	C: 12577 1	C: 77567 0	C: 44202 1	C: 24276 1
37,3110	C: 14066 1	C: 23073 1	C: 11773 1	35015 0	05105 0	C: 03145 1	C: 76067 1	05221 0
37,3120	C: 00144 0	31044 0	74740 1	00006 1	13117 1	35017 1	05072 1	C: 03132 1
37,3130	C: 76067 1	15261 0	33240 1	04616 1	C: 20212 1	05563 1	05563 1	13132 0
37,3140	06036 1	I: 77624 1	C: 77371 1	I: 77650 1	C: 77150 0	06036 1	I: 77624 1	C: 77241 0
37,3150	I: 52375 1	C: 00001 0	C: 02213 0	I: 51406 1	C: 02205 1	I: 77301 0	C: 00047 1	I: 53457 1
37,3160	C: 20201 0	I: 52315 1	C: 00007 0	C: 02221 1	I: 77641 1	I: 77752 1	C: 26207 0	C: 02213 0
37,3170	I: 63256 0	C: 06416 1	I: 77624 1	C: 47565 1	I: 41505 1	C: 01734 0	I: 72431 1	C: 00001 0
37,3200	I: 53445 1	C: 00007 0	I: 47315 0	C: 02213 0	C: 02221 1	I: 47256 0	C: 02213 0	I: 63241 0
37,3210	C: 00015 0	I: 50372 1	C: 00007 0	I: 72565 1	C: 00015 0	I: 77726 1	C: 26211 1	C: 02213 0
37,3220	I: 51041 0	C: 00007 0	C: 77227 0	I: 44345 0	C: 02211 1	C: 06432 1	C: 02211 1	I: 77776 1
37,3230	34747 1	71044 1	00006 1	15472 1	41044 1	74740 1	27044 1	13140 0
37,3240	C: 04066 0	I: 47020 0	C: 02116 0	C: 21462 1	C: 34041 0	C: 27043 0	I: 77775 1	C: 00017 1
37,3250	C: 26140 0	C: 00025 0	C: 16120 0	C: 00015 0	C: 02114 1	C: 34041 0	C: 27057 0	I: 77775 1
37,3260	C: 00017 1	C: 26170 0	C: 00025 0	C: 02105 1	I: 47014 1	C: 03712 0	C: 77346 0	C: 21462 1
37,3270	I: 52014 0	C: 04307 1	C: 77365 1	C: 77274 0	C: 34041 0	C: 27412 0	I: 43175 0	C: 02170 0
37,3300	C: 00263 0	C: 25535 0	C: 02105 1	C: 15543 1	C: 02114 1	I: 43014 0	C: 04344 0	C: 77311 1
37,3310	C: 00063 1	I: 77614 1	C: 01473 0	C: 35517 1	C: 27107 1	I: 77775 1	C: 00001 0	C: 26213 0
37,3320	C: 00007 0	C: 36221 0	C: 27412 0	I: 71214 0	C: 01473 0	C: 00015 0	C: 00041 1	I: 43175 0
37,3330	C: 02140 0	C: 00263 0	C: 25535 0	C: 02120 0	C: 15543 1	C: 02114 1	I: 43014 0	C: 04344 0
37,3340	C: 77342 1	C: 00063 1	C: 35517 1	C: 27107 1	I: 77650 1	C: 02116 0	I: 52175 0	C: 01221 1
37,3350	C: 77351 0	C: 36213 1	C: 77353 1	I: 52175 0	C: 01227 1	C: 77356 1	C: 16221 1	C: 01235 1
37,3360	I: 77624 1	C: 27412 0	I: 52014 0	C: 01673 1	C: 77326 0	C: 34041 0	C: 27057 0	I: 77650 1
37,3370	C: 77315 0	I: 52020 1	C: 02116 0	C: 77264 1	34757 0	03515 0	35031 0	05072 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

37,3740	07256 1	10154 0	03747 0	03747 0	03745 1	34742 1	26154 0	00006 1
37,3750	30315 0	20155 1	07256 1	52155 1	20025 1	05516 0	C: 00054 0	06001 0
37,3760	C: 03760 0	C: 03761 1	CKSM 76777 1	0	0	0	0	0
37,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 220, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

40,2000	35017 1	05105 0	C: 02017 0	C: 60107 1	34740 0	05146 1	32076 1	04616 1
40,2010	C: 20231 0	05563 1	05563 1	05563 1	34751 0	05464 1	05155 0	00006 1
40,2020	30036 1	53751 1	06036 1	I: 77624 1	C: 46041 0	C: 00001 0	C: 14007 0	C: 06424 0
40,2030	C: 24011 1	C: 00007 0	I: 77656 1	C: 00007 0	I: 77641 1	C: 06416 1	C: 24021 1	C: 06422 0
40,2040	I: 77641 1	C: 00007 0	C: 34023 1	C: 47222 0	I: 43244 1	C: 60047 1	C: 06432 1	C: 26207 0
40,2050	C: 00001 0	I: 77641 1	C: 06420 1	C: 24023 0	C: 00001 0	I: 77641 1	C: 00007 0	C: 34021 0
40,2060	C: 47222 0	I: 43244 1	C: 60064 0	C: 06432 1	C: 02205 1	I: 77776 1	34777 1	04616 1
40,2070	C: 01735 1	34747 1	71044 1	10000 0	02017 0	05472 0	C: 04070 1	34753 1
40,2100	57012 0	54115 0	11042 1	02105 1	02112 1	42156 0	60154 1	00006 1
40,2110	12112 0	04374 0	56154 1	54117 1	50000 1	02116 0	03432 1	02175 0
40,2120	02175 0	02175 0	02175 0	02175 0	02175 0	02175 0	02161 0	02161 0
40,2130	03432 1	03432 1	03432 1	03432 1	03432 1	03432 1	02173 0	02354 1
40,2140	03601 0	03432 1	03432 1	03432 1	03432 1	03432 1	03432 1	03457 1
40,2150	02407 0	02374 0	02157 0	03432 1	02467 0	02370 1	C: 00022 1	04635 0
40,2160	C: 62002 1	10777 1	02166 1	02166 1	05155 0	05155 0	36244 0	71000 1
40,2170	10000 0	02175 0	03432 1	34755 1	54117 1	10777 1	02202 0	02202 0
40,2200	02201 0	05155 0	02324 0	11015 0	34755 1	55015 0	02207 0	50117 0
40,2210	34066 0	74346 0	54124 1	30777 0	54143 0	03322 1	36244 0	71000 1
40,2220	10000 0	02232 0	50137 1	57001 1	54022 0	40022 0	40022 0	56022 1
40,2230	60117 0	02247 1	50137 1	57001 1	54154 0	34755 1	54155 1	34363 0
40,2240	07306 0	56155 0	60117 0	54155 1	02247 1	26154 0	02265 1	50137 1
40,2250	55001 0	40777 1	50137 1	62315 1	00006 1	12257 1	02312 0	36244 0
40,2260	71000 1	10000 0	02265 1	40777 1	02313 1	44753 0	60137 1	00006 1
40,2270	62263 1	07102 0	C: 02322 0	36244 0	71000 1	50000 1	02276 0	02303 0
40,2300	00006 1	40156 1	52156 1	56156 0	50137 1	55004 0	56155 0	50137 1
40,2310	55001 0	02263 1	10777 1	54777 1	05155 0	C: 00022 1	C: 00020 0	C: 00012 1
40,2320	C: 00005 1	C: 00000 1	C: 05174 0	C: 13261 0	50777 0	32330 0	54137 0	00002 0
40,2330	C: 00004 0	C: 00004 0	C: 00004 0	C: 00004 0	C: 00004 0	C: 00003 1	C: 00003 1	C: 00003 1
40,2340	C: 00003 1	C: 00003 1	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	C: 00002 0	05677 1
40,2350	C: 00001 0	C: 00001 0	C: 00000 1	C: 00000 1	34755 1	55001 0	34360 0	54777 1
40,2360	02601 1	34753 1	55000 1	34755 1	55013 0	34217 1	54136 1	05155 0
40,2370	34755 1	55002 0	34361 1	02357 1	02446 0	02433 1	34752 0	50137 1

OCTAL LISTING FOR PARAGRAPH # 221, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

40,2400	64745 0	27000 1	11015 0	34755 1	55015 0	02406 1	05155 0	02446 0
40,2410	02413 0	34753 1	02377 0	22002 0	02324 0	50137 1	32441 1	54123 0
40,2420	64753 1	54122 1	34755 1	54124 1	56123 1	03404 1	34741 1	54124 1
40,2430	56122 0	03404 1	00001 0	22002 0	02324 0	50137 1	32441 1	54122 1
40,2440	64753 1	54123 0	02422 1	C: 00005 1	C: 00003 1	C: 00000 1	22002 0	36244 0
40,2450	71000 1	10000 0	05155 0	44317 1	02462 0	44320 0	02462 0	44321 1
40,2460	02462 0	05155 0	60777 0	00006 1	12466 0	00002 0	00001 0	10777 1
40,2470	64753 1	02473 0	64753 1	50000 1	32330 0	54137 0	11015 0	02505 0
40,2500	02502 1	02502 1	30137 1	02527 0	02522 0	10137 0	54137 0	02527 0
40,2510	32577 0	27013 0	30137 1	54125 0	00006 1	27001 0	04616 1	C: 62340 1
40,2520	30125 1	54137 0	02525 1	25015 1	05155 0	22002 0	02540 1	67745 0
40,2530	10000 0	00002 0	05677 1	05155 0	00002 0	54777 1	22002 0	02324 0
40,2540	34755 1	50137 1	55001 0	50137 1	55004 0	54124 1	50137 1	44745 1
40,2550	71000 1	72600 1	55000 1	50137 1	32570 1	54143 0	03322 1	50137 1
40,2560	32573 1	54777 1	02601 1	44752 1	26777 1	02601 1	50137 1	34315 1
40,2570	54777 1	00001 0	C: 00016 0	C: 00005 1	C: 00004 0	C: 00015 0	C: 00011 1	C: 00003 1
40,2600	C: 77774 0	30777 0	54021 0	42614 1	00004 0	50021 1	57023 1	00006 1
40,2610	62612 0	25016 1	00003 1	00002 0	C: 04000 0	34755 1	54156 1	02652 1
40,2620	02622 0	02645 1	02663 0	02625 1	02615 1	30154 1	74733 0	00006 1
40,2630	12634 0	40154 0	64753 1	54154 0	00002 0	00006 1	00033 1	00006 1
40,2640	74742 0	40000 0	76244 1	54154 0	02677 0	00006 1	50156 0	32674 0
40,2650	52124 1	00002 0	10154 0	00002 0	00002 0	12656 1	44735 0	70154 0
40,2660	54154 0	50002 0	00001 0	00006 1	50156 0	32674 0	52155 1	07306 0
40,2670	52124 1	20155 1	02702 0	C: 05605 1	C: 03656 1	C: 16314 0	C: 31463 1	52124 1
40,2700	52155 1	04415 0	04635 0	C: 62566 0	52124 1	52155 1	04415 0	02711 1
40,2710	02723 0	56156 0	56155 0	54154 0	02702 0	02723 0	02702 0	02723 0
40,2720	36241 0	03153 0	02702 0	56002 0	54162 0	02747 1	07256 1	07102 0
40,2730	C: 00123 1	00162 1	02536 0	02413 0	30154 1	03306 1	46244 1	50117 0
40,2740	64317 0	54777 1	02747 1	30155 0	03306 1	04635 0	C: 62570 1	56002 0
40,2750	54144 1	50140 1	02752 0	02767 0	50117 0	30150 0	74356 1	04313 1
40,2760	00006 1	50000 1	30001 0	52155 1	34755 1	54156 1	00144 0	30145 1
40,2770	02760 1	50140 1	02772 1	02775 0	03420 1	00006 1	50145 1	30001 0

OCTAL LISTING FOR PARAGRAPH # 222, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

40,3000	52155 1	34317 0	54777 1	34755 1	54156 1	07256 1	03273 1	00136 0
40,3010	07102 0	C: 03074 1	10155 1	34741 1	03016 0	44741 0	60155 0	03165 0
40,3020	04404 0	04404 0	03174 0	04404 0	10154 0	03031 0	03031 0	40000 0
40,3030	54154 0	10162 0	03070 0	03043 0	10154 0	05677 1	03066 1	03040 0
40,3040	56154 1	74733 0	54154 0	50140 1	03044 1	03050 1	03060 1	03051 0
40,3050	03063 1	40000 0	64752 0	00006 1	13056 0	02625 1	04635 0	C: 63155 0
40,3060	04616 1	C: 63034 0	03047 1	04616 1	C: 63026 0	03051 0	44733 0	03042 1
40,3070	40154 0	74733 0	40000 0	03042 1	C: 26161 0	C: 30707 1	07102 0	C: 00123 1
40,3100	56156 0	56155 0	56154 1	00006 1	13106 1	04145 0	03163 0	03174 0
40,3110	03056 1	07102 0	C: 00123 1	03106 0	07102 0	C: 00123 1	56156 0	60000 1
40,3120	54156 1	64755 1	60155 0	03165 0	03174 0	50140 1	03126 1	03137 1
40,3130	30117 0	60145 1	54002 1	56155 0	50002 0	54001 1	03056 1	34755 1
40,3140	03131 1	07102 0	C: 00123 1	36241 0	03153 0	03116 1	07102 0	C: 00123 1
40,3150	34752 0	03153 0	03116 1	56002 0	54124 1	56002 0	54123 0	04404 0
40,3160	10123 0	03156 0	00124 0	56155 0	60000 1	54155 1	00002 0	60154 1
40,3170	54154 0	00002 0	54162 0	00002 0	10162 0	04145 0	00002 0	04145 0
40,3200	56002 0	54144 1	10154 0	03213 1	03213 1	64753 1	54154 0	02433 1
40,3210	40155 1	54155 1	00144 0	02413 0	00144 0	00006 1	33261 1	20155 1
40,3220	00306 1	13225 0	00006 1	34733 1	52155 1	00002 0	56002 0	54115 0
40,3230	03200 0	03215 1	34751 0	54137 0	34363 0	07306 0	50154 1	34066 0
40,3240	74346 0	54124 1	34755 1	56156 0	56155 0	54154 0	56777 0	54143 0
40,3250	10000 0	54777 1	03322 1	10137 0	03233 0	44360 1	54777 1	00115 1
40,3260	C: 00000 1	C: 02476 0	56002 0	54115 0	03200 0	03232 1	56002 0	54115 0
40,3270	03200 0	34753 1	03233 0	56002 0	54115 0	34755 1	54124 1	36244 0
40,3300	03404 1	34751 0	03404 1	03200 0	34320 1	03233 0	00006 1	73316 1
40,3310	22154 1	34755 1	54155 1	56002 0	54115 0	03271 0	C: 00244 0	03306 1
40,3320	04635 0	C: 62347 0	56002 0	54114 1	34346 1	70143 0	54021 0	56021 1
40,3330	54141 1	34753 1	70143 0	10000 0	03336 1	03346 0	56124 0	04340 1
40,3340	54124 1	34736 1	70143 0	10000 0	34752 0	64753 1	54143 0	00004 0
40,3350	50141 0	11023 0	03354 0	05677 1	64753 1	54142 1	50143 1	73400 1
40,3360	00006 1	60124 0	00006 1	13376 1	50143 1	43400 1	70142 1	60124 0
40,3370	40000 0	50141 0	57023 1	00006 1	63376 0	25016 1	00003 1	00114 0

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

40,3400	C: 00037 0	C: 01740 0	C: 02000 0	C: 03740 1	54141 1	34752 0	54143 0	56002 0
40,3410	54114 1	03347 1	03322 1	33415 1	04640 1	C: 63411 0	44360 1	54777 1
40,3420	43437 0	60136 0	00006 1	13434 0	43436 1	00136 0	00006 1	13431 0
40,3430	03432 1	04204 0	04364 1	05155 0	05652 0	C: 01501 1	C: 04124 1	04202 0
40,3440	34753 1	55014 1	04204 0	04457 0	04433 1	03545 0	44753 0	03441 0
40,3450	34755 1	55013 0	44360 1	54777 1	03440 1	44755 0	03441 0	44751 0
40,3460	00006 1	03011 1	10115 0	34736 1	71021 1	10000 0	03475 1	04457 0
40,3470	11042 1	03473 1	05155 0	04635 0	C: 20723 0	34755 1	55012 1	11042 1
40,3500	05155 0	04502 1	05155 0	30777 0	54132 0	34753 1	03525 0	34317 0
40,3510	02535 0	34752 0	03525 0	34320 1	02535 0	34751 0	03525 0	34321 0
40,3520	02535 0	30132 1	54777 1	52131 0	05166 0	70123 0	10000 0	00002 0
40,3530	50002 0	00002 0	34362 1	56777 0	54140 0	11011 1	64753 1	03306 1
40,3540	03542 1	02601 1	56140 1	54777 1	05155 0	11042 1	03550 1	05155 0
40,3550	34755 1	57042 0	00004 0	05137 1	11014 1	03577 1	05155 0	03575 0
40,3560	34752 0	50064 0	60164 1	50064 0	54164 0	31002 1	54001 1	31001 1
40,3570	50064 0	52155 1	00003 1	04457 0	05155 0	34755 1	03561 0	34753 1
40,3600	03561 0	56115 1	55012 1	00004 0	34742 1	00006 1	05011 1	33670 0
40,3610	71036 1	64735 1	55036 1	45026 1	71303 1	65026 0	55303 1	44742 0
40,3620	71302 0	64742 1	55302 0	43667 1	70110 0	64745 0	54110 0	44742 0
40,3630	00006 1	03013 0	43666 0	00006 1	03011 1	34363 0	54117 1	00004 0
40,3640	50117 0	11023 0	64753 1	03650 1	64753 1	40000 0	73671 0	03653 1
40,3650	40000 0	73671 0	40000 0	50117 0	55023 0	00003 1	10117 1	03636 1
40,3660	34755 1	54375 1	54376 1	54377 0	55357 0	05155 0	C: 00104 1	C: 00330 1
40,3670	C: 00050 1	C: 73777 1	C: 03672 1	C: 03673 0	CK SM 75045 1	0	0	0
40,3700	0	0	0	0	0	0	0	0
40,3710	0	0	0	0	0	0	0	0
40,3720	0	0	0	0	0	0	0	0
40,3730	0	0	0	0	0	0	0	0
40,3740	0	0	0	0	0	0	0	0
40,3750	0	0	0	0	0	0	0	0
40,3760	0	0	0	0	0	0	0	0
40,3770	0	0	0	0	0	0	0	0

OCTAL LISTING FOR PARAGRAPH # 224, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

41,2000	03544 1	02775 0	34755 1	55015 0	34217 1	54136 1	11013 0	02035 0
41,2010	02035 0	02012 0	32033 0	61013 1	00006 1	12027 1	36244 0	71000 1
41,2020	10000 0	02023 1	02027 0	10777 1	02351 1	02351 1	02027 0	41013 0
41,2030	55013 0	04433 1	01013 1	C: 03431 1	C: 00034 0	34755 1	55000 1	44360 1
41,2040	54777 1	41001 0	55041 1	62034 1	00006 1	62133 1	00006 1	32114 1
41,2050	52006 0	50140 1	02052 1	02055 0	02221 1	10146 0	02131 0	02351 1
41,2060	02064 1	25017 0	04311 0	02120 0	34735 1	55015 0	44217 0	60136 0
41,2070	00006 1	12073 0	02116 0	02307 1	11000 1	04145 0	44360 1	54777 1
41,2100	11042 1	02104 0	02105 1	02104 0	04427 1	57005 0	04303 0	00006 1
41,2110	32114 1	52006 0	02133 1	C: 02103 1	C: 64101 0	C: 77772 0	30156 0	04303 0
41,2120	44756 0	61001 1	00006 1	12133 0	34321 0	54777 1	31017 0	03363 1
41,2130	02133 1	64753 1	04303 0	42145 1	61001 1	10000 0	64753 1	02141 1
41,2140	02146 0	54154 0	04457 0	04635 0	C: 66000 1	C: 00050 1	51001 1	32151 0
41,2150	04640 0	C: 62351 1	C: 62365 0	C: 62373 1	C: 62400 1	C: 62360 0	C: 62353 0	C: 62523 1
41,2160	C: 60771 0	C: 62351 1	C: 62351 1	C: 61420 0	C: 63230 0	C: 63230 0	C: 63230 0	C: 63230 0
41,2170	C: 63230 0	C: 63230 0	C: 63230 0	C: 62351 1	C: 62351 1	C: 62351 1	C: 62732 0	C: 62743 0
41,2200	C: 62760 1	C: 62703 1	C: 62616 1	C: 62351 1	C: 63353 1	C: 62351 1	C: 62351 1	C: 63466 0
41,2210	C: 63512 1	C: 61455 1	C: 61440 0	C: 61446 0	C: 63613 0	C: 12447 0	C: 63430 0	C: 62351 1
41,2220	C: 62351 1	10146 0	02226 0	02351 1	02226 0	02226 0	46241 1	61001 1
41,2230	00006 1	62233 1	02133 1	34752 0	54117 1	62260 1	54145 0	50117 0
41,2240	30150 0	54122 1	03034 0	02261 0	02246 0	24122 0	30122 0	74356 1
41,2250	04313 1	50000 1	30000 1	50145 1	56000 1	10117 1	02234 0	02133 1
41,2260	00125 1	50000 1	12263 0	00002 0	00002 0	00002 0	00002 0	12301 0
41,2270	12301 0	00002 0	12301 0	00002 0	00002 0	12301 0	00002 0	00002 0
41,2300	00002 0	50002 0	00001 0	34317 0	12310 0	34320 1	12310 0	34321 0
41,2310	54777 1	40002 1	55013 0	04616 1	C: 60536 1	04427 1	00136 0	55002 0
41,2320	56002 0	54117 1	00006 1	32114 1	52006 0	10146 0	64753 1	12332 0
41,2330	12333 1	12333 1	04303 0	34361 1	54777 1	31002 1	12345 0	55001 0
41,2340	56002 0	54117 1	34360 0	54777 1	31001 1	04635 0	C: 61317 0	00117 0
41,2350	04145 0	04635 0	C: 61420 0	44752 1	02424 1	50145 1	40002 1	56132 1
41,2360	44753 0	02424 1	50145 1	40001 1	56131 1	02443 0	02466 1	50145 1
41,2370	40000 0	56130 0	02405 1	44753 0	02437 0	50145 1	40001 1	02371 0

OCTAL LISTING FOR PARAGRAPH # 225, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

41,2400	44752 1	02437 0	50145 1	40002 1	02371 0	44752 1	61001 1	10000 0
41,2410	02413 0	00136 0	02413 0	54122 1	50000 1	34317 0	54777 1	50122 0
41,2420	40130 1	03363 1	56122 0	02407 0	54123 0	22002 0	02515 1	04331 1
41,2430	76244 1	60123 1	10000 0	00001 0	05677 1	02351 1	00001 0	54123 0
41,2440	22002 0	02443 0	02426 0	00006 1	22156 0	02515 1	74736 0	10000 0
41,2450	02351 1	00156 0	22002 0	02515 1	74736 0	10000 0	04145 0	00001 0
41,2460	22002 0	02515 1	10000 0	00001 0	00001 0	02351 1	22002 0	30146 1
41,2470	64753 1	00006 1	12504 0	50140 1	02474 1	02477 1	00001 0	03026 0
41,2500	02261 0	00001 0	24145 1	00001 0	31017 0	75004 1	00006 1	50000 1
41,2510	00000 1	40000 1	12371 1	C: 00147 0	C: 00146 1	50140 1	32512 0	50000 1
41,2520	30000 1	74350 1	00002 0	02515 1	04331 1	76244 1	54117 1	54122 1
41,2530	60145 1	50000 1	40000 0	50122 0	57003 0	10122 1	02527 0	34755 1
41,2540	54155 1	54156 1	50117 0	34317 0	54777 1	50117 0	41003 1	54154 0
41,2550	03047 1	54123 0	00006 1	32565 0	52006 0	50140 1	02556 0	02562 1
41,2560	03034 0	02575 1	03026 0	02575 1	C: 02141 1	C: 64101 0	04616 1	C: 61226 0
41,2570	10117 1	02573 1	00136 0	54117 1	02537 1	50000 1	32600 0	04640 1
41,2600	C: 61416 0	C: 62566 0	C: 60615 0	C: 60677 1	C: 60710 1	C: 60715 1	C: 60635 1	C: 60717 0
41,2610	C: 65224 0	C: 65277 0	C: 60715 1	C: 60704 1	C: 60732 1	C: 60623 0	44752 1	02424 1
41,2620	02460 1	33006 1	02337 1	02303 0	33007 0	02337 1	02305 0	33010 0
41,2630	02337 1	02307 1	46241 1	03011 1	00006 1	32114 1	52006 0	34755 1
41,2640	03075 0	50145 1	54000 0	34753 1	03075 0	50145 1	54001 1	34752 0
41,2650	03075 0	50145 1	54002 1	44757 1	61002 1	00006 1	12660 1	02775 0
41,2660	31003 0	04304 1	31005 0	00004 0	00006 1	12674 1	50145 1	40000 0
41,2670	71004 0	50145 1	26000 0	02701 0	41004 0	50145 1	70000 0	50145 1
41,2700	54000 0	00003 1	02775 0	44753 0	02424 1	02460 1	33006 1	02337 1
41,2710	02303 0	33007 0	02337 1	02305 0	44756 0	03011 1	00006 1	32114 1
41,2720	52006 0	34755 1	03075 0	50145 1	54000 0	34753 1	03075 0	50145 1
41,2730	54001 1	02775 0	02303 0	00006 1	32114 1	52006 0	34755 1	03075 0
41,2740	50145 1	54000 0	02775 0	44753 0	02424 1	34735 1	55015 0	02305 0
41,2750	00006 1	32114 1	52006 0	34753 1	03075 0	50145 1	54001 1	02775 0
41,2760	44752 1	02424 1	34735 1	55015 0	02307 1	00006 1	32114 1	52006 0
41,2770	34752 0	03075 0	50145 1	54002 1	02775 0	34755 1	55000 1	44755 0

OCTAL LISTING FOR PARAGRAPH # 226, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

41,3000	55014 1	04457 0	44360 1	54777 1	04635 0	C: 61545 1	C: 00025 0	C: 00026 0
41,3010	C: 00027 1	54117 1	41000 1	54021 0	40021 0	40021 0	10000 0	13021 0
41,3020	00002 0	60117 0	00006 1	13025 1	04145 0	00002 0	56002 0	54114 1
41,3030	34347 0	70147 1	04322 0	00114 0	56002 0	54114 1	50117 0	33066 1
41,3040	54001 1	50117 0	34346 1	70153 1	50001 0	00000 1	00114 0	56002 0
41,3050	54114 1	50140 1	03052 0	03071 1	50117 0	33066 1	54001 1	50117 0
41,3060	34346 1	70147 1	50001 0	00000 1	60000 1	00114 0	03025 0	04322 0
41,3070	04331 1	34346 1	70147 1	60000 1	00114 0	54117 1	56002 0	54115 0
41,3100	34755 1	54162 0	50117 0	57006 0	54155 1	50117 0	57003 0	54154 0
41,3110	50140 1	03111 0	03137 1	50117 0	30150 0	74356 1	04303 0	00006 1
41,3120	60117 0	54145 0	11000 1	03174 0	02452 0	03034 0	02261 0	03155 0
41,3130	24145 1	30145 1	26117 1	34755 1	50117 0	53777 0	03155 0	04311 0
41,3140	11000 1	03174 0	02452 0	03026 0	02261 0	03151 1	34755 1	54117 1
41,3150	03130 0	30146 1	64753 1	00006 1	13161 0	56154 1	00115 1	C: 02147 1
41,3160	C: 64101 0	44757 1	61017 0	00006 1	12775 1	31017 0	75004 1	56154 1
41,3170	00006 1	50154 1	01000 0	02775 0	03047 1	54123 0	00006 1	33160 0
41,3200	52006 0	50140 1	03202 1	03206 0	03034 0	03207 1	03026 0	50000 1
41,3210	33212 0	04640 1	C: 62350 0	C: 61106 1	C: 61010 1	C: 61076 1	C: 61114 1	C: 61141 1
41,3220	C: 61420 0	C: 61114 1	C: 65446 1	C: 61420 0	C: 61146 0	C: 61111 1	C: 61420 0	C: 61010 1
41,3230	43237 0	71017 1	54155 1	40136 1	64217 1	10000 0	03245 1	C: 60000 1
41,3240	03245 1	34736 1	26155 1	34755 1	55022 1	36073 0	71001 0	04331 1
41,3250	54022 0	40022 0	56022 1	61002 1	54154 0	34755 1	55012 1	11042 1
41,3260	03262 1	04502 1	00004 0	11020 0	03271 0	34753 1	05203 0	C: 03275 1
41,3270	C: 62101 0	52155 1	53021 1	00003 1	00136 0	04400 1	11021 1	03303 1
41,3300	03303 1	03314 1	03314 1	33320 0	05203 0	C: 03275 1	C: 62101 0	34355 0
41,3310	05072 1	C: 03321 1	C: 62101 0	05261 1	34755 1	55020 0	55021 1	05261 1
41,3320	C: 00144 0	11021 1	03326 0	03326 0	05155 0	05155 0	11012 1	03351 0
41,3330	36073 0	71020 0	02317 0	34144 1	71020 0	63347 1	54023 1	30023 0
41,3340	55001 0	33350 1	54136 1	43237 0	71021 1	54156 1	02046 1	C: 75377 0
41,3350	C: 04124 1	04374 0	05155 0	34317 0	54777 1	31047 0	54001 1	31017 0
41,3360	04651 1	03363 1	05155 0	54022 0	56002 0	54115 0	34736 1	26777 1
41,3370	34751 0	54137 0	40022 0	40022 0	40022 0	40000 0	74757 1	50000 1

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

41,3740	৯	৯	৯	৯	৯	৯	৯	৯
41,3750	৯	৯	৯	৯	৯	৯	৯	৯
41,3760	৯	৯	৯	৯	৯	৯	৯	৯
41,3770	৯	৯	৯	৯	৯	৯	৯	৯

OCTAL LISTING FOR PARAGRAPH # 230, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

42,2000	C: 26723 0	C: 00450 0	35021 1	05146 1	32034 1	04616 1	C: 20212 1	05472 0
42,2010	05472 0	42033 1	60154 1	00006 1	12016 0	05472 0	00004 0	34755 1
42,2020	54156 1	54001 1	52025 1	52155 1	53052 0	20155 1	07256 1	52155 1
42,2030	20025 1	00003 1	05472 0	C: 00027 1	C: 06230 0	34752 0	54002 1	50000 1
42,2040	30321 1	00006 1	72053 1	50002 0	56050 1	10002 1	12036 1	37737 0
42,2050	00006 1	05014 1	15261 0	C: 03146 1	05516 0	C: 00027 1	05516 0	C: 00031 0
42,2060	05516 0	C: 00007 0	06036 1	I: 77624 1	C: 27412 0	I: 77776 1	05353 1	C: 00002 0
42,2070	00004 0	04674 0	C: 40165 1	04674 0	C: 40123 0	06011 1	44736 0	00006 1
42,2100	03012 1	04635 0	C: 12771 0	52152 0	51002 1	32154 0	54146 0	51002 1
42,2110	32320 1	54147 1	41002 0	64771 1	00006 1	62121 1	34753 1	54140 0
42,2120	02137 0	34752 0	54140 0	51002 1	33060 1	54153 1	35012 1	70146 0
42,2130	54002 1	50000 1	32644 0	54150 1	00006 1	50002 0	32646 1	52152 0
42,2140	52006 0	52124 1	00006 1	50000 1	32555 0	52124 1	52006 0	52124 1
42,2150	00006 1	50000 1	32465 1	12145 1	C: 00000 1	C: 40000 0	C: 40000 0	C: 40000 0
42,2160	C: 01045 1	C: 01045 1	C: 01144 1	C: 01003 0	C: 01363 0	C: 00375 0	C: 77776 1	C: 03631 0
42,2170	C: 01051 1	C: 03373 0	C: 01051 1	C: 77777 0	C: 01051 1	C: 00000 1	C: 02350 0	C: 00000 1
42,2200	C: 00032 0	C: 00037 0	C: 00321 1	C: 00000 1	C: 01051 1	C: 01045 1	C: 01045 1	C: 01362 1
42,2210	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 02142 1	C: 03437 1	C: 01045 1	C: 03451 1
42,2220	C: 00024 1	C: 03633 1	C: 01516 1	C: 00000 1	C: 64000 0	C: 02003 0	C: 24006 1	C: 24011 1
42,2230	C: 64014 0	C: 64017 0	C: 00022 1	C: 02025 0	C: 22030 1	C: 22033 1	C: 00000 1	C: 22041 1
42,2240	C: 00044 1	C: 00000 1	C: 24052 0	C: 24055 1	C: 02060 0	C: 20063 0	C: 24066 1	C: 24071 1
42,2250	C: 24074 1	C: 64077 0	C: 64102 0	C: 24105 0	C: 64110 0	C: 24113 1	C: 62116 0	C: 04121 1
42,2260	C: 64124 1	C: 00000 1	C: 04132 0	C: 04135 1	C: 02140 0	C: 02143 0	C: 64146 0	C: 64151 0
42,2270	C: 22154 1	C: 62157 0	C: 02162 0	C: 24165 0	C: 02170 0	C: 24173 1	C: 24176 1	C: 24201 1
42,2300	C: 24204 1	C: 24207 1	C: 24212 0	C: 02215 0	C: 24220 1	C: 24223 1	C: 24226 1	C: 00000 1
42,2310	C: 00000 1	C: 04237 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 04253 1	C: 04256 1	C: 22261 1
42,2320	C: 00000 1	C: 04040 1	C: 04140 0	C: 04102 0	C: 00504 0	C: 00504 0	C: 04000 0	C: 04000 0
42,2330	C: 04000 0	C: 04000 0	C: 00000 1	C: 24400 0	C: 02000 0	C: 24400 0	C: 04149 0	C: 00000 1
42,2340	C: 24400 0	C: 00000 1	C: 04102 0	C: 00000 1	C: 04102 0	C: 04140 0	C: 04102 0	C: 00000 1
42,2350	C: 24400 0	C: 04140 0	C: 04000 0	C: 00140 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1
42,2360	C: 24400 0	C: 24400 0	C: 24400 0	C: 24400 0	C: 24400 0	C: 24400 0	C: 24400 0	C: 00000 1
42,2370	C: 24500 1	C: 00542 1	C: 24410 1	C: 20204 0	C: 00410 1	C: 10000 0	C: 00000 1	C: 00306 1

OCTAL LISTING FOR PARAGRAPH # 231, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

42,2400	C: 01367 1	C: 00510 0	C: 00000 1	C: 00204 1	C: 00004 0	C: 00000 1	C: 10507 1	C: 10200 1
42,2410	C: 00204 1	C: 00010 0	C: 24510 0	C: 24512 1	C: 60512 1	C: 54000 0	C: 24012 1	C: 60512 1
42,2420	C: 60500 1	C: 00000 1	C: 00016 0	C: 53223 1	C: 60026 0	C: 00000 1	C: 00000 1	C: 00000 1
42,2430	C: 00102 1	C: 00102 1	C: 10200 1	C: 00010 0	C: 00410 1	C: 00500 1	C: 00654 0	C: 00102 1
42,2440	C: 00200 0	C: 24512 1	C: 24512 1	C: 24512 1	C: 24512 1	C: 24512 1	C: 24512 1	C: 00102 1
42,2450	C: 00000 1	C: 16143 0	C: 10507 1	C: 00000 1	C: 00000 1	C: 06143 1	C: 00000 1	C: 00000 1
42,2460	C: 00000 1	C: 00000 1	C: 00000 1	C: 01572 0	C: 00006 1	C: 03240 1	C: 00000 1	C: 00000 1
42,2470	C: 00000 1	C: 00000 1	C: 10707 0	C: 03435 0	C: 13070 1	C: 34345 1	C: 00005 1	C: 21616 0
42,2500	C: 26113 0	C: 31713 0	C: 00070 0	C: 20460 1	C: 01065 0	C: 05740 1	C: 11414 0	C: 31463 1
42,2510	C: 07475 0	C: 16051 1	C: 00001 0	C: 03434 1	C: 00047 1	C: 21135 0	C: 77766 0	C: 50711 0
42,2520	C: 00005 1	C: 25006 0	C: 00002 0	C: 23224 1	C: 00014 1	C: 06500 1	C: 00012 1	C: 36455 0
42,2530	C: 04256 1	C: 07071 0	C: 77766 0	C: 60557 0	C: 00005 1	C: 01114 1	C: 00007 0	C: 01247 1
42,2540	C: 04324 0	C: 27600 1	C: 00036 1	C: 20440 0	C: 00035 1	C: 30400 0	C: 23420 0	C: 00000 1
42,2550	C: 16102 0	C: 14000 1	C: 07475 0	C: 16051 1	C: 05174 0	C: 13261 0	C: 00000 1	C: 00000 1
42,2560	C: 00000 1	C: 00000 1	C: 00714 0	C: 31463 1	C: 13412 1	C: 07534 1	C: 05605 1	C: 03656 1
42,2570	C: 00001 0	C: 16170 0	C: 00441 0	C: 34306 0	C: 07176 0	C: 21603 1	C: 15340 1	C: 15340 1
42,2600	C: 01031 1	C: 21032 0	C: 34631 1	C: 23146 0	C: 00636 1	C: 14552 0	C: 74552 0	C: 70307 1
42,2610	C: 05520 0	C: 15312 0	C: 14226 1	C: 31757 0	C: 02476 0	C: 05531 0	C: 02727 1	C: 16415 0
42,2620	C: 00007 0	C: 13734 0	C: 74477 0	C: 50643 0	C: 06265 0	C: 16004 1	C: 04426 0	C: 31433 1
42,2630	C: 34772 1	C: 07016 1	C: 01030 0	C: 33675 0	C: 01046 1	C: 15700 1	C: 00321 1	C: 26706 1
42,2640	C: 11036 1	C: 06144 0	C: 01031 1	C: 21032 0	C: 03451 1	C: 03661 0	C: 03505 1	C: 01045 1
42,2650	C: 01046 1	C: 00000 1	C: 02322 0	C: 02324 0	C: 03661 0	C: 01120 0	C: 01122 1	C: 01124 1
42,2660	C: 02117 1	C: 02121 1	C: 02140 0	C: 03460 0	C: 03451 1	C: 02256 1	C: 01343 1	C: 00000 1
42,2670	C: 00000 1	C: 01331 1	C: 01332 1	C: 00000 1	C: 03002 0	C: 03001 0	C: 00000 1	C: 00314 1
42,2700	C: 00316 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 02204 0	C: 02206 1	C: 00000 1
42,2710	C: 01755 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 02204 0	C: 02206 1
42,2720	C: 02210 0	C: 03464 1	C: 02262 0	C: 03616 0	C: 02204 0	C: 02206 1	C: 00000 1	C: 02306 0
42,2730	C: 00000 1	C: 00000 1	C: 03603 1	C: 03573 0	C: 02353 0	C: 02306 0	C: 02310 1	C: 02312 0
42,2740	C: 02266 1	C: 03471 0	C: 03532 0	C: 03473 1	C: 03451 1	C: 02533 0	C: 03467 1	C: 03451 1
42,2750	C: 03505 1	C: 03467 1	C: 03471 0	C: 03532 0	C: 03664 0	C: 03471 0	C: 03532 0	C: 00013 0
42,2760	C: 00013 0	C: 00013 0	C: 02212 1	C: 00000 1	C: 00000 1	C: 02204 0	C: 02206 1	C: 02210 0
42,2770	C: 02531 1	C: 03473 1	C: 03662 0	C: 00000 1	C: 00000 1	C: 00000 1	C: 00735 0	C: 00736 0

OCTAL LISTING FOR PARAGRAPH # 232, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

42,3000	C: 00737 1	C: 00735 0	C: 00736 0	C: 00737 1	C: 00035 1	C: 00036 1	C: 00000 1	C: 01107 0
42,3010	C: 01110 0	C: 00000 1	C: 03451 1	C: 02366 0	C: 02370 1	C: 03575 0	C: 02256 1	C: 02260 1
42,3020	C: 03640 0	C: 03642 1	C: 00000 1	C: 03451 1	C: 02314 0	C: 00000 1	C: 02204 0	C: 02206 1
42,3030	C: 00000 1	C: 01045 1	C: 01046 1	C: 01052 1	C: 03731 1	C: 03732 1	C: 00000 1	C: 03431 1
42,3040	C: 03433 0	C: 03435 0	C: 03431 1	C: 03433 0	C: 03435 0	C: 03620 0	C: 03622 1	C: 03624 1
42,3050	C: 02226 0	C: 02230 1	C: 02232 0	C: 03477 0	C: 03501 0	C: 03503 1	C: 03431 1	C: 03433 0
42,3060	C: 03435 0	C: 01347 0	C: 01350 0	C: 00000 1	C: 02706 1	C: 02710 0	C: 02712 1	C: 02706 1
42,3070	C: 02710 0	C: 02712 1	C: 02204 0	C: 02206 1	C: 02210 0	C: 00000 1	C: 00000 1	C: 00000 1
42,3100	C: 00000 1	C: 00000 1	C: 00000 1	C: 02737 0	C: 02741 1	C: 02743 0	C: 00000 1	C: 00000 1
42,3110	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 00000 1	C: 01045 1
42,3120	C: 01046 1	C: 01047 0	C: 01050 0	C: 01051 1	C: 01052 1	C: 02204 0	C: 02206 1	C: 00000 1
42,3130	C: 16351 1	C: 00142 0	C: 16347 0	C: 16512 0	C: 22347 1	C: 24443 1	C: 00000 1	C: 00553 1
42,3140	C: 00143 1	C: 00347 1	C: 00000 1	C: 00512 1	C: 00012 1	C: 00000 1	C: 24344 1	C: 24503 1
42,3150	C: 00512 1	C: 00007 0	C: 16347 0	C: 16347 0	C: 10347 0	C: 24451 1	C: 16447 1	C: 10347 0
42,3160	C: 10354 1	C: 20410 0	C: 00304 0	C: 10204 0	C: 10452 0	C: 00000 1	C: 00000 1	C: 00000 1
42,3170	C: 00115 1	C: 00115 1	C: 24511 1	C: 22447 0	C: 00347 1	C: 00351 0	C: 00204 1	C: 06102 1
42,3200	C: 00503 1	C: 16347 0	C: 16347 0	C: 16347 0	C: 16347 0	C: 16347 0	C: 16347 0	C: 00102 1
42,3210	C: 02041 0	C: 10347 0	C: 24344 1	C: 00000 1	C: 00000 1	C: 16347 0	C: 00000 1	C: 00000 1
42,3220	C: 00000 1	C: 06143 1	C: 06043 0	C: 00252 1	04616 1	C: 60747 0	07256 1	03413 1
42,3230	07102 0	C: 03265 0	34321 0	54777 1	04616 1	C: 61226 0	03431 1	33267 1
42,3240	56154 1	55007 0	33270 1	56155 0	04415 0	34320 1	54777 1	04616 1
42,3250	C: 61226 0	00006 1	33274 0	52155 1	31007 1	04415 0	34317 0	54777 1
42,3260	04616 1	C: 61226 0	00136 0	C: 25660 0	C: 31742 1	C: 01727 1	C: 01217 1	C: 00011 1
42,3270	C: 32445 0	C: 02104 0	C: 10422 1	C: 05174 0	C: 13261 0	C: 00000 1	C: 00062 0	04616 1
42,3300	C: 60747 0	07256 1	10154 0	03305 1	03336 1	63373 0	10000 0	03322 1
42,3310	03336 1	03336 1	10155 1	03315 0	03336 1	63374 1	10000 0	03322 1
42,3320	03336 1	03336 1	10154 0	33376 0	03333 1	43376 1	54154 0	43377 0
42,3330	54155 1	33375 0	03414 0	54154 0	33377 1	03330 1	03400 0	33371 1
42,3340	07306 0	46244 1	26777 1	04616 1	C: 61266 1	34755 1	54124 1	44752 1
42,3350	50117 0	64317 0	54143 0	04616 1	C: 61322 0	03431 1	56155 0	00006 1
42,3360	73372 0	52155 1	50117 0	34317 0	54777 1	04616 1	C: 61266 1	04635 0
42,3370	C: 62570 1	C: 23147 1	C: 23346 1	C: 77753 0	C: 41126 1	C: 03337 0	C: 00025 0	C: 37016 1

OCTAL LISTING FOR PARAGRAPH # 233, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

42,3400	10155 1	13410 0	13410 0	13404 0	00006 1	43276 0	20155 1	13413 0
42,3410	00006 1	33276 1	13406 1	56002 0	54144 1	07102 0	C: 03263 0	00006 1
42,3420	30155 0	53010 0	04404 0	04404 0	34755 1	56156 0	56155 0	56154 1
42,3430	00144 0	56002 0	54144 1	31010 1	00006 1	74751 1	00006 1	74737 1
42,3440	22155 0	31007 1	54154 0	07102 0	C: 03271 0	00144 0	03567 0	07102 0
42,3450	C: 03530 1	03537 0	34755 1	54156 1	33532 0	54154 0	33533 1	56155 0
42,3460	07306 0	03550 1	52156 1	52124 1	31004 1	23007 1	52155 1	07102 0
42,3470	C: 03530 1	03537 0	43535 0	03555 1	56155 0	00006 1	73534 1	20124 1
42,3500	00006 1	13503 0	04145 0	31005 0	23010 1	52155 1	07102 0	C: 03530 1
42,3510	03537 0	43536 0	03555 1	52124 1	20155 1	00006 1	13520 1	04145 0
42,3520	34755 1	54156 1	07256 1	52155 1	50145 1	52001 1	04635 0	C: 62775 0
42,3530	C: 00006 1	C: 03240 1	C: 00025 0	C: 37100 1	C: 13560 0	C: 00073 0	C: 13557 1	56156 0
42,3540	60000 1	54156 1	34755 1	60155 0	54155 1	34755 1	60154 1	56154 1
42,3550	10154 0	04145 0	00002 0	04145 0	00002 0	54156 1	10155 1	64753 1
42,3560	13562 1	64753 1	60156 0	00006 1	63566 1	04145 0	00002 0	43574 0
42,3570	71000 1	63574 1	10000 0	03577 1	C: 77743 1	03577 1	00002 0	46010 1
42,3600	55041 1	04145 0	04616 1	C: 11175 1	06036 1	I: 47001 0	C: 00001 0	C: 21462 1
42,3610	C: 34041 0	C: 27100 0	I: 46135 1	C: 00050 1	C: 65632 0	I: 77775 1	C: 00001 0	C: 16211 1
42,3620	C: 00015 0	I: 77624 1	C: 33663 1	I: 74375 0	C: 02723 0	C: 24001 0	I: 53372 1	C: 02211 1
42,3630	I: 77650 1	C: 65634 0	I: 77775 1	C: 00001 0	I: 53401 1	C: 00001 0	I: 45076 1	C: 47443 1
42,3640	I: 76521 0	C: 01734 0	I: 71206 0	C: 06424 0	C: 02205 1	C: 26207 0	I: 77624 1	C: 47575 0
42,3650	C: 16211 1	C: 02213 0	I: 45206 1	C: 02211 1	I: 77605 1	C: 25765 1	C: 16213 0	I: 41215 1
42,3660	C: 02211 1	C: 25765 1	C: 26211 1	C: 02211 1	I: 63256 0	C: 02211 1	I: 72431 1	C: 06420 1
42,3670	I: 40045 1	C: 02211 1	C: 65673 0	I: 40056 0	C: 65741 0	I: 47206 0	C: 06416 1	I: 57572 0
42,3700	C: 02211 1	I: 63241 0	C: 06420 1	C: 02211 1	I: 75246 0	I: 77736 0	C: 26205 1	C: 00007 0
42,3710	I: 51041 0	C: 06416 1	C: 65717 0	I: 45345 1	C: 06422 0	C: 02205 1	C: 02205 1	I: 47375 0
42,3720	C: 00001 0	C: 00007 0	I: 77772 0	C: 16211 1	C: 02205 1	I: 74356 1	C: 06416 1	I: 71525 0
42,3730	C: 02205 1	I: 52361 1	C: 06422 0	I: 63241 0	C: 02211 1	C: 02211 1	I: 75246 0	I: 77736 0
42,3740	C: 02207 0	I: 77776 1	31044 0	74747 0	00006 1	15472 1	35017 1	05146 1
42,3750	33763 0	04616 1	C: 20231 0	05563 1	05563 1	05155 0	34751 0	05464 1
42,3760	34740 0	05146 1	03604 0	C: 01463 1	C: 26501 1	C: 07463 1	C: 03766 0	C: 03767 1
42,3770	CKSM 62274 1	a	a	a	a	a	a	a

OCTAL LISTING FOR PARAGRAPH # 234, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

43,2000	50154 1	02002 1	02130 1	02171 1	02340 1	02717 1	02302 1	02120 0
43,2010	02120 0	02377 0	03143 1	13025 1	02371 0	02120 0	02371 0	02371 0
43,2020	02371 0	02411 1	03034 0	02322 0	02325 1	02120 0	02151 0	02163 1
43,2030	02166 1	02424 1	02710 0	03227 0	03150 0	03221 0	02330 0	02037 1
43,2040	03732 1	03734 1	03736 0	03740 1	03053 1	03232 1	03011 1	03016 0
43,2050	02414 1	02627 0	03057 0	03062 0	02756 1	02766 1	02120 0	03235 0
43,2060	02120 0	02120 0	02120 0	02774 1	03003 1	03106 0	03072 1	03101 1
43,2070	02120 0	03067 0	03214 0	02371 0	02120 0	02371 0	11044 1	02120 0
43,2100	30100 0	72127 0	10000 0	02120 0	36007 0	55044 1	30002 0	54155 1
43,2110	44752 1	04154 0	02113 0	00155 0	04364 1	05472 0	34755 1	02105 1
43,2120	04364 1	04635 0	C: 20723 0	31011 0	00006 1	16741 1	02120 0	C: 24100 0
43,2130	02174 1	02133 1	02142 1	02405 1	04616 1	C: 16667 1	04616 1	C: 17671 1
43,2140	02141 1	02121 1	02652 1	04616 1	C: 52343 1	04616 1	C: 17667 0	12150 0
43,2150	02121 1	02652 1	04616 1	C: 53471 0	04616 1	C: 17667 0	02160 1	02121 1
43,2160	05567 0	C: 00523 0	02121 1	05516 0	C: 00013 0	02121 1	05504 0	C: 00013 0
43,2170	02121 1	02174 1	02205 1	02227 1	46007 1	61002 1	00006 1	16741 1
43,2200	62204 0	00006 1	16736 1	02120 0	C: 77713 1	02405 1	02076 1	32225 0
43,2210	04616 1	C: 20212 1	05472 0	12214 0	32226 0	04616 1	C: 20473 0	04616 1
43,2220	C: 16753 1	04616 1	C: 17671 1	05472 0	05472 0	C: 06226 1	C: 12200 0	02652 1
43,2230	02076 1	34745 0	70074 0	10000 0	12114 0	42321 1	00004 0	70110 0
43,2240	54110 0	32260 1	04616 1	C: 20212 1	05472 0	12241 0	04616 1	C: 46000 0
43,2250	32226 0	04616 1	C: 20473 0	34736 1	05105 0	C: 02261 0	C: 66107 1	15472 1
43,2260	C: 06111 0	04616 1	C: 52475 0	02264 0	30167 1	75004 1	10000 0	50000 1
43,2270	54000 0	40000 0	26167 0	04616 1	C: 17667 0	02277 1	05155 0	05567 0
43,2300	C: 00503 1	05155 0	10110 0	12121 0	12121 0	12306 1	42321 1	00004 0
43,2310	70110 0	54110 0	06011 1	34777 1	04616 1	C: 01735 1	05516 0	C: 00126 1
43,2320	12121 0	C: 41000 1	05504 0	C: 00254 1	12121 0	05516 0	C: 00254 1	12121 0
43,2330	05321 1	C: 00077 1	12120 1	35016 0	54003 0	34733 1	55425 1	12121 0
43,2340	02405 1	02076 1	32367 1	04616 1	C: 20212 1	05472 0	02347 0	32370 1
43,2350	04616 1	C: 20473 0	04616 1	C: 17163 0	04616 1	C: 17671 1	05472 0	32366 0
43,2360	04616 1	C: 17276 1	04616 1	C: 17671 1	05472 0	05472 0	C: 02737 0	C: 06335 1
43,2370	C: 12400 0	04433 1	34201 0	00006 1	01007 1	04635 0	C: 62001 1	02076 1

OCTAL LISTING FOR PARAGRAPH # 235, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

43,2400	34740 0	05105 0	C: 02015 1	C: 64064 1	05155 0	31304 1	00006 1	16741 1
43,2410	02120 0	02076 1	04635 0	C: 64002 1	02652 1	30077 1	74743 1	10000 0
43,2420	02120 0	05504 0	C: 00117 0	12430 0	02652 1	02076 1	05504 0	C: 00063 1
43,2430	34741 1	54003 0	32650 0	55761 1	34755 1	55760 0	55762 1	00004 0
43,2440	42651 0	70110 0	54110 0	32651 1	00006 1	02033 0	26110 0	00003 1
43,2450	40077 0	74743 1	10000 0	12605 1	34753 1	55052 0	34751 0	55051 0
43,2460	32645 1	04616 1	C: 20231 0	12613 0	12471 0	12460 0	34751 0	05464 1
43,2470	05155 0	31052 1	55755 0	36241 0	71755 0	10000 0	12607 0	55757 1
43,2500	34752 0	00006 1	02033 0	00006 1	12515 0	32647 0	55045 0	32646 1
43,2510	04616 1	C: 20223 0	12613 0	12500 1	12505 1	34736 1	00006 1	05012 1
43,2520	34752 0	55756 0	05203 0	C: 02003 0	C: 52104 0	00003 1	40077 0	74743 1
43,2530	10000 0	12121 0	36241 0	71755 0	10000 0	12552 0	32641 0	04616 1
43,2540	C: 20212 1	12613 0	12544 1	12536 1	32642 0	04616 1	C: 20212 1	12613 0
43,2550	12566 1	12536 1	32643 1	04616 1	C: 20212 1	12613 0	12560 1	12552 0
43,2560	32644 0	04616 1	C: 20212 1	12613 0	12566 1	12552 0	34755 1	55761 1
43,2570	35000 1	04616 1	C: 01735 1	32650 0	55761 1	34755 1	55760 0	36241 0
43,2600	71755 0	10000 0	44753 0	64752 0	12472 0	34766 1	55761 1	34752 0
43,2610	55757 1	36241 0	12521 1	34755 1	55761 1	34744 1	04616 1	C: 01735 1
43,2620	00004 0	44736 0	00006 1	03012 1	05516 0	C: 00063 1	05472 0	34741 1
43,2630	54003 0	34755 1	55761 1	34746 0	04616 1	C: 01735 1	05516 0	C: 00117 0
43,2640	12121 0	C: 04110 0	C: 04116 0	C: 04102 0	C: 04103 1	C: 01014 0	C: 14431 1	C: 00201 1
43,2650	C: 00145 1	C: 00444 0	40077 0	74741 0	10000 0	02120 0	30101 1	74741 0
43,2660	10000 0	02120 0	40103 1	74746 1	10000 0	12672 1	40107 0	74735 0
43,2670	10000 0	02120 0	40075 1	74747 0	10000 0	12702 1	30074 1	74745 1
43,2700	10000 0	02120 0	41011 1	62707 0	00006 1	12120 1	00002 0	C: 00026 0
43,2710	02123 0	02076 1	34740 0	05105 0	C: 03602 0	C: 64104 0	05155 0	02123 0
43,2720	34763 1	00006 1	02012 0	10000 0	12120 1	34355 0	00006 1	06031 0
43,2730	74355 1	00006 1	12734 1	12120 1	02076 1	32225 0	04616 1	C: 20212 1
43,2740	05472 0	02742 1	32755 1	04616 1	C: 20473 0	34746 0	00006 1	05012 1
43,2750	34752 0	05203 0	C: 02035 0	C: 64100 1	15472 1	C: 12600 1	02076 1	35021 1
43,2760	05146 1	00006 1	32765 1	05165 0	C: 03242 0	C: 44104 1	02076 1	34752 0
43,2770	05203 0	C: 03113 1	C: 76067 1	05155 0	02123 0	02076 1	34737 0	05105 0

OCTAL LISTING FOR PARAGRAPH # 236, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

43,3000	C: 02000 0	C: 54104 0	05155 0	02076 1	35021 1	05105 0	C: 02613 1	C: 10104 0
43,3010	15155 1	00004 0	40111 1	74735 0	26111 1	12121 0	00004 0	44735 0
43,3020	70111 1	54111 1	04674 0	C: 40153 1	02121 1	02123 0	02076 1	34737 0
43,3030	05105 0	C: 02065 0	C: 46106 1	05155 0	33052 0	70074 0	00006 1	12121 0
43,3040	05516 0	C: 00010 0	05516 0	C: 00006 1	34747 1	70075 1	00006 1	12121 0
43,3050	04635 0	C: 64054 1	C: 00500 1	33056 1	54335 0	02121 1	C: 03631 0	05516 0
43,3060	C: 00026 0	03064 0	05504 0	C: 00026 0	05516 0	C: 00030 1	12121 0	05504 0
43,3070	C: 00030 1	02121 1	02123 0	02076 1	37707 0	05105 0	C: 02002 1	C: 76065 0
43,3100	05155 0	00004 0	44753 0	70101 0	54101 0	02121 1	02123 0	02076 1
43,3110	35021 1	05146 1	34753 1	55376 0	34755 1	55362 0	33253 0	55361 0
43,3120	03530 1	23372 0	23373 1	33252 1	54156 1	33136 0	04616 1	C: 20212 1
43,3130	03133 0	03641 1	03123 1	33253 0	55371 1	05472 0	C: 01201 0	31376 1
43,3140	00006 1	13344 0	03530 1	02076 1	35021 1	05146 1	04635 0	C: 40004 1
43,3150	34737 0	05105 0	C: 03155 0	C: 66103 0	05155 0	06036 1	I: 77624 1	C: 27412 0
43,3160	I: 43014 0	C: 04063 0	C: 04304 1	C: 67166 1	I: 77614 1	C: 04263 1	I: 77776 1	33212 0
43,3170	05544 1	C: 01626 1	C: 01554 1	00003 1	06036 1	I: 77624 1	C: 26760 1	I: 45154 0
43,3200	C: 02030 0	C: 26114 1	I: 77776 1	33213 1	50120 1	54052 1	04635 0	C: 27427 0
43,3210	I: 77634 0	C: 20723 0	C: 00051 0	C: 67210 0	05504 0	C: 00221 0	34755 1	04635 0
43,3220	C: 10037 1	02076 1	35017 1	05105 0	C: 02011 0	C: 62064 1	05155 0	05504 0
43,3230	C: 00115 1	02121 1	05516 0	C: 00115 1	02121 1	02076 1	04635 0	C: 60000 1
43,3240	C: 00061 0	C: 01373 1	C: 01461 0	C: 01773 0	C: 00060 1	C: 60017 1	C: 17777 0	C: 25252 0
43,3250	C: 52400 1	C: 76777 1	C: 01371 0	C: 03344 1	31360 0	00006 1	13265 1	00006 1
43,3260	31376 1	51377 0	52001 1	34755 1	55360 1	00004 0	30002 0	55357 0
43,3270	55363 1	25365 0	05571 1	C: 01102 0	11362 0	34755 1	55362 0	03344 1
43,3300	01357 1	10000 0	13254 0	13254 0	10000 0	13254 0	00002 0	00006 1
43,3310	23371 0	03340 0	11362 0	03320 0	03311 1	03320 0	25366 0	01371 0
43,3320	65660 1	00006 1	63324 1	03275 1	25366 0	64757 0	50000 1	03330 1
43,3330	01371 0	01371 0	01371 0	03345 0	03526 0	01371 0	01371 0	01371 0
43,3340	00006 1	23361 1	04635 0	C: 03211 0	03307 0	34753 1	55372 1	34755 1
43,3350	54003 0	33242 0	55377 1	35012 1	55373 0	35007 0	35007 0	55377 1
43,3360	35012 1	55373 0	03375 0	35007 0	55377 1	33243 1	55373 0	03375 0
43,3370	55372 1	33240 1	55377 1	33241 0	55373 0	00004 0	30003 1	55374 1

OCTAL LISTING FOR PARAGRAPH # 237, WITH PARITY BIT IN BINARY AT THE RIGHT OF EACH WORD, "a" DENOTES UNUSED FIXED MEMORY

ALL VALID WORDS ARE BASIC INSTRUCTIONS EXCEPT THOSE MARKED "I" (INTERPRETIVE OPERATOR WORDS) OR "C" (CONSTANTS)

43,3400	00006 1	51377 0	30001 0	53376 0	31377 0	55360 1	54001 1	24001 0
43,3410	50000 1	52001 1	51377 0	40001 1	51377 0	60000 1	03301 0	31360 0
43,3420	00006 1	13445 0	00006 1	51377 0	40001 1	51377 0	52001 1	51377 0
43,3430	40000 0	51377 0	60001 0	03301 0	31360 0	00006 1	13445 0	00006 1
43,3440	31376 1	51377 0	52001 1	34755 1	55360 1	00003 1	03340 0	31374 0
43,3450	54003 0	25372 0	41377 1	61373 1	00006 1	13457 0	03375 0	11372 0
43,3460	03370 0	25372 0	30003 1	64743 0	54003 0	63251 1	00006 1	13363 0
43,3470	10003 0	03356 1	35007 0	54003 0	34771 1	55372 1	64750 1	50000 1
43,3500	40000 0	11372 1	03475 1	33247 0	54020 1	54022 0	54021 0	54023 1
43,3510	60020 0	60022 1	60021 1	60023 0	63250 0	03301 0	60020 0	60022 1
43,3520	60021 1	60023 0	64753 1	03301 0	25367 1	03307 0	34754 0	55376 0
43,3530	34755 1	55374 1	34753 1	55377 1	34755 1	55371 1	55373 0	34753 1
43,3540	55375 0	31374 0	54001 1	74350 1	61373 1	04651 1	03571 1	64741 1
43,3550	03602 0	40000 0	55377 1	00006 1	13557 1	34740 0	03560 1	35020 0
43,3560	55373 0	34755 1	55371 1	34753 1	55375 0	51373 1	30000 1	03571 1
43,3570	03602 0	55372 1	61371 0	55371 1	34755 1	61371 0	55371 1	41372 1
43,3600	61373 1	00002 0	22000 1	31373 1	75012 0	64350 0	00006 1	13676 1
43,3610	11375 0	03614 1	03614 1	03676 0	10001 1	03624 1	03624 1	03624 1
43,3620	11375 0	03625 0	37746 0	03625 0	34753 1	55375 0	11376 0	10067 1
43,3630	05122 0	03633 1	03340 0	25373 1	11377 1	03541 1	03541 1	03565 1
43,3640	03565 1	41374 1	63731 1	00006 1	13137 0	31374 0	64741 1	55374 1
43,3650	03654 0	34735 1	27374 1	03670 0	74350 1	00006 1	13666 0	63246 0
43,3660	00006 1	13663 0	03670 0	33244 0	27374 1	03670 0	63245 1	27374 1
43,3670	11377 1	03533 1	34753 1	03551 0	34745 0	03533 1	31374 0	74350 1
43,3700	04331 1	54001 1	31374 0	74357 0	00006 1	13713 0	54021 0	30001 0
43,3710	74757 1	60021 1	54001 1	31376 1	00006 1	13717 1	03121 0	11371 1
43,3720	03722 0	03723 1	64753 1	55371 1	40001 1	61371 0	67746 0	03301 0
43,3730	03641 1	C: 66100 0	34755 1	13741 1	34753 1	13741 1	34752 0	13741 1
43,3740	36244 0	55166 0	02076 1	31011 0	00006 1	13750 1	04635 0	C: 11703 0
43,3750	31011 0	55171 0	31166 1	55172 0	34753 1	55173 1	04635 0	C: 11322 1
43,3760	C: 03760 0	C: 03761 1	CKSM 43002 1	0	0	0	0	0
43,3770	0	0	0	0	0	0	0	0

OCCUPIED LOCATIONS PAGE				OCCUPIED LOCATIONS PAGE				OCCUPIED LOCATIONS PAGE				OCCUPIED LOCATIONS PAGE			
4000	TC	4045	168	5360	TO	5425	1293	6522	TO	6555	1015	00,2236	TO	00,2276	1049
4046	TC	4065	169	5426	TO	5435	1294	6556	TO	6623	1016	00,2277	TO	00,2331	1050
4066	TC	4101	170	5436	TO	5444	1298			6624	1017	00,2332	TO	00,2352	1051
4102	TC	4123	394	5445	TO	5455	1300	6625	TO	6665	1018	00,2353	TO	00,2421	1052
4124	TO	4144	452			5456	1301	6666	TO	6721	1019	00,2422	TO	00,2436	1053
4145	TO	4153	459	5457	TO	5463	1303	6722	TO	6745	1020	00,2437	TO	00,2477	1054
4154	TO	4203	465	5464	TO	5503	1348	6746	TO	7001	1021	00,2500	TO	00,2537	1055
4204	TC	4206	467	5504	TO	5532	1369	7002	TO	7003	1022	00,2540	TO	00,2567	1056
4207	TC	4242	468	5533	TO	5543	1370	7004	TO	7060	1023	00,2570	TO	00,2607	1057
4243	TC	4302	469	5544	TO	5562	1373	7061	TO	7067	1024	00,2610	TO	00,2624	1058
4303	TC	4335	473	5563	TO	5566	1374	7070	TO	7101	1025	00,2625	TO	00,2641	1059
4336	TC	4377	474	5567	TO	5620	1375	7102	TO	7134	1026	00,2642	TO	00,2653	1060
4400	TO	4436	475	5621	TO	5635	1376	7135	TO	7152	1027	00,2654	TO	00,2720	1061
4437	TO	4461	477	5636	TO	5713	1377	7153	TO	7213	1028	00,2721	TO	00,2747	1062
4462	TC	4511	478	5714	TO	5743	1378	7214	TO	7235	1029	00,2750	TO	00,3006	1063
4512	TC	4522	532	5744	TO	5746	1399	7236	TO	7253	1030	00,3007	TO	00,3022	1064
4523	TO	4536	533	5747	TO	5765	1400	7254	TO	7314	1031	00,3023	TO	00,3072	1065
4537	TC	4563	534	5766	TO	5767	27	7315	TO	7327	1032			00,3073	1066
4564	TC	4577	535			6000	55	7330	TO	7340	1033	00,3074	TO	00,3132	1067
4600	TC	4615	536	6001	TO	6010	239	7341	TO	7377	1034	00,3133	TO	00,3150	1068
4616	TO	4644	993	6011	TO	6021	526	7400	TO	7423	1035	00,3151	TO	00,3173	1069
4645	TC	4673	994	6022	TO	6026	604	7424	TO	7456	1036	00,3174	TO	00,3206	1070
4674	TC	4726	995	6027	TO	6035	757	7457	TO	7524	1037	00,3207	TO	00,3231	1071
4727	TO	4731	996	6036	TO	6055	997	7525	TO	7570	1038	00,3232	TO	00,3277	1072
4732	TO	4762	1090	6056	TO	6101	998	7571	TO	7622	1039	00,3300	TO	00,3342	1073
4763	TC	5010	1091	6102	TO	6113	999	7623	TO	7653	1040	00,3343	TO	00,3404	1074
5011	TO	5031	1092	6114	TO	6142	1000	7654	TO	7706	1041	00,3405	TO	00,3455	1075
5032	TC	5071	1097	6143	TO	6211	1001	7707	TO	7721	1092	00,3456	TO	00,3516	1076
5072	TO	5127	1098	6212	TO	6213	1002	7722	TO	7746	1093	00,3517	TO	00,3552	1077
5130	TC	5132	1099	6214	TO	6245	1003	7747	TO	7752	1296	00,3553	TO	00,3607	1078
5133	TC	5164	1100	6246	TO	6261	1004	7753	TO	7754	1453	00,3610	TO	00,3651	1079
5165	TC	5172	1111	6262	TO	6272	1005	7755	TO	7756	27	00,3652	TO	00,3713	1080
5173	TC	5234	1114	6273	TO	6332	1006	00,2000	TO	00,2016	1008	00,3714	TO	00,3734	1081
		5235	1115	6333	TO	6352	1007	00,2017	TO	00,2041	1042	00,3735	TO	00,3767	1371
5236	TO	5260	1116	6353	TO	6370	1009	00,2042	TO	00,2100	1043	00,3770	TO	00,3773	1372
5261	TC	5276	1124	6371	TO	6412	1010	00,2101	TO	00,2120	1044	00,3774	TO	00,3775	27
5277	TC	5300	1125	6413	TO	6432	1011	00,2121	TO	00,2143	1045	01,2000	TO	01,2001	58
5301	TC	5310	1126	6433	TO	6456	1012	00,2144	TO	00,2171	1046	01,2002	TO	01,2031	254
5311	TC	5326	1288	6457	TO	6466	1013	00,2172	TO	00,2213	1047	01,2032	TO	01,2067	255
5327	TO	5357	1292	6467	TO	6521	1014	00,2214	TO	00,2235	1048	01,2070	TO	01,2133	256

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01,2203 308		04,2020 TO 04,2023 61		05,2021 TO 05,2064 68		06,2210 TO 06,2226 177	
01,2204 TC 01,2262 309		04,2024 TO 04,2027 239		05,2065 208		06,2227 178	
01,2263 TC 01,2337 310		04,2030 TO 04,2036 240		05,2066 TO 05,2136 209		06,2230 TO 06,2274 179	
01,2340 311		04,2037 TO 04,2071 242		05,2137 TO 05,2171 210		06,2275 TO 06,2342 180	
01,2341 TC 01,2366 1082		04,2072 TO 04,2141 243		05,2172 TO 05,2231 211		06,2343 TO 06,2373 181	
01,2367 TC 01,2423 1083		04,2142 TO 04,2204 244		05,2232 TO 05,2275 213		06,2374 TO 06,2415 182	
01,2424 TC 01,2443 1084		04,2205 TO 04,2252 245		05,2276 TO 05,2302 214		06,2416 TO 06,2433 183	
01,2444 TC 01,2463 1085		04,2253 TO 04,2320 246		05,2303 TO 05,2343 215		06,2434 TO 06,2457 184	
01,2464 TC 01,2512 1086		04,2321 TO 04,2364 247		05,2344 TO 05,2356 216		06,2460 TO 06,2513 185	
01,2513 TC 01,2527 1087		04,2365 TO 04,2423 248		05,2357 TO 05,2406 217		06,2514 TO 06,2532 186	
01,2530 TC 01,2551 1088		04,2424 TO 04,2461 249		05,2407 TO 05,2445 219		06,2533 TO 06,2555 187	
01,2552 TC 01,2575 1089		04,2462 TO 04,2532 250		05,2446 220		06,2556 TO 06,2564 188	
01,2576 TC 01,2632 1101		04,2533 TO 04,2551 383		05,2447 TO 05,2510 226		06,2565 TO 06,2613 189	
01,2633 TC 01,2700 1102		04,2552 TO 04,2565 384		05,2511 TO 05,2565 227		06,2614 TO 06,2621 190	
01,2701 TC 01,2754 1103		04,2566 TO 04,2572 385		05,2566 TO 05,2643 228		06,2622 TO 06,2647 191	
01,2755 TO 01,2766 1104		04,2573 TO 04,2603 470		05,2644 TO 05,2666 229		06,2650 TO 06,2670 192	
01,2767 TC 01,3017 1105		04,2604 TO 04,2612 477		05,2667 TO 05,2731 230		06,2671 TO 06,2702 193	
01,3020 TO 01,3066 1106		04,2613 TO 04,2670 710		05,2732 TO 05,3006 231		06,2703 TO 06,2717 194	
01,3067 TC 01,3077 1107		04,2671 TO 04,2747 711		05,3007 TO 05,3051 232		06,2720 TO 06,2754 195	
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01,3255 TC 01,3304 1118		04,3174 TO 04,3211 1326		05,3345 TO 05,3367 238		06,3071 TO 06,3110 201	
01,3305 TC 01,3350 1119		04,3212 TO 04,3214 1327		05,3370 TO 05,3427 264		06,3111 TO 06,3131 202	
01,3351 TC 01,3365 1120		04,3215 TO 04,3237 1332		05,3430 TO 05,3452 986		06,3132 TO 06,3143 203	
01,3366 TC 01,3370 1121		04,3240 TO 04,3312 1333		05,3453 TO 05,3531 987		06,3144 TO 06,3155 204	
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01,3657 TC 01,3703 1300		04,3636 TO 04,3677 1388		06,2024 TO 06,2074 172		06,3425 TO 06,3453 344	
01,3704 TC 01,3742 1301		04,3700 TO 04,3711 1389		06,2075 TO 06,2115 173		06,3454 TO 06,3506 345	
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06,3713 TC 06,3714 350		07,3746 TO 07,3747 28		11,2117 TO 11,2162 697		12,3131 TO 12,3204 1187	
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07,2060 TC 07,2125 261		10,2102 TO 10,2120 1294		11,2311 TO 11,2364 1223		12,3364 TO 12,3440 1191	
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20,3652 TC 20,3661 1499		22,2312 TO 22,2357 369		23,2535 TO 23,2616 1146		24,2661 TO 24,2720 519	
20,3662 TC 20,3663 30		22,2360 TO 22,2421 370		23,2617 TO 23,2644 1147		24,2721 TO 24,2741 520	
21,2000 TC 21,2005 57		22,2422 TO 22,2503 371		23,2645 TO 23,2673 1148		24,2742 TO 24,3020 521	
21,2006 TC 21,2012 819		22,2504 TO 22,2546 372		23,2674 TO 23,2755 1149		24,3021 TO 24,3026 522	
21,2013 TC 21,2064 820		22,2547 TO 22,2625 373		23,2756 TO 23,3037 1150		24,3027 TO 24,3060 523	
21,2065 TC 21,2101 821		22,2626 TO 22,2653 374		23,3040 TO 23,3121 1151		24,3061 TO 24,3077 524	
21,2102 TC 21,2142 829		22,2654 TO 22,2723 375		23,3122 TO 23,3150 1152		24,3100 TO 24,3117 525	
21,2143 TO 21,2212 830		22,2724 TO 22,2743 376		23,3151 TO 23,3205 1244		24,3120 TO 24,3147 526	
21,2213 TC 21,2260 831		22,2744 TO 22,3002 377		23,3206 TO 23,3221 1245		24,3150 527	
21,2261 TC 21,2273 832		22,3003 TO 22,3053 378		23,3222 TO 23,3254 1246		24,3151 TO 24,3227 576	
21,2274 TC 21,2313 837		22,3054 TO 22,3124 379		23,3255 TO 23,3321 1248		24,3230 TO 24,3244 583	
21,2314 TC 21,2337 873		22,3125 TO 22,3202 380		23,3322 TO 23,3344 1249		24,3245 TO 24,3252 584	
21,2340 TC 21,2411 897		22,3203 TO 22,3212 381		23,3345 TO 23,3404 1250		24,3253 TO 24,3274 610	
21,2412 TC 21,2471 898		22,3213 TO 22,3241 382		23,3405 TO 23,3436 1251		24,3275 TO 24,3324 616	
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21,2554 TC 21,2634 900		22,3301 TO 22,3355 722		23,3443 TO 23,3456 1254		24,3400 TO 24,3401 618	
21,2635 TC 21,2713 901		22,3356 TO 22,3427 723		23,3457 TO 23,3520 1255		24,3402 TO 24,3447 665	
21,2714 TC 21,2773 902		22,3430 TO 22,3464 724		23,3521 TO 23,3551 1256		24,3450 TO 24,3503 666	
21,2774 TC 21,3053 903		22,3465 TO 22,3537 725		23,3552 TO 23,3574 1257		24,3504 TO 24,3526 1135	
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21,3447 TC 21,3454 1472		23,2041 TO 23,2064 338		24,2022 TO 24,2026 504		25,2003 TO 25,2041 502	
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31,2624 TO 31,2656 806		32,2772 TO 32,3026 789		33,2762 TO 33,3037 881		34,3517 TO 34,3535 736	
31,2657 TC 31,2722 807		32,3027 TO 32,3074 790		33,3040 TO 33,3063 882		34,3536 TO 34,3602 737	
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35,3643 TO 35,3661	692	37,2172 TO 37,2251	389	40,2656 TO 40,2722	432	41,3141 TO 41,3210	443
35,3662 TO 35,3706	693	37,2252 TO 37,2274	390	40,2723 TO 40,2766	433	41,3211 TO 41,3227	444
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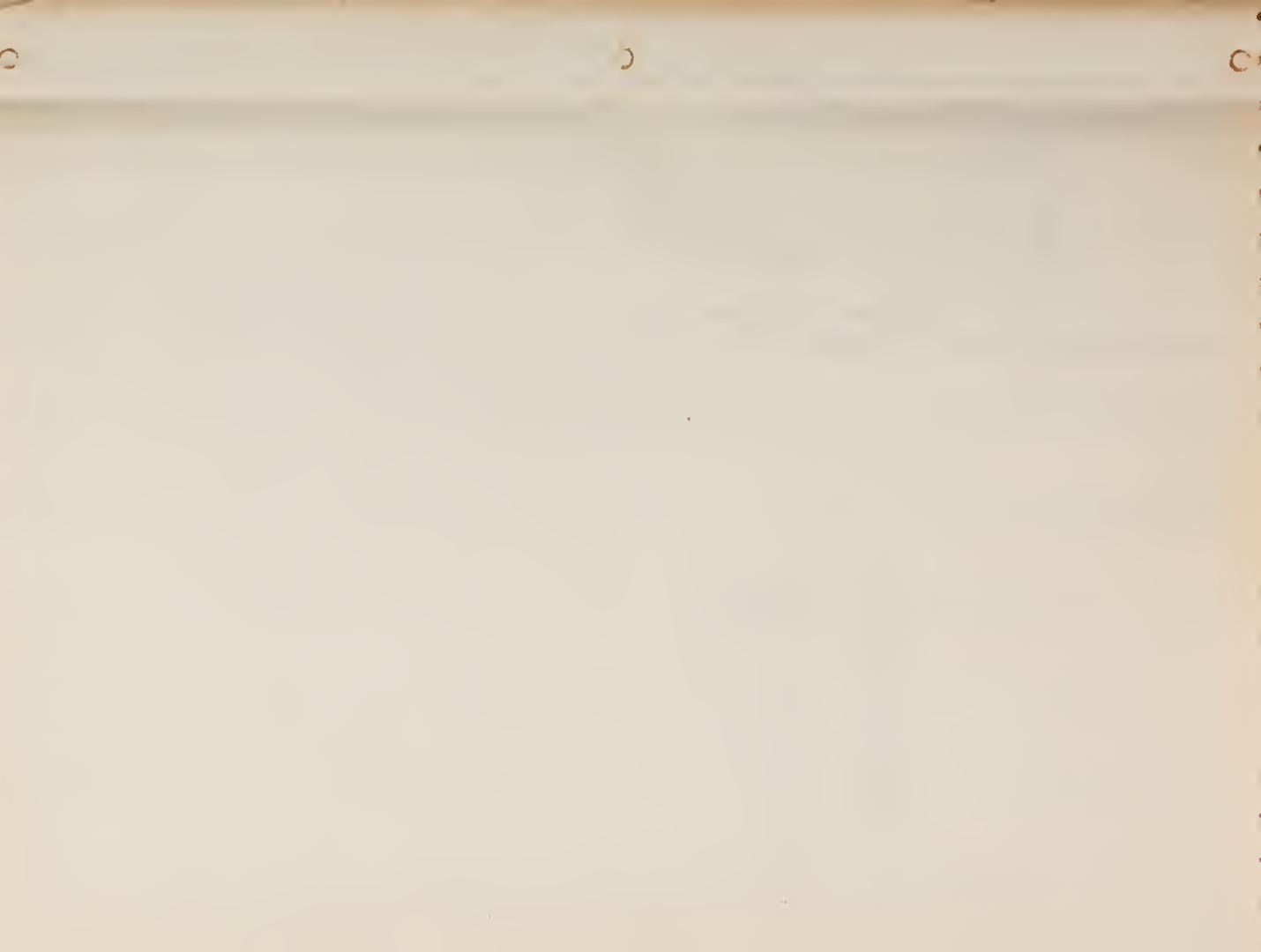
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43,2000 TC 42,3767	35	43,3544 TO 43,3622	1285				
43,2045 TC 43,2045	277	43,3623 TO 43,3701	1286				
43,2046 TC 43,2115	278	43,3702 TO 43,3731	1287				
43,2116 TC 43,2127	279	43,3732 TO 43,3751	1381				
43,2130 TC 43,2162	280	43,3752 TO 43,3757	1382				
43,2163 TC 43,2170	281	43,3760 TO 43,3761	35				
43,2171 TC 43,2176	282						
43,2177 TC 43,2226	283						
43,2227 TC 43,2274	284						
43,2275 TC 43,2321	285						
43,2322 TC 43,2337	286						
43,2337 TC 43,2337	287						
43,2340 TC 43,2370	288						
43,2371 TC 43,2410	289						
43,2411 TC 43,2413	290						
43,2414 TC 43,2456	291						
43,2457 TC 43,2527	292						
43,2530 TC 43,2603	293						
43,2604 TC 43,2651	294						
43,2652 TC 43,2716	295						
43,2717 TC 43,2754	296						
43,2755 TC 43,2755	297						
43,2756 TC 43,2773	298						
43,2774 TC 43,3015	299						
43,3016 TC 43,3024	300						
43,3025 TC 43,3033	301						
43,3034 TC 43,3052	302						
43,3053 TC 43,3062	303						
43,3063 TC 43,3071	304						
43,3072 TC 43,3131	305						

THE SUBROUTINES IN THIS PROGRAM ARE AS FOLLOWS:

LUMERASE .102
LEMONAID .070
LEMP20S .114
LEMP30S .102
KISSING .040
FLY .109
LEMP50S .103
SKIPPER .070
LMDAP .012

THE ASSEMBLY WAS GOOD AND MANUFACTURABLE. NO LINES WERE CUSSSED.

BINARY RECORDS FOR "LUMINARY.069" SUCCESSFULLY STORED.



WILSON JONES



NYLON POST BINDER

14-1411 N

TYPE 1/.020 GENUINE PRESSBOARD

2 PURPOSE BINDER

This binder may be used to bind both marginal-punched sheets and forms punched with $2\frac{3}{4}$ ", $4\frac{1}{4}$ ", 6", 7", $8\frac{1}{2}$ ", $13\frac{3}{4}$ " and $14\frac{1}{2}$ " center-to-center holes.

1. MARGINAL-PUNCHED SHEETS

BURST

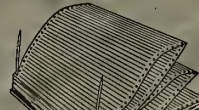


(a)
Insert posts in end holes of stub. Turn counter-clockwise until heads are flush against inside of channel.



(b)
Gather sheets in even stack. Insert posts in second holes from both ends of the sheets.

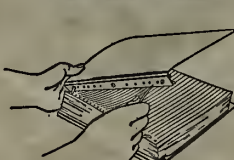
UNBURST



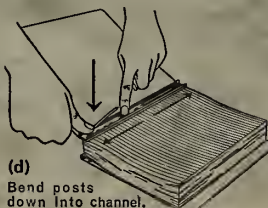
(e)
Insert posts thru end holes of stub as in illustration (a). Plug posts into top holes in both margins of sheets. Put on top cover as in illustrations (c) and (d).
(Also see No. 2 below)

TOP AND BOTTOM LOADING

This binder may be loaded from the top or bottom by using posts without screw heads. Ask the dealer from whom you bought the binder for Posts and Slides Pack No. 1323.



(c)
Put top cover on with stub turned under. Insert posts thru end holes.



(d)
Bend posts down into channel. Push locks over posts toward outside ends of channel until snug.

2. CONVENTIONALLY PUNCHED LOOSE LEAF SHEETS AND STRIPPED UNBURST SHEETS

Follow steps (a) thru (d) at left, except that posts should be threaded into holes in stub that correspond to holes in forms or sheets to be bound.

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(J2875 A)

Made in U. S. A.

